



Legislative Council Environment and Planning Committee

Climate resilience

Inquiry

August 2025

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About the Committee

Functions

The Environment and Planning Standing Committee will inquire into and report on any proposal, matter or thing concerned with the arts, coordination of government, environment, and planning the use, development and protection of land.

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Acknowledgement of Country

Parliament of Victoria acknowledges the Traditional Owners of the land on which Parliament House stands, the Wurundjeri Woi-wurrung People. We also acknowledge Traditional Owners across Victoria, and Elders past, present and emerging.

Contents

Preliminaries

Committee membership	ii
About the Committee	iii
Acknowledgement of Country	iv
Terms of reference	xi
Chair's foreword	xiii
Findings and recommendations	xv
What happens next?	xxxviii

1	Introduction: climate resilience and adaptation	1
1.1	Inquiry scope and background	1
1.1.1	Submissions and public hearings	2
1.1.2	Submission surveys: what did stakeholders identify as the most important issues?	3
1.2	Key terms and metrics	5
1.3	Climate resilience: adaptation measures and mitigation strategies to support the built environment and infrastructure in Victoria	6
1.4	Victoria's climate profile	6
1.5	Continuing examination of climate challenges	7
1.5.1	What did the Inquiry into the 2022 flood event in Victoria show?	7
1.6	Understanding what is most at risk for the built environment and infrastructure	9
1.7	Cost versus benefit of climate resilience initiatives	10
2	Climate change risks to Victoria's built environment and infrastructure	11
2.1	Introduction	11
2.2	Key climate change risks for Victoria and the effect on the lives of Victorians	11
2.2.1	Warming trends will shape the future and variability of climate change risk in Victoria	13
2.2.2	Risk profile of Victoria: state-level impacts	18
2.2.3	Metropolitan risk profile	34
2.2.4	Regional risk profile	36
2.3	Cumulative impact	39
2.3.1	Interaction between frequency and intensity	39

2.3.2	Impact of repeated extreme weather events on resilience	40
2.3.3	Compound events and cascading impacts	42
2.4	Future projections	44
3	Government responses to climate risk: governing climate resilience	47
3.1	Introduction	47
3.2	Victoria's climate risk governance framework	47
3.2.1	<i>Climate Change Act 2017</i>	47
3.2.2	Victoria's Climate Change Strategy	48
3.2.3	Adaptation Action Plans and Regional Adaptation Strategies	52
3.2.4	Built Environment Adaptation Action Plan	53
3.3	<i>Planning and Environment Act 1987 (Vic)</i>	53
3.3.1	<i>Climate Change and Energy Legislation Amendment (Renewable Energy and Storage Targets) Act 2024 (Vic): amending the Planning and Environment Act</i>	54
3.3.2	Role of the Planning and Environment Act in shaping the built environment's climate resilience	55
3.3.3	<i>Inquiry into Victoria Planning Provisions amendments VC257, VC267 and VC274</i>	57
3.4	State Actors involved in the Built Environment Adaptation Action Plan	58
3.5	Other legislation and policies	59
3.6	Role of local government	61
3.7	Federal legislation and policies	63
4	Key government responses to climate risk: how to adapt	65
4.1	Victoria's climate change governance framework	65
4.2	Victoria's <i>Climate Change Strategy</i>	66
4.2.1	Building Victoria's climate resilience: Adaptation Action Plans	69
4.2.2	Regional Climate Change Adaptation Strategies	76
4.2.3	Funding and supporting the <i>Climate Change Strategy</i> and Adaptation Action Plans	81
4.3	Victoria's <i>Asset Management Accountability Framework</i>	88
4.4	Community-led initiatives	91
4.4.1	Local adaptation strategies	95
4.4.2	Establishing a Climate Adaptation Fund	97
4.4.3	Land management	101
4.5	National response to climate risks and adaptation	106
4.5.1	National Adaptation Plan	107

4.5.2	National Climate Risk Assessment	112
4.5.3	Climate Change Authority	113
4.5.4	Stakeholders' views on the Federal response to climate change risks and adaptation	114
4.6	Committee reflection: Challenges in government responses to climate risks	119
5	Victoria's planning and building systems	123
5.1	The Victorian systems	123
5.1.1	Planning system	123
5.1.2	Building system	125
5.2	Planning scheme amendments	127
5.2.1	Improving consideration of climate risk in planning schemes	128
5.2.2	Impact of delays	131
5.2.3	Improving consistency through statewide guidance	134
5.2.4	Minister-led planning scheme amendments or directions	138
5.3	Victoria Planning Provisions	140
5.4	Land overlays	142
5.4.1	Impact of heritage overlays on climate resilience in the built environment	145
5.4.2	Updating flood overlays across Victoria	148
5.5	Recent efforts to improve Victoria's planning system	156
5.5.1	Embedding climate change considerations into the <i>Planning and Environment Act 1987</i> (Vic)	156
5.5.2	Environmentally Sustainable Development Roadmap	163
5.6	Balancing fast-tracked approvals and community rights in renewable energy projects	172
5.7	Climate considerations in Victoria's building system	173
5.8	How does Victoria's planning system consider: Adaptation, preparation and mitigation	177
5.8.1	Adaptation	177
5.8.2	Preparation	180
5.8.3	Mitigation	183
5.9	Committee comment: Importance of state-led reform	187
5.10	Inquiry into Victoria Planning Provisions amendments VC257, VC267 and VC274	189
6	Challenges to ensuring a resilient built environment	193
6.1	Barriers for local government	193
6.1.1	Funding constraints	194
6.1.2	Planning system limitations	203

6.1.3	Availability of consistent and accurate climate risk data	205
6.1.4	Community support	206
6.1.5	Accountability for action on coastal erosion	209
6.2	Barriers to upgrading infrastructure	209
6.2.1	Focus on a ‘like-for-like’ approach to restoration of public assets	210
6.2.2	Housing	212
6.2.3	Vulnerability of essential infrastructure	215
6.2.4	Climate mitigation infrastructure	228
6.2.5	Absence of critical infrastructure from Climate Adaptation Action Plans	233
6.2.6	Challenges in ensuring developers adopt climate-resilient practices	234
6.3	Shifting from a ‘like-for-like’ approach to a betterment approach	238
6.3.1	Queensland’s betterment approach	244
6.4	Insurance	247
6.5	Committee comment: Enabling communities to lead resilience	253
7	Enhancing the climate resilience of Victoria’s built environment	255
7.1	Introduction	255
7.2	Construction practices and standards to ensure climate resilience	256
7.2.1	Adequacy of building codes and regulations	257
7.2.2	Updating building practices and standards	270
7.2.3	Financial incentives and mechanisms to support the building and construction industry	281
7.3	Climate resilient construction practices and processes	284
7.4	Climate resilient construction materials and technologies	288
8	Enhancing climate preparedness: opportunities for government	293
8.1	Introduction	293
8.2	Is existing legislation sufficient?	294
8.2.1	Adherence to climate objectives	299
8.2.2	Enforceability and accountability	300
8.2.3	Changes to the <i>Planning and Environment Act 1987</i>	304
8.3	Strengthening mitigation, adaptation and resilience through Targeted Funding Mechanisms	308
8.4	Enhancing community resilience	310
8.4.1	Social capital investment	311
8.4.2	Climate equity and inclusion	318

8.4.3	Raising public awareness	321
8.5	Partnership and collaboration	325
8.5.1	Between local government, the state, and federal government	325
8.5.2	Private-sector involvement and collaboration with community organisations	329
8.6	Addressing emerging risks	334
8.6.1	Telecommunications	334
8.6.2	Transport infrastructure and roads	336
8.6.3	Essential services: energy and water	337
8.7	Statewide climate risk assessment methodology	340
8.7.1	Data inconsistencies across agencies and governments	340
8.7.2	Impact of disparate data	343
8.7.3	Adopting a statewide baseline methodology for assessing climate risk	346
9	Enhancing climate preparedness – what can individuals and communities do?	353
9.1	Introduction	353
9.2	The role of individuals in climate preparedness	353
9.3	Personal risk assessments	354
9.4	Designing and retrofitting for climate resilient homes	355
9.4.1	Renters	356
9.4.2	New construction	357
9.5	Home electrification	360
9.6	Community electrification	361
9.7	Designing and retrofitting for bushfire resilient homes	363
9.8	Tools and resources for individuals and communities	365
9.9	Government resources	366
9.9.1	Barriers to Effective Climate Preparedness	367
9.9.2	Social and economic inequities	368
9.9.3	Skills shortages	370
10	Further areas of inquiry into climate resilience and adaptation	373
10.1	Impacts on biodiversity	374
10.2	Human health implications	377
10.2.1	Heatwaves	378
10.2.2	Air pollution	379
10.2.3	Cancer risk	379
10.2.4	Mental health	380

10.3	Primary production and food security	381
10.4	Implications for industry and economy	382
10.4.1	Tourism economies	383
10.4.2	Broader Economic Risks	384
10.5	Emergency services and infrastructure	384
 Appendix		
A	About the Inquiry	387
 Extract of proceedings		 397
 Minority reports		 409

Terms of reference

Inquiry into climate resilience

On 4 October 2023, the Legislative Council agreed to the following motion:

That this House requires the Environment and Planning Committee to inquire into, consider and report, by 30 June 2025, on—

- (a) the main risks facing Victoria's built environment and infrastructure from climate change and the impact these will have on the people of Victoria;
- (b) how the Victorian Government is preparing for and mitigating the impacts of climate change on our built environment and infrastructure;
- (c) the barriers facing Victoria in upgrading infrastructure to become more resilient to the impacts of climate change, including barriers in rebuilding or retrofitting infrastructure, including but not limited to, issues relating to insurance and barriers faced by local government;
- (d) the adequacy of the current Victorian planning system as it relates to its adaptation to, preparation for, and mitigation of climate change impacts;
- (e) what more could be done to better prepare Victoria's built environment and infrastructure, and therefore the community, for future climate disaster events; and
- (f) whether further inquiries or investigation may be needed into other aspects of climate change adaptation and climate disaster preparedness in Victoria, noting that climate change will have far-reaching impacts on all aspects of Victorian life, including but not limited to biodiversity, human health, primary production, industry, emergency services and more, and that while these areas may overlap with the matters covered in this inquiry, they may also warrant further investigation in their own inquiries.

On 27 May 2025, the Legislative Council resolved to extend the reporting date to 12 August 2025.

Chair's foreword

The impact of a changing climate on Victoria's built environment is clear. Hotter summers leading to longer bushfire seasons, more intense rainfall events create new flooding patterns, coastal erosion continues apace, and we are experiencing more frequent high intensity wind and storms. The Committee heard evidence that all these natural phenomena are becoming an increasing burden on where, and how, we live.

The scientific evidence presented to the Committee was stark in demonstrating the reality that climate change is affecting our state. Victoria's existing climate zones and weather patterns are changing. Extreme weather events such as heatwaves, bushfires, droughts, storms, and flooding events are becoming more common because of the effects of climate change.

The issues presented by our Terms of Reference were broad. To help navigate the range of matters to be considered, the Committee attempted to focus deliberations in key areas. This included our planning and building systems, improved governance of climate issues, and preparedness for future climate related events.

Technology is playing an important role providing new insight and information so that we can more successfully consider future risk. It is important that the community is supported through the release of new data, and community leaders demonstrate a willingness to accept this updated evidence of future risk. To deny this evidence, or undermine its scientific basis, can present new dangers that undermine preparedness efforts.

The policy context for this Inquiry also constantly evolved during deliberations, including the passage in March 2025 of amendments to the *Planning and Environment Act 1987* (Vic) to ensure that climate change is addressed at all levels of the planning process. The Legislative Council's Select Committee on Victoria Planning Provisions amendments VC257, VC267 and VC274 was also established and the Report tabled while this Inquiry was underway. Our Report draws on this work as appropriate.

This Report builds upon many of the issues raised in the Committee's Report for the *Inquiry into the 2022 Flood event in Victoria*. The Findings and Recommendations from the *Inquiry into the 2022 Flood event in Victoria* Final Report (including the Government's response to recommendation) are discussed where relevant.

The Committee obtained evidence from more than 130 witnesses, holding eight days of public hearings, and travelling across regional Victoria. Public hearings were held across Victoria's coastal areas, outer urban communities, and in the Regions including at Traralgon, Emerald, Aireys Inlet, Mount Macedon as well as in Melbourne. I want to thank everyone who took the time to tell us their stories, and provide powerful evidence from which the Committee could draw its Findings and Recommendations.

I am grateful to the Committee Secretariat, led by Senior Committee Manager Lilian Topic, Inquiry and Research Officers Alyssa Topy and Caitlin Connally, and Researcher and Communications Adviser Bill Bainbridge, with administrative support from Monique Riordan Hill and Sylvette Bassy. Niamh McEvoy, a colleague on secondment from the UK House of Commons also contributed to the Report. We were supported by the Hansard and Broadcasting teams during hearings in Melbourne and the Regions. Please accept my appreciation for your work on this complex Inquiry on behalf of all Committee members.

I want to thank fellow Members of the Committee for the way this Inquiry was conducted. The topic areas were broad and much of the evidence from experts was detailed and complex. I would also like to extend thanks to the communities who shared heartfelt stories of their loss from natural disasters.

A handwritten signature in black ink, appearing to read 'Ryan Batchelor', with a large, stylized loop at the bottom.

Ryan Batchelor MLC
Chair

Findings and recommendations

1 Introduction: climate resilience and adaptation

FINDING 1: The more informed stakeholders are of the long-term benefits and potential savings of implementing climate resilience initiatives, the more prepared and committed they are to undertaking the required actions.

10

2 Climate change risks to Victoria's built environment and infrastructure

FINDING 2: Victoria's built environment faces increasing climate change risks, including bushfire, heatwaves, flooding, sea-level rise and drought, with intensifying impacts driven by rising global temperatures and more extreme weather events.

22

FINDING 3: The current Cape to Cape Resilience Project does not adequately reflect the immediacy of the threat faced by Inverloch and surrounding communities. Key assumptions are outdated, and risk classifications are too low to trigger timely intervention.

29

RECOMMENDATION 1: That the Victorian Government urgently revise the Cape to Cape Resilience Plan to incorporate updated environmental data, recent storm impacts, and local stakeholder input and include short-term engineered protection options alongside longer-term adaptation strategies.

29

FINDING 4: Due to high population density, impervious surfaces and limited vegetation, Metropolitan Melbourne faces distinct climate change risks compared to regional and rural Victoria. This includes intensified urban heat island effects, increased flooding risk, and greater vulnerability during heatwaves.

35

FINDING 5: Regional councils are managing extensive infrastructure over large areas, increasingly exposed to bushfire, flooding, drought, and coastal hazards. These risks are compounded by slower restoration times and the escalating frequency and intensity of extreme weather events.

39

FINDING 6: The cumulative impact of climate change intensifies risk to Victoria's built environment and infrastructure. The increasing frequency and intensity of extreme weather events leads to compounding and cascading effects that shorten recovery periods, overwhelm resilience mechanisms, and leaves communities in a constant state of preparation or recovery.

44

FINDING 7: Victoria's built environment and infrastructure will be resilient to climate change risk if it is designed and built with consideration for climate change modelling and projections.

45

4 Key government responses to climate risk: how to adapt

FINDING 8: The lack of transparent and accessible progress updates on the Climate Adaptation Action Plans undermines public confidence and engagement in Victoria's climate resilience efforts.

71

RECOMMENDATION 2: That the Victorian Government provide regular, consolidated, and publicly accessible updates on their progress for all climate Adaptation Action Plans. This should include:

- development, with key stakeholders, of a set of performance indicators to assess the implementation of Adaptation Action Plans;
- the Secretary of DEECA being required to monitor and report on all Adaptation Action Plans and related;
- annual publication of the results of the assessment and monitoring of Adaptation Action Plans.

72

FINDING 9: While the Victorian Government's *Climate Change Strategy* and Adaptation Action Plans contain significant investments in emissions reduction, stakeholders identified gaps in implementation and funding for resilience and adaptation initiatives.

88

FINDING 10: Assessing funding for resilience activities is challenging, as funding allocations may be dispersed across various budget initiatives and portfolios, and not explicitly designated for resilience work. This lack of clear attribution makes it difficult to evaluate the extent of resources committed to adaptation and preparedness efforts.

88

RECOMMENDATION 3: That the Victorian Government implement a transparent funding framework that explicitly identifies and tracks budget allocations for climate resilience and adaptation initiatives across all relevant departments and programs. This tracking should be reported in updates on Victoria's progress in implementing the *Climate Change Strategy*.

88

RECOMMENDATION 4: That the Victorian Government update the Asset Management Accountability Framework to include climate resilience as a consideration. Alongside this, it should develop resources to equip agencies with the necessary tools, funding, and expertise to safeguard infrastructure against future environmental challenges.

91

RECOMMENDATION 5: That this Committee invites the Victorian Auditor-General to review the Government's implementation of Adaptation Action Plans and Climate Change Strategies to assess whether they are achieving their aims and objectives.

91

FINDING 11: Community-led initiatives are crucial for building climate resilience, but their success depends on consistent guidance, adequate resources, and effective integration with broader frameworks.

95

RECOMMENDATION 6: That the Victorian Government ensure First Nations land management practices are firmly embedded in climate resilience efforts, including adaptation plans.

105

RECOMMENDATION 7: That the Victorian Government mitigate the impact of bushfire on the built environment by appropriately using strategic fuel reduction and planned burns, and fuel load removal to better manage fuel loads.

105

RECOMMENDATION 8: That the Victorian Government work with First Nations communities to support First Nations fire management practices, through accredited training programs, to upskill individuals on topics including Indigenous land, fire, and water management and incorporate insurance for cultural burning activities.

105

FINDING 12: A coordinated multilevel governance approach, with enhanced federal leadership and equitable resource allocation, is essential to effectively address climate resilience challenges across all levels of government.

118

FINDING 13: Addressing climate resilience in Australia requires a bold and coordinated approach across all levels of government, with the essential goal of empowering local communities to build a climate-resilient future. **120**

RECOMMENDATION 9: That the Victorian Government review climate governance and oversight mechanisms, including consideration of establishing an independent oversight body, to ensure clear lines of responsibility and accountability for monitoring and implementation of climate resilience strategies. **121**

5 Victoria's planning and building systems

FINDING 14: Providing specific guidance on how to achieve climate-resilient buildings, will assist and encourage builders and owners to make progress towards more resilient buildings. Guidance on how to achieve climate resilience must include specific, actionable measures that can be applied consistently by councils and decision-makers. **131**

FINDING 15: The Victoria Planning Provisions' integrated decision-making allows for balancing competing objectives, which can result in climate considerations being deprioritised in favour of economic or development goals. **131**

FINDING 16: The planning system's focus on new developments means that existing built environments—often facing significant climate risks—are excluded from its scope, limiting the ability to address legacy issues. **131**

FINDING 17: Delays in planning scheme amendments hinder effective responses to climate change. Streamlining the process, ensuring adequate resourcing, and maintaining regular updates are essential to building climate resilience. **133**

FINDING 18: Stakeholders called for statewide guidance to improve consistency in integrating climate resilience into planning schemes. **137**

RECOMMENDATION 10: That the Victorian Government, through collaboration with key planning stakeholders including councils, improve the consistency of how climate resilience is considered in planning processes at the state government level. This should include considering the need for actions such as:

- developing a clear statewide framework for addressing climate risks
- developing practice notes or guidelines for adaptation which establish clear links between the *Climate Change Act 2017* (Vic) and the *Planning and Environment Act 1987* (Vic).

137

FINDING 19: The Victoria Planning Provisions (VPPs) have the capacity for stronger integration of climate considerations and enforceable measures to support local councils in managing climate risk.

142

RECOMMENDATION 11: That the Victorian Government undertake a review of the Victoria Planning Provisions (VPP) to specifically examine climate resilience including compliance measures.

142

RECOMMENDATION 12: That the Victorian Government develop a consistent set of engineering assumptions and modelling standards in relation to climate resilience for overlays.

144

RECOMMENDATION 13: That the Victorian Government work with local governments to expedite the approval process for planning scheme amendments or permits that support greater climate resilience.

144

RECOMMENDATION 14: That the Victorian Government ensure adequate resources are provided so that the Minister for Planning and relevant government departments can facilitate timely and responsive decision-making with respect to climate change responses, including development and/or approval of climate-related planning scheme amendments.

144

RECOMMENDATION 15: That the Victorian Government work with local governments to foster community involvement in overlay updates to improve transparency and public trust in the system. This could be achieved by actions such as targeted public education campaigns to explain the purpose, benefits, and necessity of land overlays, reducing resistance and frustration with the planning process.

145

FINDING 20: A balanced approach is required to ensure that heritage overlays evolve to support both cultural preservation and climate resilience. By modernising heritage planning requirements, Victoria can protect its historical legacy while empowering communities to adapt to the challenges of a changing climate. **148**

FINDING 21: Accurate and up-to-date flood studies are essential for informed land use planning, risk mitigation, and enhancing community preparedness for the increasing impacts of flooding and climate change. **156**

RECOMMENDATION 16: That the Victorian Government engage local government stakeholders and investigate the feasibility of establishing a centralised approach to updating flood modelling across the state, with a particular focus on ensuring the timely integration of modelling outcomes into planning schemes to reflect current and future flood risks driven by climate change. **156**

RECOMMENDATION 17: That the Victorian Government provide an update on the outcome of its review of Recommendations 13, 15, 16, 35, 48 and 51 in the Final Report on the *Inquiry into the 2022 flood event in Victoria* and the current status of implementing the remaining recommendations, and the funding allocated in the state budget to implement recommendations. **156**

FINDING 22: The inclusion of climate change considerations as explicit objectives in the *Planning and Environment Act 1987* (Vic) represents a significant step forward in embedding climate risk management into Victoria's planning framework, although concerns remain about its operationalisation and scope. **162**

RECOMMENDATION 18: That the Victorian Government ensure that Ministerial directions under the new Section 12A of the *Planning and Environment Act 1987* are urgently issued so that planning decisions are clear on how they account for emissions reductions and climate impacts, including for planning scheme amendments to rezone for the next 50 activity centres identified in *Plan for Victoria*. **162**

RECOMMENDATION 19: That the Victorian Government work with other jurisdictions to support a nationally consistent approach to climate resilience in the housing sector that supports both climate resilience and housing affordability. **163**

FINDING 23: Stage Two of the Environmentally Sustainable Development Roadmap was to be completed in September 2021 and is now well behind schedule. **167**

RECOMMENDATION 20: That the Victorian Government expedite the implementation of Stage Two of the Environmentally Sustainable Development Roadmap. **167**

RECOMMENDATION 21: That the Victorian Government review and update the Infrastructure Design Manual (IDM) and related engineering standards to reflect projected climate conditions, including increased rainfall intensity, prolonged droughts, and more frequent extreme weather events. **168**

RECOMMENDATION 22: That the Victorian Government monitor the impact of the new townhouse and low-rise code (VC267) on the application of Environmentally Sustainable Design (ESD) standards, and revise and improve any deficiencies that are identified with the application of the new code. **171**

FINDING 24: The Victorian building system acknowledges climate risk but requires stronger integration of adaptation measures, clearer guidance, and coordinated support to ensure resilient and sustainable communities. **176**

FINDING 25: Stakeholders expressed concern that Victoria's planning system lacks agility and sufficient provisions for climate resilience and delays adaptations, limiting its ability to address evolving climate risk. **179**

FINDING 26: A best practice planning system is agile, equitable, and effectively integrates climate adaptation measures to address the long-term impacts of climate change. **183**

RECOMMENDATION 23: That the Victorian Government review the Victoria Planning Provisions and *Planning and Environment Act 1987* to ensure that climate adaptation considerations are embedded in the planning stage at a precinct level, as well as individual buildings. **183**

FINDING 27: Effective climate mitigation is essential to reducing greenhouse gas emissions, slowing the impacts of climate change, and safeguarding both communities and ecosystems for future generations. **186**

FINDING 28: Addressing gaps in Victoria's planning framework, such as the inconsistent application of climate-resilient measures and missed opportunities in green infrastructure, is vital to effectively mitigating climate risks and meeting Victoria's net-zero emissions targets. **187**

RECOMMENDATION 24: That the Victorian Government provide clear guidance within the planning system regarding tree canopy coverage and vegetation, with a view to retaining existing canopy trees and vegetation where possible, and achieving at least 30% tree canopy coverage as outlined in Plan for Victoria.

187

RECOMMENDATION 25: That the Victorian Government review the Victoria Planning Provisions and Planning and Environment Act to ensure that climate mitigation is embedded in the planning stage at a precinct and subdivision level, as well as for individual buildings.

187

FINDING 29: The Final Report of the Select Committee into Victoria Planning Provisions Amendments VC257, VC267 and VC274 demonstrates that the Amendments make significant changes to the existing 'res code' and the new townhouse code has raised Environmentally Sustainable Design standards in some areas, and lowered standards in others.

192

RECOMMENDATION 26: That the Victorian Government continue to monitor the impact of recent amendments to the Victorian Planning Provisions, especially VC267, in relation to Environmentally Sustainable Design, and revise as required to ensure the reforms are working as intended.

192

6 Challenges to ensuring a resilient built environment

FINDING 30: For many local councils, climate adaptation and resilience investment, particularly for upgrading public infrastructure, stretches their financial capacity.

198

FINDING 31: The increasing frequency and intensity of extreme weather events means that a more flexible and proactive funding approach is needed to support councils in both emergency response and long-term climate resilience efforts.

198

RECOMMENDATION 27: That the Victorian Government explore options for diversifying funding streams for local councils to adapt important public infrastructure to be more climate resilient, including considering providing financial incentives for private investment in resilient infrastructure.

198

FINDING 32: The Disaster Recovery Funding Arrangements (DRFA) create administrative challenges for local governments and limit betterment funding, making recovery efforts less efficient and increasing financial strain on councils.

203

FINDING 33: Current disaster recovery funding arrangements focus on like-for-like restoration rather than sustainable, resilient solutions. Expanding funding eligibility to include betterment expenses and proactively investing in resilience are essential steps for reducing asset vulnerabilities. **203**

FINDING 34: Limitations in the Victorian planning system, including inadequate climate adaptation provisions and delays in planning reforms, create significant barriers for local councils in ensuring a climate-resilient built environment. **204**

FINDING 35: A lack of consistent, locally relevant, and granular climate risk data, along with outdated flood mapping and inconsistent risk assessment methodologies, significantly hinders councils' ability to plan and implement effective climate adaptation measures. **206**

FINDING 36: Where engagement strategies are lacking, local councils face significant challenges in securing community support for climate resilience initiatives due to difficulties in communicating climate risk. **209**

RECOMMENDATION 28: That the Victorian Government, in collaboration with local councils, ensure consistent community engagement across all projects, including fast-tracked developments, to prevent communities from being left behind. This should include clear communication strategies, targeted support, and funding for local councils to lead adaptation initiatives. **209**

FINDING 37: Delays in implementing erosion control measures at Inverloch and Loch Sport are increasing risks to infrastructure, community safety, and local economies. Interim works such as sandbagging have had limited success. **209**

RECOMMENDATION 29: That the Victoria Government initiate temporary protection works at high-risk locations while longer-term adaptation strategies are developed in partnership with local communities. **209**

FINDING 38: The like-for-like approach to asset restoration creates a resiliency gap by reinstating infrastructure to its pre-disaster condition without allowing for necessary upgrades, leaving assets vulnerable to repeated damage and increasing long-term costs for councils. **212**

FINDING 39: Victoria's housing stock is increasingly vulnerable to climate-related risks due to poor thermal design, inadequate retrofitting policies, and outdated urban planning. This leaves many homes and communities exposed to extreme heat, flooding, and energy inefficiency.

214

FINDING 40: Resilient telecommunications infrastructure is critical for emergency response, community safety, and disaster recovery. However, vulnerabilities exposed during extreme weather events highlight an urgent need for enhanced backup systems and increased investment in climate-resilient networks.

218

FINDING 41: Victoria's energy infrastructure is increasingly vulnerable to climate change and extreme weather events, susceptible to risks such as power generation disruptions and increased strain on the grid due to rising temperatures.

222

FINDING 42: Without a proactive plan, Victoria risks creating a new category of environmental waste just as it works to reduce emissions. A government-led investigation into end-of-life pathways and domestic recycling capacity is needed.

222

RECOMMENDATION 30: That the Victorian Government investigate and report to Parliament on the end of life of renewable energy products including wind turbines, solar panels and batteries and opportunities for recycling within Australia.

222

RECOMMENDATION 31: That the Victorian Government undertake a review of the resilience and sustainability of Victoria's energy generation and associated transmission, distribution and storage networks, including an assessment of impacts on agriculture and manufacturing.

222

RECOMMENDATION 32: That the Victorian Government prepares a road, rail and port infrastructure strategy which:

- a. assesses the resilience of this infrastructure to climate change.
- b. identifies actions to improve the function and climate resilience of this infrastructure.
- c. and includes an implementation plan to undertake works to improve the function and climate resilience of this infrastructure.

226

FINDING 43: Victoria's road and transport networks are highly vulnerable to climate change, with extreme weather events such as flooding, storms, heatwaves, and bushfires causing significant damage. This is compounded by issues such as funding constraints and outdated planning frameworks which limit the ability to build resilient infrastructure, leaving communities at risk of recurrent disruptions and costly repairs. **227**

FINDING 44: Retrofitting existing infrastructure is essential to withstand future climate impacts but remains cost-prohibitive for many councils. **227**

RECOMMENDATION 33: That the Victorian Government work with local councils and the Commonwealth to identify pathways for integrating 'build back better' principles into post-disaster infrastructure funding, to reduce repeated damage and improve long-term resilience. **227**

FINDING 45: Victoria's climate mitigation infrastructure, including levees, seawalls, and drainage systems, is increasingly vulnerable due to inadequate maintenance, outdated design, and intensifying climate impacts. **233**

RECOMMENDATION 34: That the Victorian Government expand the scope of its Climate Resilience Adaptation Action Plans to explicitly include critical essential infrastructure, such as telecommunications infrastructure. **234**

RECOMMENDATION 35: That the Victorian Government advocate to the Commonwealth Government to fund more resilient telecommunications infrastructure across the State. **234**

FINDING 46: Clear and consistent regulatory requirements provide greater certainty to the planning and building industries regarding the standards necessary to address climate risk. A combination of strong regulations and targeted incentives is required to encourage and assist them to adopt climate-resilient practices. **238**

RECOMMENDATION 36: That the Victorian Government undertake a review of planning and building regulations to reduce duplication and inconsistencies related to climate resilience requirements. This should include developing a clear, standardised framework that aligns local, state, and national regulations to provide greater certainty for developers and planners. **238**

RECOMMENDATION 37: That the Victorian Government work with property developers and the building and construction industry to improve climate-resilient building practices. This work should balance upfront costs with long-term affordability and sustainability.

238

FINDING 47: Rebuilding infrastructure with a betterment approach reduces long-term costs by minimising the need for repeated repairs and ensuring assets are more resilient to future climate events.

243

RECOMMENDATION 38: That the Victorian Government support betterment in rebuilding infrastructure with climate resilient designs and provide funding to local government to help achieve this.

244

RECOMMENDATION 39: That the Victorian Government work with the Commonwealth to reform disaster recovery funding frameworks to:

- a. Ensure that betterment is recognised as an eligible expense, and infrastructure is not just replaced 'like for like' where appropriate.
- b. Expand eligibility to include heatwaves, droughts, and other climate-related events in disaster declarations and funding access.
- c. Support local capacity by providing long-term funding to councils for resilient upgrades to roads, drainage, and community assets.
- d. Shift funding emphasis toward proactive mitigation, adaptation and resilience-building to reduce long-term recovery costs.

244

FINDING 48: The rising cost and decreasing availability of insurance, particularly for properties newly designated as high-risk due to updated climate overlays, present a significant challenge to building climate resilience. Homeowners, businesses, and local governments are facing escalating premiums, policy exclusions, and financial strain that can undermine recovery and adaptation efforts.

252

7 Enhancing the climate resilience of Victoria's built environment

FINDING 49: Victoria's building codes and regulations do not adequately respond to climate risks facing the State's built environment and infrastructure.

261

FINDING 50: Victoria's current building codes and regulations are contributing to inconsistent climate resilience outcomes for the built environment and infrastructure. **261**

FINDING 51: Victoria's building codes and regulations have changed over time, leading to diverging standards in climate resilience for newer and older built environments and infrastructure. **261**

RECOMMENDATION 40: That the Victorian Government include in its forward planning upgrades to older infrastructure to reflect modern building codes and regulations and ensure that modern climate resilience standards are consistently reflected across the State. **261**

FINDING 52: Reliance on historical data undermines the climate resilience of Victoria's building codes and regulations, as current and future climate trends are changing in a way that do not reflect historical trends. This can mean that the built environment is unprepared for current and future climate change risks. **265**

FINDING 53: Up-to-date climate data ensures that construction does not occur in areas highly vulnerable to climate change risks. **265**

FINDING 54: Minimum standards reflected in building codes and regulations must be sufficiently robust to effectively reduce the built environment's exposure to climate risk. **266**

FINDING 55: The Committee heard that the cost of building a home in a flame zone has increased to meet bushfire safety requirements. **266**

RECOMMENDATION 41: That the Victorian Government ensure that the current regulatory framework and any proposed updates to minimum housing standards support the supply of urgently needed dwellings in Victoria. **266**

RECOMMENDATION 42: That the Victorian Government advocate to the Federal Government for building codes and regulations to be informed by up-to-date climate data and future climate projection data. **266**

RECOMMENDATION 43: That the Victorian Government update minimum standards reflected in building codes and standards to reflect climate-resilient design based on climate projections, with evidence-based future climate scenarios rather than historical climate data and modelling.

266

FINDING 56: Simple design measures can significantly enhance the climate resilience of buildings and other infrastructure.

275

FINDING 57: The performance-based nature of the National Construction Code leads to building and design practices that do not adequately consider climate resilience.

275

FINDING 58: There needs to be more consistent incorporation of climate resilience principles in the building system's regulatory mechanisms to ensure a stronger climate-resilient approach by the building and construction sector.

275

RECOMMENDATION 44: That the Victorian Government update minimum standards for design measures that lead to stronger climate resilience outcomes for built environments and infrastructure. This should include the measures outlined by stakeholders:

- passive solar design principles
- high levels of insulation
- effective ventilation
- high-performance windows and glazing
- external shading
- light-coloured roofs and cool roof finishes
- air tightness
- selection of low-impact materials
- water management.

276

FINDING 59: In response to climate change, existing buildings and infrastructure should be examined for retrofitting to meet modern standards of climate resilience.

280

RECOMMENDATION 45: That when the Victorian Government undertakes significant upgrades or renovations to existing buildings, those upgrades include retrofitting to strengthen resilience to climate change risk.

281

RECOMMENDATION 46: That the Victorian Government establish a Resilient Homes scheme, similar to those in NSW and QLD which are in partnership with the Commonwealth Government, to support communities recovering from disasters. This would include funding support to enhance resilience, raise, demolish and rebuild/relocate homes.

281

FINDING 60: Current reconstruction funding and standards do not support a betterment approach.

282

RECOMMENDATION 47: That the Victorian Government provides stronger support for adaptation projections to encourage certainty for infrastructure managers to undertake investment in risk analysis and cost-benefit assessments of reconstruction efforts.

282

RECOMMENDATION 48: That the Victorian Government provide clear accountability frameworks and clarify responsibility for infrastructure upgrades and climate preparedness measures.

282

RECOMMENDATION 49: That the Victorian Government expand the Victorian Energy Upgrades program and offer rebates for Resilience Rating Assessments for households.

283

FINDING 61: Climate resilient buildings and upgrades can be delivered using existing financial mechanisms such as the Victorian Energy Upgrades program.

283

FINDING 62: A comprehensive framework for climate-resilient construction would lead to market demand for resilience upgrades and include:

- financial mechanisms such as grant and funding programs
- a clear rating system
- workforce training
- procurement reforms.

283

RECOMMENDATION 50: That the Victorian Government develop a comprehensive and unified framework supporting the State's transition to a climate-resilient construction industry through further improvements to workforce training and procurement.

284

FINDING 63: Support for research into alternative building materials would assist industry use of climate-resilient materials.

284

RECOMMENDATION 51: That the Victorian Government work with the building and construction industry and workforce representatives to develop better climate resilience practices.

284

8 Enhancing climate preparedness: opportunities for government

FINDING 64: Current legislation supporting the Victorian Government's action on climate resilience could benefit from further development and improvement through a coordinated, multilevel governance approach.

298

FINDING 65: The Built Environment Climate Change Adaptation Action Plan 2022–2026 is a critical tool for state and local government but lacks adequate legal accountability and enforcement mechanisms.

303

FINDING 66: It is unclear what legal tools the Victorian Government will use and deploy to support climate resilient environments under Action 19 of the Built Environment Climate Change Adaptation Action Plan 2022–2026.

304

RECOMMENDATION 52: That the Victorian Government clarify the legal tools that will be used to support climate resilient environments and how they will be deployed under the Built Environment Climate Change Adaptation Action Plan 2022–2026.

304

RECOMMENDATION 53: That the Victorian Government clarify the legal mechanisms that operate to enforce and deliver accountability on the Built Environment Climate Change Adaptation Action Plans and implement mandatory reviews for existing and future Adaptation Action Plans.

304

RECOMMENDATION 54: That the Victorian Government improve the state's climate legislation framework by:

- strengthening accountability mechanisms
- accelerating the implementation of supporting regulations
- improving transparency in monitoring and reporting progress in relation to climate change objectives.

304

FINDING 67: Climate justice is not adequately considered across Victoria's regulatory and legislative framework, that informs adaptation on climate change and climate resilience.

307

FINDING 68: Victoria's recent amendments to the *Planning and Environment Act* represent a crucial step toward integrating climate change into planning decisions, but some gaps remain in implementation, enforcement, and long-term adaptation support.

307

FINDING 69: Without action to approve Environmentally Sustainable Design standards, clear ministerial guidance, and establishment of adaptation frameworks, local governments will continue to struggle in translating policy into tangible climate resilience measures.

307

RECOMMENDATION 55: That the Victorian Government undertake a review of the Planning and Environment Act to strengthen and clarify climate considerations and compliance measures and include provisions regarding climate justice.

307

FINDING 70: An infrastructure funding model based on a betterment approach leads to more climate resilient results.

310

FINDING 71: People play an important role at the local level in supporting community resilience through volunteering. It is important that Victoria has a sustainable volunteer workforce to support climate resilience responses.

312

RECOMMENDATION 56: The Victorian Government work with community organisations and other relevant stakeholders to reduce the barriers to volunteering and to encourage people of all ages and backgrounds to volunteer.

313

FINDING 72: Engagement of children and young people in climate preparedness and responses benefits the community immensely through the knowledge and resources they bring to groups seeking to influence climate resilience. **314**

RECOMMENDATION 57: That the Victorian Government work with local government, community organisations and children and young people to incorporate youth-specific roles into local emergency management planning. **314**

FINDING 73: Community infrastructure, such as community halls, are important places for communities to gather, engage and develop. To enhance social capital and serve communities, community infrastructure needs to be made more resilient to the climate risks facing Victoria. However, financial resources may not be available to support enhancements. **315**

RECOMMENDATION 58: That the Victorian Government adequately fund climate resilience adaptations to community infrastructure. The funding should be allocated to both local governments and relevant community organisations or groups with management oversight of community infrastructure. **316**

FINDING 74: Community organisations play an important role in supporting communities – particularly the most vulnerable and disadvantaged – to prepare, respond and adapt to climate change. As climate events increase, demand on the services they provide may also increase. However, financial constraints will limit the provision of services and, in turn, prevent communities enhancing their climate resilience. **318**

RECOMMENDATION 59: That the Victorian Government continue to adequately support community organisations, particularly those offering mental health, homelessness and legal support services, to ensure people who are the most vulnerable to the effects of climate change are adequately supported. **318**

FINDING 75: People from disadvantaged and marginalised backgrounds are disproportionately impacted by climate change. Responses to climate change must prioritise these groups or risk entrenching and perpetuating their disadvantage and marginalisation. **320**

RECOMMENDATION 60: That the Victorian Government conduct a state-level assessment to identify the groups in Victoria vulnerable to the varied effects of climate change. This knowledge would support climate preparedness and awareness responses at a local and state level. **320**

RECOMMENDATION 61: That the Victorian Government undertake a review of climate legislation and policies to ensure inclusions of climate justice considerations. **320**

RECOMMENDATION 62: That the Victorian Government and local government consult vulnerable and marginalised groups in climate resilience and adaptation efforts through co-design projects, such as those facilitated by The South East Councils Climate Change Alliance during its Enhancing Climate Resilience Project. **320**

FINDING 76: Public awareness is an important tool for building community resilience against climate change and its effects. Local government and community-based organisations have a key role in communicating information to raise public awareness on climate change and its effects. **324**

FINDING 77: The Victorian Government and local government have taken steps to increase public awareness of climate change and its effects. However, a lack of funding and gaps in how information is communicated prevents greater public awareness. **324**

RECOMMENDATION 63: That the Victorian Government provide adequate funding to local government and community-based organisations to raise public awareness and build climate resilience. **324**

RECOMMENDATION 64: That the Victorian Government review its practices for raising public awareness and address the communication gaps identified in this Report. **324**

FINDING 78: Collaboration between government and the private and community sectors is fundamental to enhancing Victoria's climate resilience. **333**

FINDING 79: The Geelong Sustainability Climate Safe Rooms program was successful in improving the health and wellbeing of vulnerable people and people from low-income backgrounds. It provides an evidence-based and cost-effective retrofitting scheme that can provide appropriate refuge in extreme weather whilst having additional benefits, such as saving participants money on energy bills. **333**

RECOMMENDATION 65: That the Victorian Government expand access to the Climate Safe Rooms program to provide vulnerable people and people from low-income backgrounds with appropriate refuge from extreme hot and cold weather. **334**

FINDING 80: Communities continue to experience systemic failures in telecommunications when extreme weather events and climate hazards affect infrastructure

336

FINDING 81: Regulatory frameworks for telecommunications need to be modernised to incorporate forward-looking climate risk assessments.

336

FINDING 82: Legislating board-level accountability, like Commonwealth Government arrangements for telecommunications, would shift accountability for climate resilience outcomes away from consumers and onto telecommunications providers.

336

RECOMMENDATION 66: That the Victorian Government advocate to the Commonwealth Government that it explores avenues to strengthen accountability for climate resilience outcomes in the telecommunications industry.

336

RECOMMENDATION 67: That the Victorian Government increase investment in road and bridge infrastructure upgrades and ongoing maintenance to strengthen the resilience of roads to climate risk.

337

FINDING 83: There is a need to maintain a balance between affordability and preparedness in Australian Energy Regulator determinations.

339

FINDING 84: The delivery of resilience-focused regulatory reforms for energy infrastructure needs to be accelerated.

339

FINDING 85: Requirements for worst-performing network segments in relation to energy infrastructure need to be strengthened

339

RECOMMENDATION 68: That the Victorian Government expand targeted investment in high-risk areas for energy and water infrastructure.

339

RECOMMENDATION 69: That the Victorian Government strengthen requirements for worst-performing network segments in relation to energy infrastructure.

340

FINDING 86: The lack of standardised, accessible, and integrated climate risk data in Victoria presents a significant challenge to effective climate adaptation and resilience planning. Addressing this issue requires a coordinated effort from the State Government to develop standard methodologies, provide consistent funding for local assessments, and create integrated data-sharing platforms.

345

FINDING 87: Many Councils lack the tools, guidelines, and funding to undertake consistent comparable climate risk assessments, leading to uneven adaption planning across the state.

346

RECOMMENDATION 70: That the Victorian Government develop and distribute a standardised framework and methodology for local government climate risk assessments, including hazard mapping, timeframes, and cost-benefit analysis templates.

346

RECOMMENDATION 71: To enhance climate resilience and infrastructure adaptation, that the Victorian Government establish a statewide baseline methodology for climate risk assessments. This standardised approach will:

- ensure consistency in climate risk assessments across sectors and regions
- facilitate equitable resource allocation by enabling uniform data collection and analysis
- support evidence-based decision-making by integrating up-to-date climate projections into asset management and planning
- prevent maladaptation by ensuring localised, scenario-based assessments that reflect unique regional vulnerabilities.

352

9 Enhancing climate preparedness – what can individuals and communities do?

RECOMMENDATION 72: The Victorian government should examine ways to provide greater access to individual property assessments to homeowners in areas vulnerable to natural disasters and to assist homeowners develop appropriate mitigation measures.

355

FINDING 88: Victoria's existing housing stock is generally built to low energy efficiency standards and raising these standards would improve householders comfort and energy costs, and reduce pressure on the electricity grid.

358

FINDING 89: Engaging in good climate aware design is the most cost effective means of building homes that are resilient to fluctuations in climate. **358**

RECOMMENDATION 73: The Victorian Government should promote the education of designers, builders and assessors to leverage the NatHERS whole-of-home scheme to generate high performance outcomes. **358**

RECOMMENDATION 74: That the Victorian Government should introduce mandatory disclosure of energy efficiency ratings at the point of sale and lease for residential buildings. **359**

RECOMMENDATION 75: That the Victorian Government expand funding for home electrification, particularly targeting those on lower incomes and renters. **360**

FINDING 90: It is considerably more expensive to build a home in a high fire risk area. Using free resources, such as the FORTIS House which includes plans for a sustainable building and measures for mitigating risk, can alleviate some of this cost. **365**

RECOMMENDATION 76: That the Victorian Government examine how to assist the roll-out of the Multi-Hazard Resilience Ratings Scheme across the state. **366**

FINDING 91: The number of underinsured and uninsured households is predicted to continue to grow in Victoria, with socioeconomically disadvantaged households and households built in areas of high risk to flood and fire, the most vulnerable. **368**

RECOMMENDATION 77: That the Victorian Government introduce minimum energy efficiency standards that ensure that minimum levels of insulation are in place in rental properties, including social housing. **370**

RECOMMENDATION 78: That the Victorian Government undertake to assess the uptake of the Victorian Energy Upgrades program by landlords and explore ways to encourage landlords to make their properties more energy efficient and improve their thermal comfort. **370**

RECOMMENDATION 79: That the Legislative Council Legal and Social Issues Committee consider issues about climate resilience of public and community housing as part of its Inquiry into the redevelopment of Melbourne’s public housing towers, in line with its terms of reference.

370

FINDING 92: That skills shortages in the building and electrical trades will increase the cost and hamper the transition to more climate resilient homes.

371

RECOMMENDATION 80: The Victorian Government explore ways to increase attraction and retention in the electrical trades and create pathways for careers in retrofitting, energy management and energy efficiency.

371

10 Further areas of inquiry into climate resilience and adaptation

RECOMMENDATION 81: That the Victorian Government consider further investigation or inquiry into the impacts of climate change on biodiversity, human health, primary production, and industry in Victoria.

373

FINDING 93: There is an emotional toll that some landowners feel due to uncertainty in coastal and flood-prone areas which has left them in limbo, facing property devaluation and complex regulatory barriers with limited state support for navigating this issue.

381

RECOMMENDATION 82: That the Victorian Government provide clear guidelines and a communication strategy for councils to engage with communities affected by climate-related rezoning or managed retreat, including access to planning advice, hardship assistance, and mental health support.

381

What happens next?

There are several stages to a parliamentary inquiry.

The Committee conducts the Inquiry

This report on the Inquiry into climate resilience is the result of extensive research and consultation by the Legislative Council Environment and Planning Committee.

The Committee received written submissions, spoke with people at the public hearings, attended site visits, reviewed research evidence and deliberated over a number of meetings. Experts, government representatives and individuals expressed their views directly to us as Members of Parliament.

A Parliamentary Committee is not part of the Government. The Committee is a group of members of different political parties (including independent members). Parliament has asked us to look closely at an issue and report back. This process helps Parliament do its work by encouraging public debate and involvement in issues.

You can learn more about the Committee's work at: <https://www.parliament.vic.gov.au/epc-lc>.

The report is presented to Parliament

This report was presented to Parliament and can be found at: <https://www.parliament.vic.gov.au/get-involved/inquiries/climateresilience/reports>.

A response from the Government

The Government has six months to respond in writing to any recommendations made in this report.

The response is public and put on the inquiry page of Parliament's website when it is received at: <https://www.parliament.vic.gov.au/get-involved/inquiries/climateresilience/reports>.

In its response, the Government indicates whether it supports the Committee's recommendations. It can also outline actions it may take.

Chapter 1

Introduction: climate resilience and adaptation

1.1 Inquiry scope and background

The Terms of Reference for the Inquiry into climate resilience were agreed by the Legislative Council on 4 October 2023 and referred whilst the Committee was finalising the Final Report for its Inquiry into the 2022 flood event in Victoria. To allow for completion of that Inquiry, the call for submissions was advertised online on 23 February 2024. The Committee engaged across social media platforms and through direct correspondence with those identified as having expertise or significant interest in the subject.

Victoria has faced many climate-related disasters over the last decade, including heatwaves, bushfires, storms and floods. Climate-related issues are of increasing interest to the community with concerns shared equally by metropolitan and rural and regional Victorians.

Victoria's most severe flooding events that occurred in October 2022 is just one example. It affected communities across the state, including urban centres and rural and regional areas. This Committee reported to the Parliament on the 2022 flood event on 30 July 2024. Several issues raised during that Inquiry have been discussed further in this report. The Committee further notes that through the course of this Inquiry, Victoria experienced other extreme weather events such as the February 2024 major storm event.

The Terms of Reference that the Legislative Council agreed to for this Inquiry were extremely broad, requiring the Committee to inquire into the main risks facing Victoria's built environment and infrastructure from climate change, and the impact these risks will have on the people of Victoria. This also included how the Government is preparing for these impacts, the challenges to becoming more resilient and improving preparedness for future climate disaster events.

As part of its online submission process, the Committee conducted a survey to assess which issues were most important to stakeholders. In survey responses to this Inquiry many complex areas of concern were raised. It is beyond the scope of this Inquiry to comment on or assess all those areas of concern. Chapter 10 explores areas that stakeholders would like to see investigated in future inquiries. The results of the survey are discussed further in Section 1.1.2.

Committee inquiries must be completed within a limited timeframe. In the case of this Inquiry, given the breadth of issues surrounding climate resilience, the Committee resolved that it should focus on:

- the built environment and infrastructure
- the planning and building systems
- how good governance of climate issues can ensure that the community is well prepared for climate-related events.

This Report advocates, as the Final Report for the Inquiry into the 2022 flood event in Victoria also did, for a shift in focus away from responding to disasters after they occur to building resilience in the built environment. This would ensure ongoing disaster preparedness and putting in place mitigation measures to reduce the impact of climate change on Victoria's built environment.

Chapter Two identifies the primary risks to Victoria's infrastructure and built environment, how these risks occur across metropolitan and regional areas, the cumulative impact of risk and how to measure risk.

Chapter Three examines government responses to climate risk and seeks to understand how climate resilience should be governed and further examines where responsibility for risk management should lie. Chapter Four looks at the Victorian Government's plans for adapting to, and preparing for, climate risk.

Chapter Five examines the planning and building systems in Victoria and Chapter Six looks at the challenges and barriers to ensuring a resilient environment. Chapter Seven considers how the climate resilience of Victoria's built environment could be enhanced and includes an examination of building codes and regulations.

Chapter Eight asks whether current legislation is enough and looks at what the opportunities are for government to enhance climate preparedness. Expanding on this, Chapter Nine turns the focus to what individuals and communities can do to assist with climate resilience. Chapter Ten concludes with a discussion of potential future areas of Inquiry.

1.1.1 Submissions and public hearings

The Committee received 285 submissions from a range of stakeholders including local governments, climate resilience advocates, members of the community and experts in climate science and practice.

The Committee held eight days of public hearings which were convened in Traralgon, Emerald, Aireys Inlet, Mount Maceon and Melbourne. The Committee heard from over 130 witnesses.

Appendix A of this Report lists submissions to the Inquiry, public hearing locations, and witnesses.

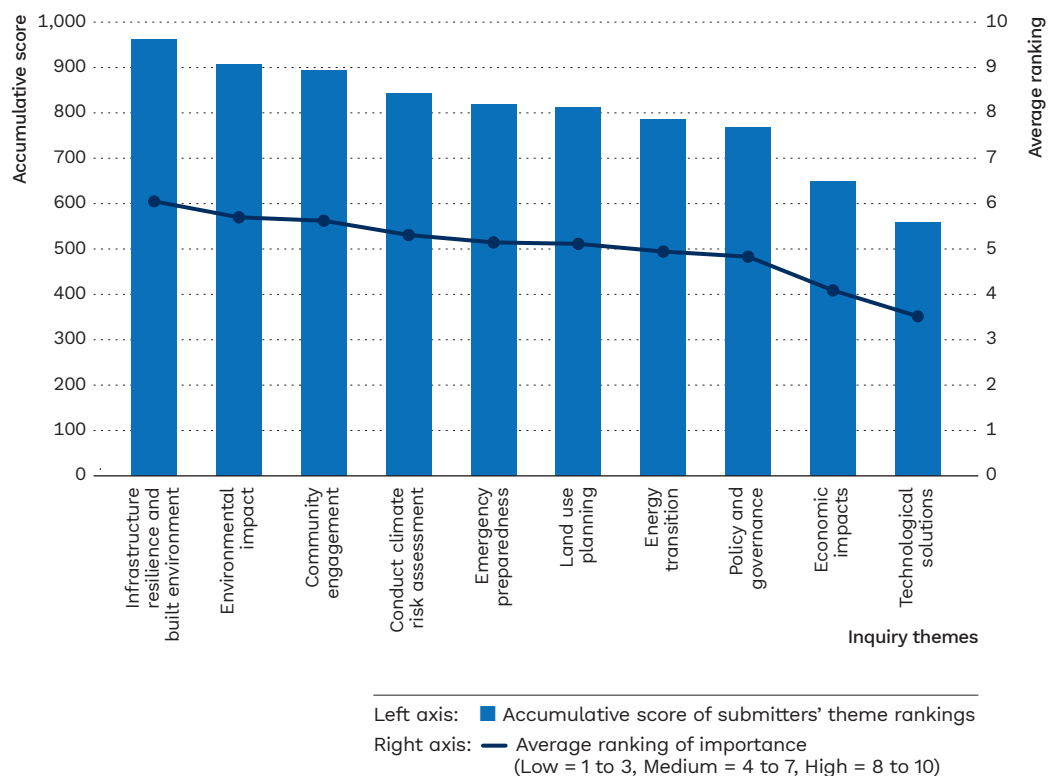
Notably several stakeholders who contributed to the Inquiry into the 2022 flood event in Victoria also contributed to this Inquiry. This is understandable given the clear connection between issues and concerns raised across both inquiries. The Committee acknowledges evidence from the 2022 flood Inquiry, including its findings and recommendations, throughout this Report where relevant.

1.1.2 Submission surveys: what did stakeholders identify as the most important issues?

As part of the submission process stakeholders were asked to complete a survey to identify the areas of greatest importance to them based on the Inquiry's Terms of Reference. The Committee proposed 10 themes for submitters to rank and the option for them to suggest their own themes and issues.

In total, 159 submitters responded to the survey questions through the online portal. Figure 1.1 shows the order of importance each theme received based on the rankings that submitters assigned, (including accumulative score and average rank).

Figure 1.1 Ranking of Inquiry themes (including accumulative score and average rank)



Source: Legislative Council Environment and Planning Committee.

The results aligned to the concerns of the Committee and helped to strengthen areas of focus during hearings and in Committee deliberations.

Additional issues raised in the submissions survey are reflected in Figure 1.2 below.

As shown in Figure 1.2, there are a huge number of concerns in the community. For example: food security; residential tenancies and renter protection; equity, access and fairness; Indigenous-led adaptation solutions, geopolitical destabilisation, radicalisation and community division; population growth; insurance; health and wellbeing impacts – including public health; climate and disability justice; local adaptation initiatives; biodiversity; the fossil fuel industry and others.

4

1.2 Key terms and metrics

In this Report, the Committee has focussed on climate resilience in relation to the built environment.

Built environment refers to buildings and infrastructure, such as:

- residential, commercial and industrial buildings
- streetscapes and public areas
- government and community assets
- utilities including water supply, waste management and energy distribution.

The clear message from stakeholders throughout the Inquiry was that extreme weather and climate change pose a significant risk to our built environment and infrastructure. This risk is particularly prevalent where there is a lack of adaptation measures or maladaptation has occurred.

Climate change is assessed across a number of metrics, several of which are canvassed in detail in Chapter 2. Key metrics include

- temperature and rainfall patterns
- the cost of infrastructure damage
- disruption to essential services
- the need for retrofitting or upgrading existing infrastructure
- insurance and premium payments
- the loss of economic productivity.

This Report has identified a vast number of factors that can be considered in assessing the impact of climate change.

In Infrastructure Victoria's 2024 *Weathering the storm* report, the costs of climate action and the effectiveness of adaptation are measured in relation to the frequency of damage to infrastructure and the resilience of infrastructure such as roads and powerlines.¹ In the Victorian Government's Built Environment Adaptation Action Plan, hazard mapping is used to assess the vulnerability of urban and rural areas to floods, bushfires and heat.²

¹ Infrastructure Victoria, *Weathering the storm: adapting Victoria's infrastructure to climate change*, 2024.

² Department of Energy, Environment and Climate Action, *Built Environment Adaptation Action Plan — a snapshot*, 2022, <<https://www.climatechange.vic.gov.au/building-victorias-climate-resilience/our-commitment-to-adapt-to-climate-change/built-environment-adaptation-action-plan>> accessed 26 February 2025.

Infrastructure Victoria's Report, *Victoria's infrastructure strategy 2021–2051*, seeks to track investment in climate resilience infrastructure and changes in urban growth patterns.³

1.3 Climate resilience: adaptation measures and mitigation strategies to support the built environment and infrastructure in Victoria

Adapting to climate change means adjusting Victoria's current processes, policies and behaviour to support a reduction in negative impacts from climate change on the built environment. It can mean mitigation through creating new systems or processes to cope with challenges from climate change. For example, building for extreme heat, adapting and changing land use regulations and preparing the community for heatwaves.

Resilience is just as necessary. It ensures that infrastructure, communities, government and the economy can absorb the shocks of extreme weather events and continue to thrive.

Chapters Seven to Nine of this Report look at enhancing the climate resilience of Victoria's built environment in the context of the planning and building schemes. These Chapters consider what governments, individuals and communities can do to build resilience.

The Chapters also include a discussion of the State Government's Adaptation Action Plans such as the Built Environment Adaptation Action Plan (2022–2026) and infrastructure-related strategies such as *Victoria's infrastructure strategy 2021–2051* which emphasises climate resilience and adaptation.

1.4 Victoria's climate profile

Although Victoria generally has a temperate climate it also has a diverse geography. This means there are regional variations in its coastal areas, mountains, and inland plains. In coastal and southern Victoria, which includes Melbourne and Geelong, the climate is defined as temperate oceanic with mild summers and cool winters. There are occasional heatwaves in summer and rainfall is frequent in winter.

Inland parts of northern and western Victoria (including Bendigo, Mildura, and Swan Hill) are defined as semi-arid to Mediterranean with hot summers and dry winters.

In the Alpine Region (including the Victorian Alps and towns like Bright and Falls Creek) the temperatures are cool to subalpine. Winters are traditionally cold and there is heavy snowfall.

³ Infrastructure Victoria, *Victoria's Infrastructure Strategy 2021–2051*, 2021, <<https://www.infrastructurevictoria.com.au/resources/victorias-infrastructure-strategy-2021>> accessed 26 February 2025.

Eastern Victoria and Gippsland (including Bairnsdale and Lakes Entrance) experience a temperate maritime climate with moderate temperatures and generally wetter conditions.⁴

During this Inquiry, the Committee heard that existing climate zones and weather patterns are changing with extreme weather events such as heatwaves, bushfires, droughts, storms, and flooding events becoming more common because of the effects of climate change.⁵ The research reinforces this view.

Chapter 2 canvasses climate and weather trends in Victoria, including historical changes. Below is a summary of how Victoria's climate trends have changed since 1910:

- the average temperature has risen by 1.2°C⁶
- Victoria experiences more hot days over 35°C in summer⁷
- southern Victoria is drier, but intense rainfall events are increasing⁸
- bushfire seasons are longer and hotter, drier conditions are leading to more frequent and severe bushfires⁹
- sea level rise and increased coastal erosion are affecting Victoria's coastline.¹⁰

1.5 Continuing examination of climate challenges

1.5.1 What did the Inquiry into the 2022 flood event in Victoria show?

The Environment and Planning Committee's first Inquiry for this Parliament was into the 2022 flood event in Victoria. The Inquiry was received on 22 February 2023. The Committee tabled an interim Report for the Inquiry on 28 April 2024 in Echuca during the Legislative Council's regional sitting. The Final Report was delivered on 30 July 2024.

The Victorian Government provided a response to the Inquiry on 6 February 2025. The response is comprehensive, outlining in detail the Government's intentions in relation to each of the Committee's 73 recommendations. It includes information about flood governance arrangements; planning systems and flood risk management; flood mitigation infrastructure; flood emergency warnings; resourcing and response of the Victoria State Emergency Service; and flood relief and recovery measures.

4 Australian Building Codes Board, *Climate zone map*, <<https://www.abcb.gov.au/resources/climate-zone-map>> accessed 26 February 2025.

5 Department of Energy, Environment and Climate Action, *Victoria's Climate Science Report*, 2024.

6 Australian Building Codes Board, *Climate zone map*.

7 Climate Change Australia, *Victoria's Changing Climate*, 2021, <<https://www.climatechangeinaustralia.gov.au/en/changing-climate/state-climate-statements/victoria>> accessed 26 February 2025.

8 Ibid.

9 Department of Energy, Environment and Climate Action, *Victoria's Climate Science Report* 2024.

10 Ibid.

Sixteen of the Committee's recommendations were supported in full, 6 in part, 43 were supported in principle, 6 recommendations remain under review and 2 were not supported.¹¹

In the Final Report, the Committee made a note on climate resilience, focussing on the role that technology plays to provide new insight and information to successfully consider future risk.

Flood modelling is one area where this can occur. Updated modelling of the Maribyrnong River was released by Melbourne Water just prior to the Committee's 10 May 2024 final hearing for the flood Inquiry. The Committee heard from Melbourne Water and expert members of the Flood Review Panel. In its Final Report, the Committee noted that:

The modelling clearly signals that flood risk is becoming more unpredictable with climate change. The increased flood risk identified by the new modelling was very challenging for many in local communities to receive. The updated flood model for the Maribyrnong was just the first of models being prepared and released across metropolitan Melbourne. It raises issues with the current built environment, future planning, and insurance matters.¹²

A concern of the Committee during the flood Inquiry was whether flood modelling was adequately funded. The need for accurate climate projections in flood modelling to successfully predict and understand the impacts of floods can be transposed to other areas of disaster management. Climate resilience means having scientific measures in place to understand Victoria's environment and to better predict the impacts of weather or other disaster event. This is so that mitigation measures can be put in place, and the State's policy focus can be on building resilience rather than disaster responsiveness alone.

The planning system was addressed during the flood Inquiry and is again a subject of this Report. Ensuring that mechanisms, policies and procedures are in place to mitigate climate risk and support the community is an enormous task and not just the purview of the Department of Energy, Environment and Climate Action (DEECA). DEECA coordinates extensive infrastructure, monitoring changes in the climate, water and other resources across more than 50 organisations. It also works with the Bureau of Meteorology. The Victorian Government has had to face the fact that the intensity and frequency of climate emergencies is increasing, and that it must respond appropriately.

The Committee notes that Recommendation 18 in the floods report, to introduce amendments to the *Planning and Environment Act 1987* (Vic) to ensure that climate change is addressed at all levels of the planning process, is one of the sixteen recommendations the Government supported in full. This Report discusses this issue further in Chapter 5.

¹¹ Victorian Government, *Response to the Inquiry into the 2022 flood event in Victoria*, 6 February 2025.

¹² Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into the 2022 flood event in Victoria*, 30 July 2024, p. xxv.

Flood modelling provides reliable climate-related data that allows governments, communities and individuals to prepare for the future. During this Inquiry, the Committee heard that it is of major importance to use this data well and to support communities and individuals with managing outcomes, which may be unexpected and, in some cases, costly.

Throughout this Report, the findings and recommendations of the Final Report for the 2022 flood event (including the Government's response to recommendations) are discussed where relevant.

A key message of this Report is that governments must work with communities to undertake resilience and mitigation measures to achieve successful outcomes. This is evident from the response to the flood modelling that has been released so far in Victoria.

1.6 Understanding what is most at risk for the built environment and infrastructure

Victoria is increasingly facing extreme weather events such as bushfires, floods, heatwaves, and storms. The scientific evidence suggests that these are all expected to intensify with climate change. Long-term risks include sea-level rise, changing precipitation patterns, increasing temperatures, coastal erosion, prolonged droughts and biodiversity loss.¹³

The Australian Government is currently developing Australia's first National Climate Risk Assessment and National Adaptation Plan. The Plan responds to the need for evidence-based decision-making concerning climate risk. The Plan considers issues such as:

- environment
- agriculture
- biodiversity
- health
- social and cultural way of life
- infrastructure
- First Nations values and knowledge
- economy.

¹³ Victorian Farmers Federation, *Submission 252*; Latrobe Valley Sustainability Group, *Submission 261*.

The Australian Climate Service, a partnership between the Bureau of Meteorology, CSIRO, the Australian Bureau of Statistics and Geoscience Australia, will identify the risks that are of national significance.¹⁴ The Committee hopes that this will be a useful process that can contribute to Victoria's assessment of climate risk.

As mentioned previously, Chapter Two identifies the primary risks to Victoria's infrastructure and built environment, and how these occur across metropolitan and regional areas, the cumulative impact of risk and how to measure risk. It looks at the significant risks facing Victoria's built environment and infrastructure and the impact on different parts of the community including vulnerable Victorians. It also looks at what the long-term implications are for the safety of Victorians.

Risks include the increasing frequency and intensity of extreme weather, the impacts of sea level rise, coastal erosion and urban heat island effects that may be more gradual, and the possible effect on transport, utilities and housing for example. The impacts can be wide ranging—as seen during the floods Inquiry—and include loss of homes and services, increasing insurance premiums, losses to agriculture and mental and physical health impacts.

1.7 Cost versus benefit of climate resilience initiatives

During our investigation, the Committee consulted with, and heard a wide range of opinions from, community members, builders, businesses, local governments, government departments and proponents of climate resilience initiatives. The Committee is aware that even after all of this consultation, there is still a diverse range of opinions on how to best move forward, and that some stakeholders remain uncertain about the cost versus benefit of implementing climate resilience initiatives. In preparing this Report, the Committee is cognisant of the cost versus benefit of recommendations made in the Report. However, the Committee does not have the resources to fully and accurately measure the costs and benefits of all recommendations.

FINDING 1: The more informed stakeholders are of the long-term benefits and potential savings of implementing climate resilience initiatives, the more prepared and committed they are to undertaking the required actions.

¹⁴ Australian Climate Service, *National Climate Risk Assessment*, <<https://www.acs.gov.au/pages/ncra-home>> accessed 26 February 2025.

Chapter 2

Climate change risks to Victoria's built environment and infrastructure

2.1 Introduction

This Chapter explores the key climate change risks for Victoria's built environment and infrastructure, outlining a risk profile of Victoria along with state-level impacts. This Chapter also describes a risk profile for metropolitan and regional environments respectively. Evidence to this Inquiry has raised significant concerns about the cumulative impacts of more frequent and intense weather events on resilience. The Committee examines the interaction between frequency and intensity and explores the impacts of cascading and compounding weather events. Finally, this Chapter explores future projections and considers several factors that may influence the nature of climate change risk and their impacts.

2.2 Key climate change risks for Victoria and the effect on the lives of Victorians

Required by the *Climate Change Act 2017* (Vic), *Victoria's Climate Science Report 2024* (VCSR24) 'summarises the best available scientific evidence on climate' for Victoria.¹ The Climate Change Act requires the Victorian Government to produce a climate science report every five years. VCSR24 is the most up to date iteration of this requirement. It builds on the knowledge presented in *Victoria's Climate Science Report 2019* (VCSR19) and provides 'updated climate projections for Victoria and reviews from leading academic institutions and experts on climate hazards'.² The Victorian Government's understanding of climate change risk comes from the scientific knowledge outlined in these reports.

The *Built Environment Climate Change Adaptation Action Plan 2022–2026* (released in 2022) outlines adaptation objectives and measures which are underpinned by the findings presented in VCSR19. VCSR24 and VCSR19 inform current definitions of terms such as 'climate change risk', 'extreme weather' and 'climate hazard' which are used in the Adaptation Action Plan. VCSR24 'builds on the evidence base that enables the government to deliver a range of 5-yearly legislated requirements' including the Built Environment Adaptation Action Plan.³

¹ Department of Energy, Environment and Climate Action, *Victoria's Climate Science Report 2024*, 2024, p. 4.

² Ibid.

³ Ibid., p. 2.

The Built Environment Adaptation Action Plan uses the term 'climate change risk', which is 'based on the consequences of past climate related hazards and assumptions made from future climate projections'.⁴ The Plan defines **risk** as the 'effect of uncertainty on objectives'.⁵ Both, VCSR19 and VCSR24 define risk as:

the potential for consequences where something of value is at stake and where the outcome is uncertain. Risk is often represented as a probability of occurrence of hazardous events or trends multiplied by the consequences if these events occur.⁶

Other key terms that relate to climate change risk include:

- climate hazard
- extreme weather.

VCSR24 explores the science of **climate hazard** in greater detail and defines it as a 'natural or human-caused event or condition that may cause damage and loss'.⁷ The 2024 report emphasises the importance of addressing climate hazards given their increasing intensity and frequency in Victoria.⁸

Extreme weather relates to the way climate change risk is conceptualised. VCSR24 offers the most comprehensive definition, describing it as:

A weather event that is rare at a particular place and time of year. Definitions of rare vary, but an extreme weather event would normally occur less than 10% of the time ... the term "extreme" is used in multiple differing contexts, including to describe:

- temperature: whereby a hot day is defined as within the 99th percentile maximum daily temperature, and a very hot day is defined as within the 99.9th percentile maximum daily temperature
- rainfall: with multiple types of intense rainfall considered extreme depending on the timescale (i.e. sub-hourly, sub-daily and multi-day)
- flooding: a flood that is likely to cause major rivers to overtop their banks, with an annual likelihood of 1-in-20 to 1-in-100, and rarer.⁹

⁴ Department of Climate Change, Energy, Environment and Climate Action, *Built Environment Climate Change Adaptation Action Plan 2022–2026*, 2022, p. 21.

⁵ Ibid., pp. 51–52.

⁶ The Department of Energy, Environment and Climate Action, *Victoria's Climate Science Report 2019*, 2019, p. 44; The Department of Energy, Environment and Climate Action, *Victoria's Climate Science Report 2024*, 2024, p. 99.

⁷ The Department of Energy, Environment and Climate Action, *Victoria's Climate Science Report 2024*, p. 97.

⁸ Ibid., pp. 4–5.

⁹ Ibid., p. 98.

Similarly, the Built Environment Adaptation Action Plan outlines a definition for **extreme weather events** as 'weather phenomena that are at the extremes of the historical distribution, including especially severe or unseasonal weather'.¹⁰

The definitions outlined above provide insight and context into the State Government's understanding of climate change risk. They lay the groundwork to understanding how Victoria's climate has changed overtime and the climate change risks facing Victoria's built environment and infrastructure.

2.2.1 Warming trends will shape the future and variability of climate change risk in Victoria

Evidence to the Inquiry widely agreed, and emphasised, that Victoria's climate and weather have become more extreme.¹¹ The frequency, intensity and duration of extreme weather, extreme weather events and climate hazards have increased.¹² This trend is attributed to Victoria's warming climate which has increased in temperature by 1.2°C since 1910.¹³ As a result of this trend, Victoria's climate is hotter and drier.¹⁴ Figure 2.1 shows Victoria's changing climate.

The Committee's recent Inquiry into the 2022 flood event in Victoria speaks to the increasing frequency and intensity of extreme weather events in Victoria. In its Final Report for that Inquiry, the Committee found that 'unprecedented' climatic conditions led to 'uniquely devastating flood conditions'.¹⁵

¹⁰ Department of Climate Change, Energy, Environment and Climate Action, *Built Environment Climate Change Adaptation Action Plan 2022–2026*, 2022, p. 51.

¹¹ The Department of Energy, Environment and Climate Action, *Victoria's Climate Science Report 2024*, p. 5; ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p. 2; Natural Hazards Research Australia, *Submission 113*, p. 1.

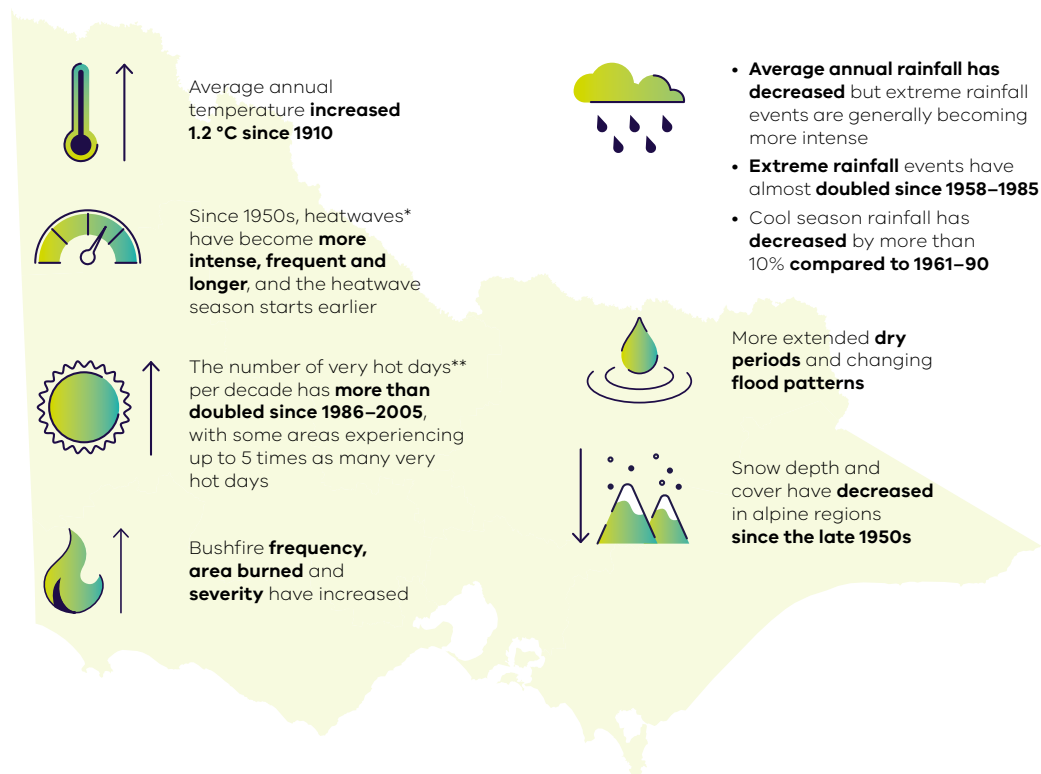
¹² Gippsland Climate Change Network, *Submission 68*, p. 1; Insurance Council of Australia, *Submission 46*, p. 3; City of Melbourne, *Submission 75*, pp. 4–5; Stephen Angus, Deputy Chair, Gippsland Climate Change Network Inc, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, p. 59; Adam Gellie, General Manager, Network Services, Powercor, public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 43; Victorian Council of Social Service, *Submission 237*, p. 6; Dr Kimberley Reid, Research Fellow, School of Earth Atmosphere and Environment, Faculty of Science, Monash University, public hearing, Melbourne, 9 October 2024, *Transcript of evidence*, p. 13.

¹³ *Victoria's Climate Science Report 2024*, p. 5.

¹⁴ *Victoria's Climate Science Report 2024*, p. 5; Infrastructure Victoria, *Submission 126, Attachment 1*, p. 7.

¹⁵ Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into the 2022 flood event in Victoria: Final Report*, 2024, p. 25.

Figure 2.1 Victoria's changing climate

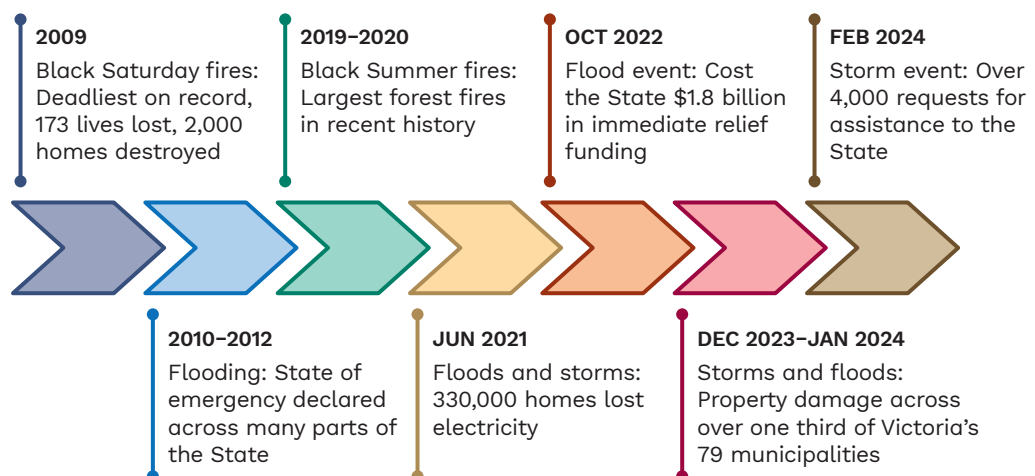


* A heatwave is defined as at least 3 consecutive days above the 95th percentile of daily average temperatures

** Very hot days are defined as days with daily maximum temperature exceeding the 99.9th percentile

Source: The Department of Energy, Environment and Climate Action, *Victoria's Climate Science Report 2024*, p. 5.

Figure 2.2 Examples of significant extreme weather events in Victoria



Source: Legislative Council Environment and Planning Committee.

Victoria's warming climate aligns closely with broader trends. Evidence showed that Australia's climate has warmed by approximately 1.5°C and the global climate has warmed by 1.1°C.¹⁶ Climate modelling has projected that Victoria's climate will continue to warm until at least 2050.¹⁷ Dr Kimberley Reid, a Research Fellow at Monash University and a representative of the Australian Research Council Centres of Excellence for Climate Extremes and 21st Century Weather told the Committee:

Surface air temperatures in Australia have already risen by about 1.5 degrees Celsius and are continuing to rise. Resilience to weather and climate hazards has always been necessary. Fires, floods, storms and heatwaves are nothing new to the state of Victoria. However, climate change is now moving the goalposts, so some of these hazards are likely to occur more often and be more severe as our climate continues to change.¹⁸

Moreover, the Intergovernmental Panel on Climate Change's *Sixth Assessment Report* stated that global warming will likely surpass 1.5°C in this century:

Global GHG emissions in 2030 implied by nationally determined contributions (NDCs) announced by October 2021 make it likely that warming will exceed 1.5°C during the 21st century and make it harder to limit warming below 2°C.¹⁹

Stakeholders contended that the risk of climate and weather extremes will increase as Victoria's climate rises in temperature.²⁰ The extent to which Victoria's climate rises in temperature and the associated risks increase, will depend partly on which emissions reduction scenario pathway governments globally choose to follow.²¹ Curtailing the impacts of climate and weather changes is essential for shaping future climate risks, and the options for government to prepare, adapt and mitigate these risks.

At a public hearing, Dr Kimberley Reid 'commend[ed] the Victorian Government for setting ambitious but necessary emissions targets to reach net zero by 2045', stating that 'Victoria is a national leader in climate action'.²² Dr Reid emphasised that '[t]he most immediate and direct way that we can improve climate resilience is to lower greenhouse gas emissions.'

¹⁶ Australian Bureau of Meteorology & CSIRO, *State of the Climate*, 2024, p. 2; IPCC, 2023: Summary for Policymakers. In: *Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, H. Lee and J. Romero (eds.)], IPCC, Switzerland, p. 4; The Department of Energy, Environment and Climate Action, *Victoria's Climate Science Report 2024*, p. 11.

¹⁷ Infrastructure Victoria, *Submission 126*; ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*.

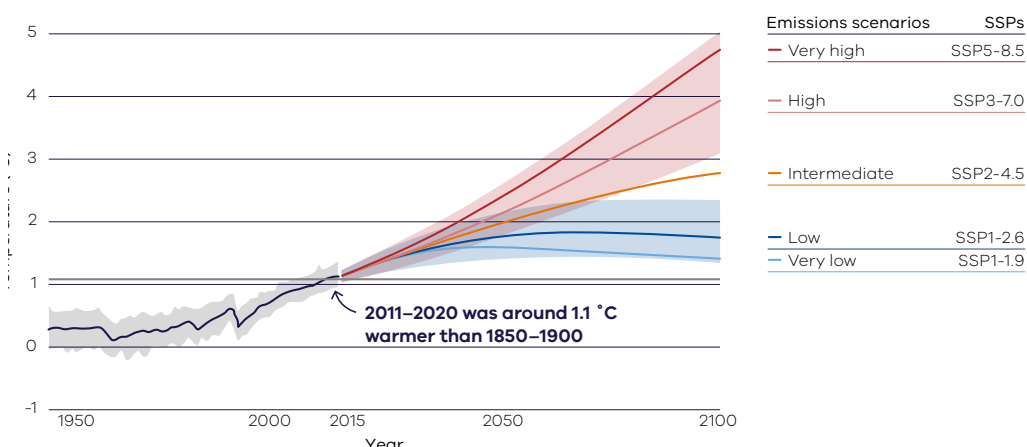
¹⁸ Dr Kimberley Reid, Research Fellow, School of Earth Atmosphere and Environment, Faculty of Science, Monash University, public hearing, Melbourne, 9 October 2024, *Transcript of evidence*, p. 13.

¹⁹ IPCC, 2023: *Summary for Policymakers*. In: *Climate Change 2023: Synthesis Report*, p. 10.

²⁰ ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p. 2.

²¹ Infrastructure Victoria, *Submission 126, Attachment 1*, p. 7; ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p. 2.

²² Dr Kimberley Reid, *Transcript of evidence*, p. 13.

Figure 2.3 Global temperature projections based on emissions scenarios

Source: The Department of Energy, Environment and Climate Action, *Victoria's Climate Science Report 2024*, p. 6.

The Committee was informed that there is some uncertainty concerning the nature of future climate risk due to the ambiguity over which emissions reduction pathway will be adopted; not only in Australia but globally.²³ The resilience of Victoria's built environment and infrastructure will depend on its capacity to manage present and future climate change risk.²⁴

As part of its submission, Infrastructure Victoria include its 2024 report *Weathering the Storm: Adapting Victoria's infrastructure to climate change*. Several other stakeholders also cited this report. This report argued that uncertainty can be minimised if climate change risks are assessed according to different emissions reductions scenarios.²⁵ The Weathering the Storm report further explained that if Victoria's built environment and infrastructure is prepared for risks based on historical understandings of climate hazards and weather extremes (where climate risk was low), then the impacts of climate change will be more pronounced.²⁶

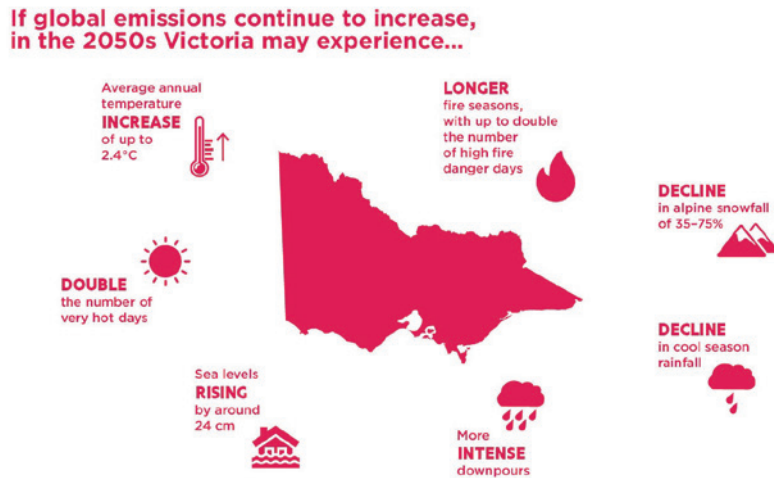
²³ ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p. 11.

²⁴ Associate Professor Ailie Gallant, Chief Investigator, School of Earth Atmosphere and Environment, Faculty of Science, Monash University, ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, public hearing, Melbourne, 9 October 2024, *Transcript of evidence*, p. 16.

²⁵ Infrastructure Victoria, *Submission 126, Attachment 1*, p. 34.

²⁶ *Ibid*, p. 10; Transurban, *Submission 47*, p. 2.

Figure 2.4 Projected changes to Victoria's climate in 2050 under a high emissions scenario



Source: Built Environment Climate Change Adaptation Action Plan 2022–2026, p. 19.

While there are some uncertainties around future projections for some climate change risks, with others there is a greater degree of certainty. Associate Professor Ailie Gallant, from the Australian Research Council Centre of Excellence for Climate Extremes and the Centre of Excellence for Weather of the 21st Century, told the Committee:

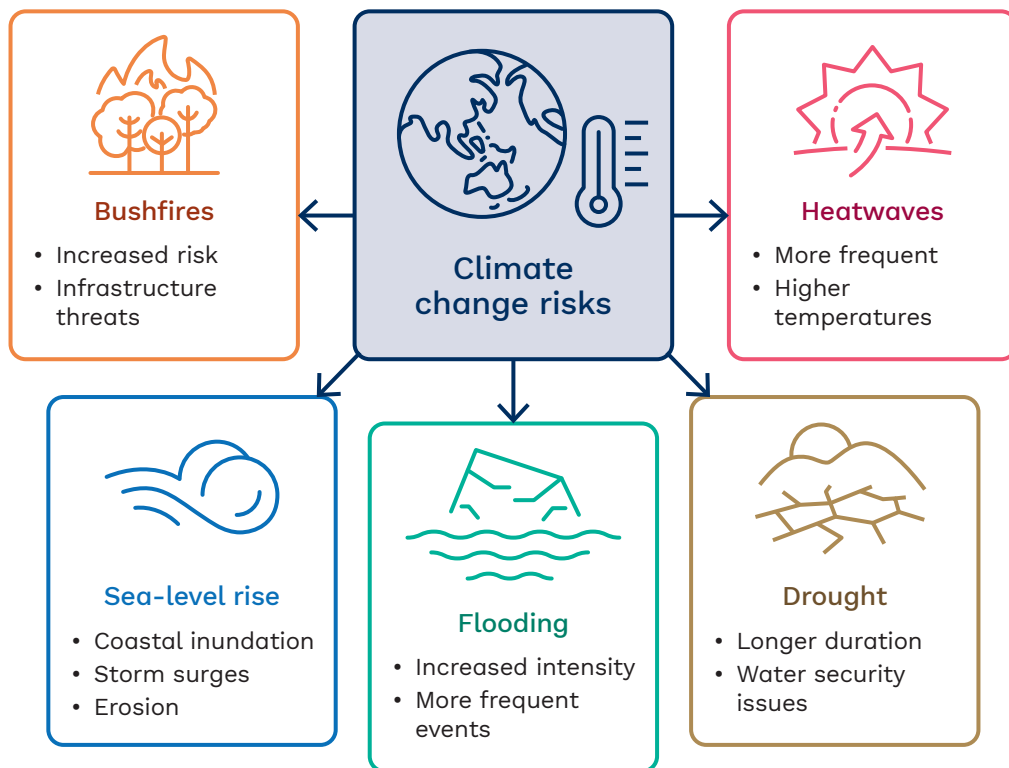
One thing I would say ... is with future climate change uncertainties in some areas we are very confident with what is going to happen. Sea level rise is one of those. Temperature is another one of those. Uncertainties happen at the more local level, and unfortunately with things like rainfall that is where the larger uncertainties lie. The uncertainties around sea level rise I would say are small. We should expect significant sea level rise into the future, and coastal communities should be planning for future sea level rise.²⁷

It is important to highlight the relationship between climate change risk and uncertainty. The government and community can better prepare Victoria's built environment and infrastructure where there is greater certainty of risk.

²⁷ Associate Professor Ailie Gallant, *Transcript of evidence*, p. 21.

2.2.2 Risk profile of Victoria: state-level impacts

Figure 2.5 State-level climate change risks



Source: Legislative Council Environment and Planning Committee.

The Built Environment Adaptation Action Plan identifies seven key climate change risks for Victoria's built environment and infrastructure. The risks are 'based on the consequences of past climate-related hazards and assumptions made from future climate projections' and consist of the following:

- bushfires
- heat
- drought
- coastal inundation, sea level rise and erosion
- flooding.²⁸

Similarly, VCSR24 identifies five key climate hazards that affect Victoria which are changing due to the climate warming:

- heatwaves
- bushfires

²⁸ Department of Climate Change, Energy, Environment and Climate Action, *Built Environment Climate Change Adaptation Action Plan 2022–2026*, pp. 23–37.

- floods
- sea level rise
- drought.²⁹

The Plan's understanding of climate change risk is based on the climate science presented in VCSR19, which includes projections for medium and very high scenarios for future global greenhouse gas emissions.³⁰ VCSR24 expands on the projections presented in VCSR19 and 'adds projections for two new emissions scenarios, with low and high emissions.'³¹ VCSR24 also provides a more detailed risk description for each climate hazard and its relationship with the different emissions pathways.

Table 2.1 summarises the Built Environment Adaptation Plan's understanding of the key climate change risks facing Victoria's built environment and infrastructure. Table 2.2 summarises VCSR24's understanding of the key climate hazards that affect Victoria.

Table 2.1 Summary of risks facing Victoria's built environment and infrastructure

Risk	Risk description
Bushfire	• The number, scale and intensity of bushfires over the past decade has grown significantly. • There is a strong consensus that climate change is increasing the risk of bushfire. • The number of high fire danger days is likely to rise (especially in alpine regions). • Built environments and infrastructure surrounded by vegetation and/or border vegetated areas are at higher risk. • Bushfire threatens essential infrastructure i.e. energy transmission and distribution lines. • The built environment and infrastructure are a potential source of ignition i.e. they can intensify bushfire risk in more intense fire conditions.
Heat	• Heatwaves are increasing in frequency. • The number of hot and very hot days is increasing—the number of very hot days per decade has more than doubled since 1986–2005. • More stress is placed on the built environment during heatwaves, hot days and very hot days due to increased demand for cooling and heat protection. • More stress is placed on energy infrastructure to cool the built environment i.e. increased demand from the grid for power. • Materials melting from heat i.e. railways, tarmac and concrete.
Drought	• Victoria will be drier in the long-term. • Periods of drought will likely increase in duration. • Reduced rainfall—an issue for water security in urban areas.

²⁹ Ibid., p. 21; The Department of Energy, Environment and Climate Action, *Victoria's Climate Science Report 2024*, p. 8.

³⁰ Department of Climate Change, Energy, Environment and Climate Action, *VCP24 Fact sheet - How do the Victorian Climate Projections 2024 compare with previous climate projections for Victoria?*, p. 2.

³¹ Ibid.

Risk	Risk description
Coastal inundation, sea level rise and erosion	- Sea level is projected to rise by about 24 cm in Victoria by the 2050s (relative to 1986–2005) under medium and high emissions scenarios. - Built environments and infrastructure located along the coast are likely to be more exposed to sea level rise, inundation and erosion. - The effects of sea level rise will be amplified when combined with events such as extreme rainfall or flooding.
Flooding	- The intensity of extreme rainfall is expected to increase by about 7% for each degree of warming. - The built environment and infrastructure (drainage and flood reduction infrastructure) is under more pressure to cope with increasingly larger and more frequent floods.

Source: Department of Climate Change, Energy, Environment and Climate Action, *Built Environment Climate Change Adaptation Action Plan 2022–2026*, pp. 23–37; Department of Climate Change, Energy, Environment and Climate Action, *Victoria’s Climate Science Report 2024*, pp. 43–85.

Table 2.2 Climate hazards identified in *Victoria’s Climate Science Report 2024*

Climate hazard	Observed changes in 2024
Heatwave	- The intensity, frequency and duration of heatwaves has increased. - A warming climate will result in longer, more intense and more frequent heatwaves. - The typical Victorian heatwave season is now longer and starts earlier. - Significant increases in the intensity, frequency and duration of concurrent droughts and heatwaves.
Bushfire	- Bushfires have become more frequent and severe, burning larger areas. - Fire activity is increasing in fire prone areas and will continue to do so. - Fire seasons are longer and the number of significant fire days has risen.
Flooding	- The magnitude of flooding in Victoria is changing— The magnitude of flooding extremes on both ends will become more pronounced. - Small floods are becoming smaller and large floods are becoming larger due to increases in extreme rainfall. - Extreme floods will likely increase in magnitude. - The frequency and severity of flood events have increased. - Flood risks will double in medium to high emissions scenarios by 2100.
Sea-level rise	- Sea levels will continue to rise in the next 100 years under all emissions scenarios. - A slower rate of sea-level rise depends on a lower emissions pathway. - Rates of sea-level rise to the north and south-east of Australia have been much higher than global averages.
Drought	- Droughts have become significantly warmer in the 21st century. - Future droughts will be hotter and may develop faster due to a thirstier atmosphere.

Source: Department of Climate Change, Energy, Environment and Climate Action, *Victoria’s Climate Science Report 2024*, pp. 43–85.

The Committee received evidence from several scientific organisations and academic institutions which identified key climate change risks to Victoria's built environment and infrastructure. The risks identified by these stakeholders closely reflected the climate change risks identified in the Built Environment Adaptation Plan. The most common climate change risks identified by these stakeholders included:

- extreme heat and heatwaves
- bushfire
- flooding
- sea level rise and coastal erosion
- storms and extreme wind events
- drought
- compound events.³²

Dr Kimberley Reid spoke to the Committee about the broad challenges each of these risks pose to Victoria's built environment and infrastructure, explaining:

Heatwaves are getting hotter, longer and more frequent and will continue to do so ... The intensity of extreme rainfall is expected to increase as well as more frequent swings between very wet and very dry conditions. We need to prepare for the possibility of longer and more intense droughts punctuated by periods of flooding. In other words, our infrastructure needs to be designed to handle both sides of water extremes. With increased heat and drought, bushfire risk will also increase. The number of days with very high fire danger in Victoria has already increased by 40%. Global sea levels have already risen by 20 centimetres, with an additional 20 centimetres expected in the next few decades. This means Victoria's valued coastal infrastructure is at risk of inundation and erosion. Extreme wind and hail can cause considerable damage to the built environment, but since they are short lived and challenging to observe, there is significant uncertainty about their future risks. Finally, as the risk of severe weather increases, so does the risk of compound extremes – that is, when multiple hazards combine to cause greater impacts than if the events had happened separately, such as heatwave followed by a bushfire or two back-to-back flooding events.³³

Moreover, the Australian Research Council Centres of Excellence for Climate Extremes and 21st Century Weather emphasised that Victoria's built environment is increasingly experiencing these climate change risks at greater intensity and frequency:

Victoria's mean maximum temperature in 2023 was 0.69°C above the 1961–1990 average, with above average temperatures across the state. Victoria experienced a

³² Natural Hazards Research Australia, *Submission 113*; Infrastructure Victoria, *Submission 126*; Infrastructure Victoria, *Submission 126, Attachment 1*; ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*; RMIT University - Urban Futures, *Submission 222*; La Trobe University Climate Change Adaptation Lab, *Submission 236*; Dr Kimberley Reid, *Transcript of evidence*, p. 13; Associate Professor Ailie Gallant, *Transcript of evidence*, p. 13; Associate Professor Rakibuzzaman Shah, Smart Power Systems Engineering, Federation University, public hearing, Melbourne, 3 September 2024, *Transcript of evidence*, pp. 16–17.

³³ Dr Kimberley Reid, *Transcript of evidence*, p. 13.

broad range of extreme events in 2023, including the hottest winter on record, the driest September on record and consecutive fire and floods across the Gippsland region of the state.³⁴

Infrastructure Victoria asserted that the State's 'infrastructure was not built for frequent and severe events.'³⁵ Similarly, Michael Nolan, Director, Climate Change Risk and Resilience at Aurecon, told the Committee 'with regard to the infrastructure side of things ... we are seeing significant impacts in the energy, water and transport space, but also telecommunications', further adding that:

Dealing with the existing assets is probably the biggest issue because the majority of those assets already exist and were designed for past climate, and the effort to maintain these assets under more extreme, regular events—variability degrades the asset, and the maintenance to prop them up may not be as effective or may require more funding in order to do so.³⁶

The Committee was advised that locations that were previously considered to be less exposed to climate change risk are now increasingly exposed.³⁷ Climate change risks such as floods and bushfires are increasing in magnitude, size and scale. Infrastructure and built environments that may not have faced climate change risks in the past will face them with increasing likelihood in the future. In general, there was agreement among stakeholders that the vulnerability of Victoria's built environment to climate change is more pronounced.³⁸

FINDING 2: Victoria's built environment faces increasing climate change risks, including bushfire, heatwaves, flooding, sea-level rise and drought, with intensifying impacts driven by rising global temperatures and more extreme weather events.

Extreme heat and heatwaves

The frequency and intensity of extreme heat and heatwaves in Victoria has increased and will continue to increase with climate change.³⁹ In its submission, the Australian Research Council Centres of Excellence for Climate Extremes and 21st Century Weather emphasised:

Heatwaves in Australia have been intensifying, becoming hotter, longer and more frequent and will continue to increase with climate change. Some projections show heatwaves may be up to 85% more frequent at 1.5–2°C warming levels. Concerningly,

³⁴ ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p.2.

³⁵ Infrastructure Victoria, *Submission 126*, p. 1.

³⁶ Michael Nolan, Director, Climate Physical Risk and Resilience, Aurecon, public hearing, Melbourne, 6 November 2024, *Transcript of evidence*, p. 20.

³⁷ Ibid.

³⁸ Energy Efficiency Council, *Submission 38*, pp. 1–2; Council Alliance for a Sustainable Built Environment, *Submission 111*, p. 5; Infrastructure Victoria, *Submission 126*, p. 1; Infrastructure Victoria, *Submission 126, Attachment 1*, p. 3; *Submission 180*, p. 1; *Submission 188*, p. 2.

³⁹ ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p. 3.

local scale extreme temperatures can increase at a significantly higher rate than the global average temperature.⁴⁰

Urban Futures (RMIT University) made a similar point illustrating that extreme heat and heatwaves will pose a much greater risk to Victoria as the climate continues to warm:

The increasing frequency, duration and intensity of heatwaves in Victoria is expected to increase, with recent IPCC projections indicating heatwave frequency may rise by 85% if global warming increases from 1.5°C to 2.0°C, and it may rise by four times for 3°C warming. This could mean that Victorian summers increasingly involve multiple instances where the city faces 3+ days of intense heat (exceeding 40°C).⁴¹

Stakeholders raised several common concerns in relation to the risk extreme heat and heatwaves pose to Victoria's built environment and infrastructure. Several stakeholders mentioned how extreme heat and heatwaves can damage infrastructure as high temperatures can cause surfaces to melt, crack or soften.⁴² The Australian Research Council Centres of Excellence for Climate Extremes and 21st Century Weather explained how extreme heat and heatwaves affect the built environment and infrastructure:

Extreme heat impacts the built environment, causing the buckling of roads and footpaths, damage to train tracks, the expansion and cracking of building materials and reduced efficiency of transmission lines and generators disrupting energy supply. Increased energy demand for cooling puts further strain on power supplies potentially causing blackouts.⁴³

Several stakeholders also added that extreme heat and heatwaves put increased demand on cooling systems, straining power supplies and potentially leading to blackouts.⁴⁴ Chapter 6 examines the need to increase the climate resilience of key infrastructure, including electricity and telecommunications.

The 'urban heat island effect' was another common issue raised by many stakeholders in relation to extreme heat and heatwaves.⁴⁵ Associate Professor Ailie Gallant spoke to the Committee about how the built environment 'can compound the effects of weather, climate and climate change', explaining that:

the built environment retains heat, known as the urban heat island effect. This effect causes urbanised areas to be warmer than surrounding non-urbanised areas,

⁴⁰ Ibid, pp. 3–4.

⁴¹ RMIT University - Urban Futures, *Submission 222*, p. 3.

⁴² Youth Affairs Council Victoria, *Submission 142*, p. 11; ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p. 4.

⁴³ Ibid.

⁴⁴ Friends of the Earth Melbourne, *Submission 192*, p. 6.

⁴⁵ City of Stonnington, *Submission 42*, p. 2; Robert Hart, *Submission 74* p. 4; ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, pp. 3–4; Associate Professor Ailie Gallant, *Transcript of evidence*, pp. 13–15.

particularly at night. Heat islands in excess of 5 degrees have been recorded in Melbourne.⁴⁶

As extreme heat and heatwaves increase in frequency and intensity, the urban heat island effect will materialise more often in the built environment. Built environments that lack heat-sensitive or heat-minimising urban designs will experience the urban heat island effect more intensely. As such, there is an increased risk to the built environment if Victoria's climate continues to warm. Associate Professor Ailie Gallant added:

Particularly during heatwaves we find urban heat islands are worse than they normally are, by around 3 degrees or so. Let us just say you have a normal urban heat island of around 2 degrees; that would mean that you have an urban heatwave of 5 degrees during a heatwave instead of 2 degrees. What that can mean is that increases people's vulnerability to those heat extremes. There are certainly cities around the world right now who are actively incorporating that planning for what we call heat-sensitive cities into urban design and planning to reduce temperatures, because if we do not, we will continue to see urban areas likely warm at a faster rate than non-urban areas.⁴⁷

Several stakeholders emphasised that many buildings are not designed for extreme heat or heatwaves.⁴⁸ In its submission, Friends of the Earth noted heat is responsible for more deaths in Australia compared to other natural hazards partly due to the vulnerability of built environments to heat:

One of the reasons why extreme heat kills more Australians than any other climate disaster is that most of our buildings are not designed or built for extreme heat in Australia.⁴⁹

Stakeholders emphasised that many buildings in Victoria have poor thermal performance, and they struggle to maintain a comfortable internal temperature during periods of extreme heat or heatwaves.⁵⁰ Stakeholders also mentioned that buildings often lack designs which promote passive cooling and rely on air-conditioning or other energy-reliant cooling products to ensure they are comfortable.⁵¹

⁴⁶ Associate Professor Ailie Gallant, *Transcript of evidence*, p. 13.

⁴⁷ *Ibid.*, p. 15.

⁴⁸ City of Melbourne, *Submission 75*, p. 4; Council Alliance for a Sustainable Built Environment, *Submission 111*, p. 5; Doctors for the Environment Australia, *Submission 122*, p. 3; Friends of the Earth Melbourne, *Submission 192*, p. 5; RMIT University - Urban Futures, *Submission 222*, p. 4; Victorian Council of Social Service, *Submission 237*, p. 7; ANMF (Vic Branch), *Submission 256*, pp. 9-10; Sweltering Cities, *Submission 257*, p. 3.

⁴⁹ Friends of the Earth Melbourne, *Submission 192*, p. 5.

⁵⁰ Dan Cowdell, Chief Executive Officer, Geelong Sustainability, Melbourne, 20 November 2024, *Transcript of evidence*, p. 23; Alex Trudzik, Policy Officer, Community Housing Industry Association Victoria, Melbourne, 6 November 2024, *Transcript of evidence*, pp. 41-42; Council Alliance for a Sustainable Built Environment, *Submission 111*, pp. 5-7; Yarra City Council, *Submission 25*, p. 2; Greater Dandenong environment group, *Submission 226*, p. 2; RMIT University - Urban Futures, *Submission 222*, p. 7; YIMBY Melbourne, *Submission 138*, p. 10; Energy Efficiency Council, *Submission 38*, p. 2.

⁵¹ James Legge, Founding Director, Six Degrees Architects, Australian Institute of Architects, Melbourne, 6 November 2024, *Transcript of evidence*, p. 32; David Wagner, President Victorian Chapter of the Australian Institute of Architects, Australian Institute of Architects, Melbourne, 6 November 2024, *Transcript of evidence*, p. 33.

Bushfire

The Committee received several submissions which consistently noted that climate change is increasing the risk of bushfire. The Australian Research Council Centres of Excellence for Climate Extremes and 21st Century Weather stated that 'extreme fire weather has been increasing, and it is expected to worsen with climate change.'⁵² The Research Council went on to add:

The impacts from bushfires are expected to increase with climate change. In Australia, extreme fire weather days have become more frequent, and the fire season has lengthened since 1950 in various locations, while projections indicate that this trend will continue. The number of days of very high fire danger has increased by 40% and may triple for regions of Victoria by 2100.⁵³

The Committee received evidence from stakeholders that identified the following as more vulnerable to bushfire:

- roads
- electricity grids
- telecommunications
- buildings.⁵⁴

While bushfires rarely cause direct damage to roads, they can weaken the surrounding landscape through erosion and debris. Bushfire-induced landslides are more likely to cause significant damage to roads compared to the bushfire event itself.⁵⁵ However, bushfires do pose a much more direct risk to infrastructure such as electricity grids and telecommunications assets. In its submission, Infrastructure Victoria emphasised the level of destruction bushfires can inflict on infrastructure and the built environment: 'more frequent bushfires can destroy critical buildings and facilities, electricity and telecommunication cables, mobile phone towers, and block roads and rail lines.'⁵⁶

Floods

Floods were identified as a significant risk to Victoria's built environment and infrastructure, something that was identified in the Committee's *Inquiry into the 2022 flood event in Victoria*. A key concern amongst stakeholders was the projected increase in rainfall intensity.⁵⁷ The Australian Research Council Centres of Excellence for Climate

⁵² ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p. 7.

⁵³ Ibid.

⁵⁴ Infrastructure Victoria, *Submission 126, Attachment 1*, pp. 25–27; Associate Professor Rakibuzzaman Shah, *Transcript of evidence*, pp. 16–17; John Bradley, Secretary, Department of Energy, Environment and Climate Action, public hearing, Melbourne, 20 November 2025, *Transcript of evidence*, p. 76; Dr Bronwyn Lay, Strategic Lead, Climate Justice Unit, Federation of Community Legal Centres Vic, public hearing, Melbourne, 20 November 2025, *Transcript of evidence*, pp. 14–15.

⁵⁵ Ibid.

⁵⁶ Infrastructure Victoria, *Submission 126, Attachment 1*, p. 7.

⁵⁷ *Submission 42*, p. 3; *Submission 192*, p. 5; Sue Phillips, Executive Officer, Barwon South West Climate Alliance, public hearing, Aireys Inlet, 23 October 2024, *Transcript of evidence*, pp. 4–5.

Extremes and 21st Century Weather stated that Victoria can expect that 'rainfall variability and intensity will increase, with more frequent swings from flooding rains to extreme droughts.'⁵⁸ The submission went on to add:

It is expected that rainfall variability and intensity will increase, with more frequent swings from flooding rains to extreme droughts. The atmosphere can hold 7% more moisture per 1°C of warming, making heavier rainfall possible.⁵⁹

The City of Stonnington noted forecasts which predict an 18.5% increase in rainfall intensity in Australia by the year 2100.⁶⁰ The Council emphasised that the risk of storm events and flooding for its built environment and infrastructure has increased. These events are becoming more severe.⁶¹ The Committee received evidence from stakeholders that indicated certain areas are particularly vulnerable to flooding:

- low-lying coastal regions
- areas located near rivers and creeks
- areas with reduced permeable surfaces due to increased development.⁶²

In relation to flooding, stakeholders commonly identified the following asset types as high risk for damage:

- roads
- drainage systems
- public transport networks.⁶³

Several stakeholders emphasised that current drainage systems are often inadequate to handle the increased volume of water, exacerbating flooding.⁶⁴ Many councils emphasised that their drainage systems are considered substantially under capacity and cannot cope with the rising intensity and severity of floods.⁶⁵

Evidence to the Inquiry noted that intense rainfall events are causing flash flooding, which damages roads, buildings, drainage systems and other infrastructure.⁶⁶ The Australian Research Council Centres of Excellence for Climate Extremes and 21st Century Weather further detailed the risks of flash flooding on infrastructure and the built environment:

⁵⁸ ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p. 5.

⁵⁹ Ibid.

⁶⁰ *Submission 42*, p. 3.

⁶¹ Ibid, p. 2.

⁶² *Submission 155*, p. 1; *Submission 42*, p. 3; *Submission 189*, pp. 1–2.

⁶³ *Submission 75*, p. 3; *Submission 158*, pp. 1–4; *Submission 252*, p. 5; *Submission 281*, p. 10; John Bradley, *Transcript of evidence*, p. 81.

⁶⁴ *Submission 42*, p. 2; *Submission 197*, p. 11.

⁶⁵ *Submission 42*, p. 2; *Submission 200*, p. 3; Pete Mercouriou, Senior Sustainability Officer (and Chair/President of Alliance), City of Greater Geelong, public hearing, Aireys Inlet, 23 October 2024, *Transcript of evidence*, p. 4.

⁶⁶ Klaus Brodeck, Captain, Emerald Fire Brigade, public hearing, Emerald, 10 October 2024, *Transcript of evidence*, pp. 45–46.

there are important implications for flash flooding for stormwater systems that are not designed for these intense bursts of heavy rainfall. Pooling of fast-moving water, landslides and the flow of debris can result, causing damage to infrastructure such as buildings, roads (eg. potholes, hidden snags), bridges and power lines, water supply as well as loss of agricultural crops and livestock.⁶⁷

Other submissions noted that rising sea levels and storm surges exacerbate the risk of flooding to low-lying coastal areas, leading to permanent inundation and damage to infrastructure.⁶⁸ The Port Phillip Bay Coastal Hazard Assessment noted that 2% of the City of Port Phillip is currently within the storm tide inundation zone. This is projected to grow to 25% with a 1.1m sea level rise.

As already noted in this Chapter, Victoria has recently experienced extreme flooding which caused damage to infrastructure and other built assets. In its *Inquiry into the 2022 flood event in Victoria* (which affected 81% of all local government areas in Victoria),⁶⁹ the Committee received first-hand accounts of the devastating and far-reaching damage to affected communities. For example, in the town of Rochester, which was heavily impacted by extreme flooding, every dwelling experienced some level of flood damage.⁷⁰ Residents of Northern Victoria expressed disappointment with the Victorian Government's response to the 2022 flood inquiry, describing it as inadequate and lacking urgency. Of the 73 recommendations made in the Final Report, only 16 were fully supported, with many others delayed or under review. Community members remain concerned about the lack of commitment to key measures such as upgrading levee banks and assisting residents in flood-prone areas. There is also frustration that the government did not apply for federal grants available to help elevate homes, as seen in other flood-affected states.

Sea level rise, storm surges and coastal erosion and inundation

Stakeholders raised significant concerns to the Committee regarding sea level rise, coastal inundation and coastal erosion, emphasising that they represent major risks to Victoria's built environment and infrastructure.⁷¹ Sea level rise poses an unavoidable risk as Associate Professor Ailie Gallant explained to the Committee:

Sea level rise unfortunately is one of those things that are baked into climate change for a very long time. We will continue to get sea level rise with current climate changes for 100 more years – many, many more years – into the future.⁷²

Urban Futures (RMIT University) stated that '[o]ver half the Australian coastline is vulnerable to recession from rising sea level, with 80% of the Victorian coast and 62%

⁶⁷ ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, pp. 5–6.

⁶⁸ *Submission 68*, p. 1; *Submission 155*, p. 1; *Submission 181*, p. 2.

⁶⁹ Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into the 2022 flood event in Victoria*, 2024, p. 27.

⁷⁰ *Ibid.*

⁷¹ *Submission 222* pp. 4–5; *Submission 48*, p. 2; *Submission 181*, p. 2; *Submission 194*, p. 2.

⁷² Associate Professor Ailie Gallant, *Transcript of evidence*, p. 21.

of the Queensland coast at risk.⁷³ Climate projections suggest that by 2100, sea-level rise is expected to impact nearly every community along Victoria's coastline.⁷⁴ The Victorian Marine and Coastal Council underscored Victoria's vulnerability to sea level rise, noting that many critical infrastructure assets—which support economically significant geographical areas in Victoria—are located along the coast:

that extensive infrastructure (roads, water treatment plants, ports) supporting the economic viability of Greater Melbourne, Greater Geelong, Portland and the Gippsland Lakes region is located on the coast ... the majority of Victoria's most expensive real estate (per hectare) is on the coast.⁷⁵

Storm surges are becoming more frequent and intense, causing higher water levels in coastal areas.⁷⁶ Urban Futures (RMIT University) explained that the risk of coastal flooding has increased due to the interaction between rising sea levels and storm events:

Sea level has already risen and continues to rise due to climate change. Climate change exacerbates coastal flooding from a storm surge as the storm rides on higher sea levels.⁷⁷

Similarly, Associate Professor Ailie Gallant emphasised that extreme winds and storm events further intensifies coastal inundation:

The other thing we have to consider with sea level rise is there is the general trend but then there are also changes in storms, and those changes in storms can lead to what we call storm surge. That is the winds pushing the ocean in, and that leads to an extra risk as well ...⁷⁸

Victoria's infrastructure and built environment face heightened risk of coastal erosion which has intensified because of storm surges and rising sea levels.⁷⁹ Martin Gill, Chief Executive Officer for the Borough of Queenscliffe, explained to the Committee how storm surges are affecting the Council's infrastructure:

The other infrastructure that we are really conscious of is the end of our stormwater infrastructure and how that is interacting with areas. As you all know, we are also seeing the increase of the groundwater in conjunction with the increase of the sea level. So we are now in a position where for a lot of our infrastructure at the coastal edge and around those 1100 homes that will go under, our infrastructure is interacting with groundwater more often and also we are getting water up through that infrastructure.⁸⁰

⁷³ Submission 222 pp. 4–5.

⁷⁴ Submission 194 p. 2.

⁷⁵ Submission 194, p. 3.

⁷⁶ Martin Gill, *Transcript of evidence*, pp. 6–7; Submission 192, p. 7; Cr Tom Crook, *Transcript of evidence*, p. 13; Chris Pike, *Transcript of evidence*, pp. 2–3.

⁷⁷ Submission 222, p. 4.

⁷⁸ Associate Professor Ailie Gallant, *Transcript of evidence*, p. 21.

⁷⁹ Submission 291, p. 1.

⁸⁰ Martin Gill, *Transcript of evidence*, p. 7.

The economic impacts of sea level rise and storm surges are expected to be significant. One report estimated these impacts could result in \$442 billion in economic losses by 2100.⁸¹ In its submission, the Victorian Marine and Coastal Council suggested that in 2100 Victoria's built environment and infrastructure (including residential and commercial assets and infrastructure) may lose more than \$337 billion in value from sea level rise and storm surges. This damage could lead to financial instability for both coastal communities and the State.⁸²

Impact of Coastal Erosion

Initiated in 2020, the Cape to Cape Resilience Project was established to address long-term climate risks along the Bass Coast and South Gippsland shoreline, including Inverloch. While its intent was to identify pathways for adaptation, including nature-based dune rehabilitation and retreat strategies, community evidence suggests that delays in implementation have weakened public trust in the process.

The Inverloch Surf Life Saving Club and the Inverloch Tourism Association raised significant concerns about the project's timelines, risk classifications, and economic modelling. Despite clear evidence of worsening erosion and rising sea levels, key hazards have been assessed as only 'medium' risk—a designation that does not trigger immediate action under current policy frameworks.

Stephen Duncan, Treasurer for the Inverloch Surf Life Saving Club stated that 'The report is already out of date.'⁸³ We are at the 2040 trigger point now, not 15 years from it.'⁸⁴

FINDING 3: The current Cape to Cape Resilience Project does not adequately reflect the immediacy of the threat faced by Inverloch and surrounding communities. Key assumptions are outdated, and risk classifications are too low to trigger timely intervention.

RECOMMENDATION 1: That the Victorian Government urgently revise the Cape to Cape Resilience Plan to incorporate updated environmental data, recent storm impacts, and local stakeholder input and include short-term engineered protection options alongside longer-term adaptation strategies.

Stakeholders describe a system where no single authority takes ownership, and departmental overlap leads to stagnation. Community members expressed frustration at the lack of urgency and the absence of short-term trial solutions such as rock walls or groynes—options that are already working elsewhere along the same beach.

⁸¹ *Submission 142*, p. 13.

⁸² *Submission 194*, p. 2.

⁸³ Stephen Duncan, *Transcript of evidence*, p. 48.

⁸⁴ *Ibid.*

The risks include the loss of critical infrastructure, economic decline, increased safety hazards, environmental degradation, social impacts, and escalating costs due to delayed action. Immediate intervention is necessary to prevent these outcomes.

Case Study 2.1 The impacted coastal erosion case study 1: Inverloch Surf Life Saving Club

The Inverloch Surf Life Saving Club (SLSC) provides a clear example of coastal vulnerability. Once buffered by wide dunes, the club now sits just 10 metres from the encroaching ocean. Since 2013, over 60 metres of protective dune has been lost, placing both infrastructure and public safety at significant risk.

Club President Glenn Arnold and Treasurer Stephen Duncan shared with the Committee their concerns about delayed reports, underwhelming interim measures, and unclear decision-making structures. They stressed the need for timely, coordinated action.

Glen Arnold, President, SLSC stated:

'We are literally metres from dropping a multimillion-dollar building into the ocean ...'

'... the longer this takes the more it will ultimately cost to resolve it.'

'The layers of bureaucracy are ultimately just crippling any decision-making and paralysing any action moving forward.'

Stephen Duncan, Treasurer, SLSC stated:

'I was involved in a rescue late last year in the entrance area to Andersons Inlet ... That is because of the erosion that is pushing it all into that area and that is changing on a daily basis.'

'Erosion is forcing 'beachgoers' to move 'further down the beach, away from' lifesaving resources, increasing risks. It is spreading the risk down the beach and around the corner into the inlet.'

The Inverloch Tourism Association estimates economic losses could exceed \$7 million annually if erosion continues unchecked. Inverloch attracts over 20,000 visitors each year and contributes over 5,000 volunteer patrol hours. The beach's value extends well beyond recreation – it's a pillar of the local economy and social fabric.

Source: Glen Arnold, President, Inverloch Surf Life Saving Club, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, pp. 53–55; Stephen Duncan, Treasurer, Inverloch Surf Life Saving Club, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, pp. 49–53.

Case Study 2.2 The impacted coastal erosion case study 2: Loch Sport

Loch Sport's residents have long raised the alarm on coastal erosion, advocating for groynes and rock revetments to protect their foreshore. Despite years of lobbying and a \$400,000 grant in 2022–23, no physical works have commenced. The community remains frustrated by continued delays and a perceived lack of responsiveness.

Tony Patchell, Loch Sport Business and Tourism Association told the Committee:

'It has been going on for years, and, as I say, when we finally got some money we were told, "It's gone." It has been spent on reports.'

'We are a tourist town.'

'if the tourists go away ... the town is finished.'

Source: Tony Patchell, Secretary, Loch Sport Business and Tourism Association, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, pp. 46–50.

Storms and extreme wind events

An emerging threat identified throughout the Inquiry was severe storms and extreme wind events, characterised by high winds, flash flooding, and lightning. The Committee was told that storms and extreme wind events are becoming more frequent and intense due to climate change, and this trend will likely continue.

Dr Kimberley Reid projected that as temperatures rise, storms will become more intense, leading to stronger wind events.⁸⁵ Additionally, the temperature difference between land and sea, especially during warmer winters, will likely intensify wind strength.⁸⁶ These increased storm intensities, coupled with rising sea levels, could also lead to storm surges, further threatening coastal infrastructure.⁸⁷ Extreme wind events are difficult to predict in terms of timing and location, making it challenging to prepare communities in advance, as highlighted by Dr Kimberley Reid:

Extreme wind is unfortunately very challenging to observe, because it happens so quickly and we are relying on station data, which is scattered around, to observe these events. So unfortunately, there is a lot of uncertainty surrounding this.⁸⁸

Although future trends in hailstorms remain uncertain, some stakeholders anticipated that they will be affected by climate change.⁸⁹ Victoria has already seen varying trends in hail-prone days, with some regions experiencing increased frequency.⁹⁰

⁸⁵ Dr Kimberley Reid, *Transcript of evidence*, p. 20.

⁸⁶ Dr Kimberley Reid, *Transcript of evidence*, p. 21.

⁸⁷ Associate Professor Allie Gallant, *Transcript of evidence*, p. 21.

⁸⁸ Dr Kimberley Reid, *Transcript of evidence*, p. 20.

⁸⁹ ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p. 8.

⁹⁰ *Ibid.*, p. 9.

Extreme wind events pose direct threats to infrastructure, with strong winds causing significant damage, as evidenced by the severe thunderstorm event in February 2024 that disrupted power to 530,000 people.⁹¹ Stakeholders commonly identified the following issues in relation to the risk that storms, and extreme wind pose to the built environment and infrastructure:

- Powerlines and electrical infrastructure are particularly vulnerable to high winds and lightning strikes.⁹²
- Telecommunications infrastructure can be damaged, causing interruptions to phone and internet services.⁹³
- Roads can be damaged or blocked by fallen trees, debris, and flash flooding, disrupting transport and isolating communities.⁹⁴

In examining the impact of storms on Victoria's built environment and infrastructure, Urban Futures (RMIT University) emphasised that:

the consequences for the built environment are increased likelihood of damages to buildings, roads and bridges, including essential infrastructure such as power, transport, telecommunication, water and sewerage systems.⁹⁵

Severe storms with high winds, flash flooding, and lightning are causing damage to properties, powerlines, and infrastructure.⁹⁶

Drought

The Committee received several submissions that stressed the risk that drought poses to Victoria's built environment.⁹⁷ Rainfall in south-eastern Australia has decreased by around 10% per decade since the late 1990s, and this trend is expected to continue, increasing the severity and frequency of drought.⁹⁸

Several stakeholders noted that drought poses a risk to the built environments. Water restrictions and scarcity can cause green spaces to dry out and street trees to die, decreasing the liveability of cities.⁹⁹ Tiffany Crawford, Co-Director, Climate Change and City Resilience for Melbourne City Council, explained how water scarcity poses a risk to liveability in the built environment:

⁹¹ Ibid.

⁹² *Submission 75*, p. 6; ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p. 9; Infrastructure Victoria, *Submission 126, Attachment 1*, p. 7.

⁹³ *Submission 75*, p. 6; ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p. 9; Infrastructure Victoria, *Submission 126, Attachment 1*, p. 7.

⁹⁴ Ibid., p. 7.

⁹⁵ *Submission 222*, p. 5.

⁹⁶ Klaus Brodeck, *Transcript of evidence*, pp. 45–46; *Submission 68*, p. 1.

⁹⁷ *Submission 68*, p. 1; *Submission 252*, p. 1; Dr Kimberley Reid, *Transcript of evidence*, p. 13.

⁹⁸ ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p. 6.

⁹⁹ *Submission 222*, p. 4.

We will face ongoing challenges in maintaining our trees and open space ... but these assets are critical as well in the services that they provide in adapting our city and cooling it.¹⁰⁰

Zoe Roloff, Acting Director, Sustainability at Deakin University affirmed that drought will have an 'impact ... on community sport and access to green open spaces.'¹⁰¹

Compound events

Several stakeholders discussed compound events as a significant risk to Victoria's built environment and infrastructure.¹⁰² Inquiry evidence emphasised the interconnectedness of climate risks and the potential for compounding impacts as critical considerations. The submission from the Australian Research Council Centres of Excellence for Climate Extremes and 21st Century Weather defined 'compound event' as:

Many weather-related disasters are compound events, where multiple weather and climate hazards come together to cause significant impacts. Compound events arise from multiple hazards or drivers, a succession of hazards, hazards in multiple connected locations, or preconditioning.¹⁰³

These events, where multiple disasters occur either at the same time or in rapid succession, have combined effects that exceed the impact of individual events.¹⁰⁴ Compound events amplify challenges, leading to prolonged recovery periods that can strain mental health and community well-being. They also pose risk to infrastructure, often damaging roads, isolating communities and increasing maintenance and repair costs. Stakeholders identified the following as common examples of compound events in Victoria:

- bushfire followed by intense rainfall events
- heatwave followed by a bushfire
- two back-to-back flooding events
- drought, bushfire, and flooding, intersected by COVID-19
- storms in February 2024 causing power outages, impacting transportation and telecommunications.¹⁰⁵

Future climate change challenges, if not appropriately mitigated, are expected to result in an increase in sustained hot and dry compound events across Australia.¹⁰⁶ While changes in wet and windy compound events are less predictable.

¹⁰⁰ Tiffany Crawford, *Transcript of evidence*, p. 3.

¹⁰¹ Zoe Roloff, *Transcript of evidence*, p. 31.

¹⁰² *Submission 133*, p. 13; *Infrastructure Victoria, Submission 126, Attachment 1*, p. 17; ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p. 10.

¹⁰³ ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p. 10.

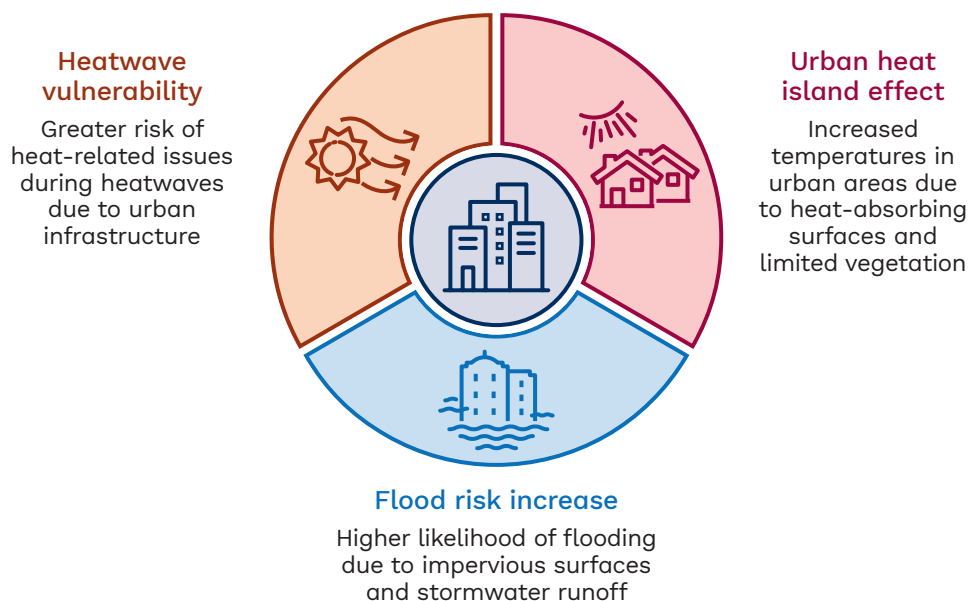
¹⁰⁴ *Submission 113*, p. 1.

¹⁰⁵ *Submission 133*, p. 15.

¹⁰⁶ ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p. 10.

2.2.3 Metropolitan risk profile

Figure 2.6 Key climate change risks for metropolitan Melbourne



Source: Legislative Council Environment and Planning Committee.

Metropolitan Melbourne will experience the impact of climate change differently to regional and rural Victoria as specific geographic and demographic characteristics influence its exposure to risk. Metropolitan Melbourne has a higher population density with larger numbers of people living in more contained urban areas. Around 72.5% of the State's population live in metropolitan Melbourne.¹⁰⁷

Metropolitan Melbourne's built environment is characterised by a high concentration of impervious surfaces and a relative lack of vegetation.¹⁰⁸ This combination contributes to a range of climate-related issues, notably the urban heat island effect, and increased flood risk.¹⁰⁹

Urban heat really refers to areas that are built up. These are typically areas like cities, where there is a lot of concrete asphalt and very little vegetation and also where there are concentrations of people ... The areas where we do see urban heat really tend to be in the larger built-up areas, cities like Melbourne and even Geelong ...

Associate Professor Ailie Gallant, *Transcript of evidence*, p. 4.

¹⁰⁷ ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p. 5.

¹⁰⁸ *Submission 42*, p. 3; *Submission 216*, p. 1; *Submission 222*, p. 3.

¹⁰⁹ Tiffany Crawford, *Transcript of evidence*, p. 3;

The prevalence of materials such as asphalt and concrete in metropolitan areas leads to greater heat absorption and retention.¹¹⁰ Whereas, this effect is less evident in rural settings as highlighted by Associate Professor Ailie Gallant: 'you can go 5 kilometres out to a rural area and you will not see that urban heat island impacting so much'.¹¹¹ These materials act like 'big hot water bottles', heating up during the day and re-emitting that heat at night, exacerbating the urban heat island effect.¹¹² Additionally, these surfaces prevent water from being absorbed into the ground, increasing the risk of stormwater runoff and flooding.

The limited amount of vegetation in metropolitan Melbourne means less shade, and less evaporative cooling, contributing to higher temperatures.¹¹³ This lack of vegetation is particularly impactful in inner-city areas, where the combination of heat-absorbing materials and minimal tree canopy create intense heat islands.¹¹⁴ The combination of heat-absorbing surfaces and a lack of vegetation results in significantly higher temperatures in urban areas compared to surrounding rural areas.¹¹⁵ These urban heat islands can be 4–8 degrees hotter than regional areas and can be as high as 10.75 degrees in some areas.¹¹⁶

The heat island effect in Melbourne means it can be 4–8 degrees hotter than regional areas because the built environment is not designed to mitigate heat. During heat events we experience power outages, and disruption to transport services and outdoor events. Our streets, our footpaths and our buildings are not designed for heatwaves and will require adaptation.¹¹⁷

The heat island effect is more prevalent during the night, further increasing the risk of heat stress.¹¹⁸

FINDING 4: Due to high population density, impervious surfaces and limited vegetation, Metropolitan Melbourne faces distinct climate change risks compared to regional and rural Victoria. This includes intensified urban heat island effects, increased flooding risk, and greater vulnerability during heatwaves.

¹¹⁰ Associate Professor Ailie Gallant, *Transcript of evidence*, pp. 14–15.

¹¹¹ *Ibid.*, p. 17.

¹¹² *Ibid.*, p. 14.

¹¹³ *Submission 75*, p. 6.

¹¹⁴ RMIT submission, p. 8.

¹¹⁵ Associate Professor Ailie Gallant, *Transcript of evidence*, p. 14.

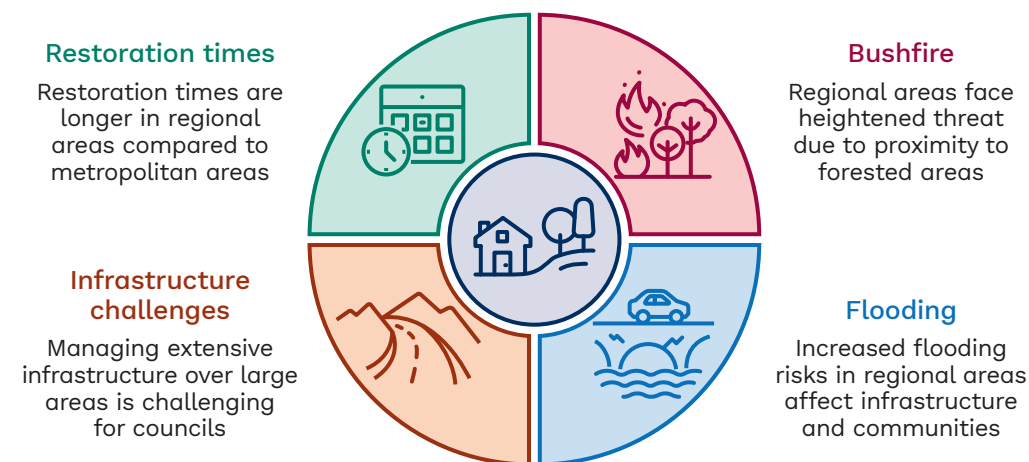
¹¹⁶ *Submission 75*, p. 5; ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p. 5.

¹¹⁷ *Submission 75*, p. 4.

¹¹⁸ Associate Professor Ailie Gallant, *Transcript of evidence*, p. 14.

2.2.4 Regional risk profile

Figure 2.7 Key climate change risks for regional and rural Victoria



Source: Legislative Council Environment and Planning Committee.

Climate change risks are distributed unevenly across Victoria. The location of a built environment or infrastructure asset influences its exposure to climate risk. The Committee acknowledges the Victorian Government's efforts to recognise geographic variations in risk exposure. A core component of *Building Victoria's Climate Resilience* is the six community-owned Regional Adaptation Strategies. The strategies provide a comprehensive profile of the climate change risks facing Loddon Mallee, Hume, Gippsland, Grampians, Barwon South West and Greater Melbourne.¹¹⁹ In effect, the risk profile for regional areas is markedly different from that of the metropolitan risk profile.

Stakeholders highlighted that certain climate change risks are heightened for built environments and infrastructure located in regional areas. Bushfire disproportionately affects regional areas.¹²⁰ Regional areas are often located near vegetated areas which can act as significant fuel sources for bushfire. Climate projections for the 2050s suggest that regional towns such as Bendigo, Ballarat and Shepparton will experience 60% more high fire danger compared to 1986–2005. Whereas Melbourne may see a 40% increase in the same period.¹²¹

Road networks in regional areas are more exposed to climate change risks such as fires and floods compared to those in metropolitan areas.¹²² Bryan Sword, Director of Sustainable Development at Moira Shire Council, spoke to the Committee about the unique pressure regional councils face in having to manage infrastructure

¹¹⁹ Department of Energy, Environment and Climate Action, *Building Victoria's Climate Resilience*, 2022, p. 9.

¹²⁰ Jonathan Spear, *Transcript of evidence*, pp. 37–38; Dr Kimberley Reid, *Transcript of evidence*, p. 16; Tom Crook, *Transcript of evidence*, p. 6; Chris Pike, *Transcript of evidence*, p. 2; Sue Phillips, *Transcript of evidence*, p. 5; Martin Gill, *Transcript of evidence*, p. 7; Ian Laging, *Transcript of evidence*, p. 43; Dan Cowdell, *Transcript of evidence*, p. 23; *Submission 189*, p. 2.

¹²¹ *Submission 126*, Attachment 1, p. 8; *Submission 142*, p. 18.

¹²² *Submission 126*, Attachment 1, p. 10; Caroline Evans, *Transcript of evidence*, p. 32.

assets distributed across large-scale areas that are increasingly exposed to climate change risk:

Some specific challenges – councils in regional and rural Victoria are responsible for the maintenance and renewal of significant road networks. Climate change in areas with higher rainfall or inundation predicted will experience a higher rate of deterioration and failure. This will exacerbate the financial sustainability challenge. To compare the rural v. metropolitan burden, Moira shire is responsible for a road network which covers over 4000 square kilometres from a population base of just over 30,000. Comparing that to a metropolitan example, the City of Stonnington covers 25 square kilometres and a population of 100,000.¹²³

Similarly, electricity networks in regional areas are more exposed to climate change risks such as bushfires and extreme winds compared to those in metropolitan areas.¹²⁴ Chris Pike, General Manager, Placemaking and Environment at Surf Coast Shire Council, elaborated on how extreme wind and storm events pose heightened:

We had six weeks of storm events in 2022. Many other councils were far worse hit than this one was, particularly with severe flooding – \$3.5 million worth of infrastructure damage in this area. Just last month we had an extreme wind event – another \$100,000 there. But it is also the flow-on impacts on our everyday work. We have got a three-month backlog that our arborists now have in their proactive space because we are dealing with that wind event from last month.¹²⁵

Several regional coastal discussed their heightened exposure to climate change risks such as sea level rise, storm surges, and coastal erosion.¹²⁶ Councillor Tom Crook, Mayor for East Gippsland Shire Council raised a concern regarding councils' capacity to manage risk, noting regional and rural councils are often geographically larger. Mayor Crook said that East Gippsland Shire Council includes extensive coastlines with exposure to sea level rise, storm surges, and coastal erosion:

East Gippsland is one of the largest shires in Victoria. It is nearly 10 per cent of the state – 21,000 square kilometres in size. About 75 per cent of our shire is forested public land. We have over 200 kilometres of coastline. Many of our communities are vulnerable to the impact of sea level rise and coastal inundation risk, such as Lakes Entrance and the beautiful Raymond Island.¹²⁷

The Committee received evidence from several stakeholders which emphasised that regional communities are likely to be exposed to climate impacts for longer periods of time compared to metropolitan areas as restoration following an extreme weather

¹²³ Bryan Sword, *Transcript of evidence*, p. 3.

¹²⁴ Associate Professor Rakibuzzaman Shah, *Transcript of evidence*, pp. 16–17; John Bradley, *Transcript of evidence*, p. 76; Bronwyn Lay, *Transcript of evidence*, pp. 14–15; *Submission 126*, Attachment 1, p. 10; Adam Gellie, *Transcript of evidence*, p. 43; Michael Nolan, *Transcript of evidence*, pp. 20–21; Jonathan Spears, *Transcript of evidence*, p. 31.

¹²⁵ Chris Pike, *Transcript of evidence*, pp. 2–3.

¹²⁶ Martin Gill, *Transcript of evidence*, pp. 3–4; *Submission 181*, p. 2; Chris Pike, *Transcript of evidence*, pp. 2–3; Tom Crook, *Transcript of evidence*, pp. 2–3; Donna Taylor, *Transcript of evidence*, 3–4; Jillian Carroll, *Transcript of evidence*, p. 58; Sue Phillips, *Transcript of evidence*, p. 5; Ian Lagging, *Transcript of evidence*, pp. 43–44; Dan Cowdell, *Transcript of evidence*, p. 22.

¹²⁷ Tom Crook, *Transcript of evidence*, p. 2.

event often takes longer.¹²⁸ Rosemary Sinclair AM, the independent Chair of the Network Outage Review Panel, explained that restoration rates for infrastructure in regional communities exceeded those for metropolitan communities following the February 2024 storm event:

The communities that we spoke to were all regional ... The historical restoration data that we looked at suggested that metropolitan communities are restored well within 72 hours. Beyond 72 hours we are looking at regional communities. We did see that.

Case Study 2.3 highlights how East Gippsland Shire Council is exposed to climate change risk at greater frequency and intensity.

Case Study 2.3 'we have had more declared disaster events in my council term than since the council first came into being in the 1990s.'

As a regional coastal council with extensive forested areas, East Gippsland Shire Council faces significant climate change risks. Councillor Tom Crook, Mayor of East Gippsland Shire Council, explains that 'the majority of East Gippsland's 50,000 residents live in Bairnsdale, Paynesville, and Lakes Entrance.' However, he adds, there are also 'many small communities spread throughout the landscape, from the High Country to coastal areas, as well as many settlements deep within the forest.'

Mayor Crook acknowledges that 'East Gippsland is no stranger to the impacts of climate change. We have lived the reality of the Black Summer fires, which burnt more than half our municipality. We have also recently been impacted by storms and floods, with fatalities just last summer as a result of the Boxing Day storms. In fact, we have had more declared disaster events in my council term than since the council first came into being in the 1990s.'

Reflecting on the Black Summer fires, Mayor Crook describes them as 'probably [East Gippsland's] most catastrophic example in recent times ... the scale, the severity of that event was entirely unprecedented – well, in European history anyway. We had community infrastructure damaged at a scale we had never experienced before and an impact on communities themselves as a result of not only the physical damage to, let us say, the road network. We had communities stranded, isolated, for weeks. The Princes Highway was shut to Cann River for three weeks.'

Mayor Crook highlights the unique challenges faced by East Gippsland: 'Increasingly, because we have a lot of remote settlements in a heavily forested environment, the impact of those extreme weather events, whether it is storms or fires, is increasingly being felt by our communities. The intensity is going up. They are more frequent, more often, more intense. That has been our lived experience just in my short time in council, but I have lived in the region for some decades.'

(Continued)

¹²⁸ Submission 156, p. 10; Submission 168, p. 11; Rosemary Sinclair, *Transcript of evidence*, p. 2.

Case Study 2.3 Continued

Mayor Crook describes witnessing the scale and intensity of these wildfires as 'nothing short of shocking,' emphasising that 'the impact on community infrastructure and council's infrastructure is absolutely commensurate with those observations.'

Mayor Crook stresses that the Council and community are 'grappling with ... the elevated risk under increasingly catastrophic weather conditions.' He concludes by noting that 'the severity of these events is unprecedented and the impact on infrastructure, whether that be communities themselves or the infrastructure they rely on – roads, community halls, that sort of thing – is a really challenging space for [the Council]. But it is most certainly getting worse, and we are seeing that in real time right across our region.'

Source: Cr Tom Crook, *Transcript of evidence*, pp. 1–6.

FINDING 5: Regional councils are managing extensive infrastructure over large areas, increasingly exposed to bushfire, flooding, drought, and coastal hazards. These risks are compounded by slower restoration times and the escalating frequency and intensity of extreme weather events.

2.3 Cumulative impact

Cumulative impact refers to the combined effects of multiple events, which are often more severe than the sum of their individual effects.¹²⁹ These events can occur in succession or simultaneously, creating complex challenges for communities and infrastructure. For example, a drought followed by bushfire and then flooding can result in cascading consequences, more significant than those of any single event. Dr Jessica Reeves elaborated to the Committee about cumulative impact in relation to climate change risk:

The key here is the cumulative impact of multiple events. For example, the algal blooms that follow the floods, that follow the fires, that follow the drought are not isolated events and have a larger impact than the one that makes news headlines and captures public imagination.¹³⁰

2.3.1 Interaction between frequency and intensity

Evidence to the Inquiry noted a significant interaction between the frequency and intensity of climate hazards and extreme weather events, which significantly elevates

¹²⁹ Submission 68, p. 4.

¹³⁰ Jessica Reeves, *Transcript of evidence*, p. 16.

the risk to Victoria's built environment and infrastructure.¹³¹ This interaction creates a cumulative impact that amplifies resilience challenges, shifting from isolated events to a more complex and destructive cycle.

Stakeholders emphasised that the increasing frequency of extreme weather events exposes built environments and infrastructure to climate hazards more often, leaving less time to recover between events.¹³² The Committee also heard how the growing intensity of climate hazards means that built environments and infrastructure are increasingly exposed to larger-scale events that cause significantly greater damage during their occurrence.¹³³ The combination of frequent and intense weather events means that built environments and infrastructure are damaged more often and more severely. As a result, the recovery period between events is becoming shorter despite the growing scale of impacts. This interaction poses a deep challenge to resilience.

2.3.2 Impact of repeated extreme weather events on resilience

Stakeholders highlighted the significant impact of repeated extreme weather events on resilience, noting that recurrent disasters erode the ability of communities and infrastructure to withstand future risk.¹³⁴ The cumulative effect of multiple disasters can overwhelm coping mechanisms and resources, leading to a decline in overall resilience. Rosemary Sinclair AM told the Committee:

One lesson that we learned was that the recurrent power outages are cumulatively eroding the resilience of customers and communities. It is not just one; it is a number of events, and that cumulative effect becomes very difficult. The loss of telecommunications and other critical infrastructure is really a very important consideration, and we heard from all communities that the loss of communications really exacerbated the loss of power supply. In fact people said, 'We could have gotten by without the power. We simply cannot get by without access to communications. We don't know what's going on, and we can't tell other people what's going on.'¹³⁵

Case Study 2.4 and Case Study 2.5 describe the impact of repeated extreme weather events on resilience in communities such as in the Macedon Ranges and the Bendigo area.

¹³¹ Submission 126, Attachment 1, p. 7; Submission 188, p. 2.

¹³² Submission 142, p. 10.

¹³³ Ibid.

¹³⁴ Rosemary Sinclair, *Transcript of evidence*, p. 3.

¹³⁵ Ibid.

Case Study 2.4 'Macedon Ranges has been impacted by 22 severe weather events that have qualified for disaster recovery funding arrangements in the past 10 years'

Bernie O'Sullivan, Chief Executive Officer, from Macedon Ranges Shire Council told the Committee how:

'Under climate change the Macedon Ranges environment will become increasingly warmer and drier. Infrastructure will need to withstand three times as many above 38 degrees days annually by 2040, while experiencing fewer frosts. Annual rainfalls are likely to decline. However, a warmer climate is expected to bring more heavy and intense rainfall events than we are already seeing. Bushfire seasons will become longer, with the Macedon Ranges bushfire season predicted to extend up to six weeks longer, with the season extending into late April by 2050. It is starting earlier now, and it is going to increasingly extend later.

The events of February 1983 are never too far from residents' minds, when wildfires destroyed the townships of Macedon and Mount Macedon ... as well as over 6000 hectares of vegetation. More recent fires—thinking about February 2014, Gisborne South and Mickleham; October 2015, Lancefield–Cobaw; and January 2016, Edgecombe—have resulted in the loss of homes, significant numbers of stock, outbuildings and fencing and have impacted lives. Our shire continues to recover from multiple weather events that have impacted our local communities in recent years, including the vicious 2021 windstorm, the 2022 rainfall flood events and the early 2024 events ...

When we talk about an increasing number of events, Macedon Ranges has been impacted by 22 severe weather events that have qualified for disaster recovery funding arrangements in the past 10 years—22 events in the past 10 years.'

Source: Bernie O'Sullivan, *Transcript of evidence*, pp. 2–3.

Case Study 2.5 'in recent years the City of Greater Bendigo has also experienced an increase in climate-related natural disasters ...'

Ashley Fletcher explains that 'the City of Greater Bendigo is in the centre of Victoria. We have the third-largest urban area in Victoria but also many small towns and villages. ... Bendigo is known as the "city in the forest" due to the state and national parks which surround the urban area. Large areas of bushland also extend throughout our rural areas and contain rural living and many bush blocks as well too. This increases the bushfire risk for the municipality as a whole but also for our rural communities and the residents in our small towns.'

Ashley highlights how 'in recent years the City of Greater Bendigo has also experienced an increase in climate-related natural disasters ... Some of the events that we have experienced include the Black Saturday fires, which were mainly in Redesdale and in Eaglehawk, but we also had that fire spread to within 1.2 k's of our city centre, so it came very close in our urban environment. We were also impacted by the 2022 flood event and as part of the Northern Victoria Emergency Management Cluster provided assistance to our neighbouring councils. This assistance included establishing and operating the largest relief centre in the state since Black Saturday.'

Ashley describes the series of extreme weather events in late 2023 and early 2024, 'between Christmas and through to February we had a Boxing Day rain event, a storm hail event on 2 and 3 January, another rain and flood event on 7 and 8 January and then another storm event on 13 and 14 February in our municipality. In many cases people were impacted by flooding twice in a 15-month period. The emergency services responded to 4668 requests during the period of 2 January to 20 January alone, so it was a very busy time.'

Ashley emphasises that 'the concurrent events and the long tail of recovery have meant that council is both responding to new events while also recovering from previous events' and further adds that 'slow-onset climate impacts, such as drought, increased heat and lower rainfall' also need to be considered as they 'will also impact our built environment and infrastructure in the future.'

Source: Ashley Fletcher, *Transcript of evidence*, pp. 3–4.

2.3.3 Compound events and cascading impacts

Many stakeholders raised concerns regarding compound events and cascading impacts.¹³⁶ Compound events were explored earlier in the Chapter (see section 2.2.2). Infrastructure Victoria explained the difference between cascading and compounding impacts in its submission, stating:

¹³⁶ Submission 126, Attachment 1, p. 17; Submission 192, p. 4.

Cascading impacts: Occur when an extreme hazard generates a sequence of secondary events in natural and human systems that result in physical, natural, social or economic disruption, whereby the resulting impact is significantly larger than the initial impact.

Compounding impacts: The combination of multiple drivers and/or hazards that contributes to societal and/or environmental risk.¹³⁷

Compound events are when multiple hazards or drivers combine to create a greater impact than if each event occurred separately. These events can occur simultaneously or in quick succession. Examples of compound events raised by stakeholders include:

- bushfire followed by intense rainfall
- heatwaves followed by bushfire.

Whereas **cascading impacts** occur when an initial event triggers a series of secondary events that result in significant disruption. These secondary events can affect various systems, including infrastructure, communities, and the environment. For example, cascading impacts include:

- storms causing blackouts, which then disrupt water, sewerage, and communication services
- fallen trees blocking roads which delay repairs to power lines.

The interconnectedness of systems means that the failure of one infrastructure type can lead to the failure of others. The cumulative impact of multiple events is greater than the impact of individual events and recovery is often interrupted by subsequent compounding events. As a result, this leads to communities living in a constant state of preparation or recovery:

I would like to start with 28 February 2024. That day I remember strongly, because I had staff in my team deployed to the Maryborough relief centre for people evacuating the Bayindeen bushfires that you will remember. The very same day, the rest of the team were out doing flood recovery outreach. I have worked in emergency management a long time, but I have never been doing bushfire relief and flood recovery literally on the same day. So this is the new world that we are in right now. I have met people who were impacted twice. I remember one couple in their mid 80s who had just gone home. Their house had just been fixed up 13, 14 months after October 2022. They had just gone home a few weeks earlier, and they got flooded again. They were 86 years of age. That is just one example, but it really reinforces the point that people are going to be impacted more than once ... the reality on the ground is that we may be dealing with many incidents simultaneously ... Our communities are not living with single incidents; they are living with the accumulated impacts of climate change.¹³⁸

¹³⁷ Submission 126, attachment 1, p. 57.

¹³⁸ Frances Ford, *Transcript of evidence*, pp. 4–5.

FINDING 6: The cumulative impact of climate change intensifies risk to Victoria's built environment and infrastructure. The increasing frequency and intensity of extreme weather events leads to compounding and cascading effects that shorten recovery periods, overwhelm resilience mechanisms, and leaves communities in a constant state of preparation or recovery.

2.4 Future projections

I think in our opinion we need to plan for the climate of the future, not for the climate of now. So if we are thinking of infrastructure that will be around in 2070, you need to build that infrastructure for the climate of 2070, taking into account that it needs to be resilient to a range of things that might happen.

Ailie Gallant, *Transcript of evidence*, p. 16.

The Committee consistently heard that most of Victoria's infrastructure and built environment is not constructed for the projected frequency and severity of future climate events.¹³⁹ The State's infrastructure is increasingly vulnerable as climate change risks are set to intensify and increase in frequency.

Climate projections for Victoria indicate that the risk of temperature increase and sea level rise is relatively certain. Risk related to rainfall and wind are projected with greater uncertainty.¹⁴⁰ Overall, the uneven distribution of climate change risk will continue to become more pronounced.

Stakeholders reinforced these key considerations for the built environment and infrastructure in relation to climate change risk projections:

- **Using climate projections:** Infrastructure and building designs should be informed by climate projections rather than historical patterns. This includes accounting for temperature increases, shifts in rainfall patterns, sea-level rise, and heightened bushfire risks.¹⁴¹
- **Accounting for variability:** Infrastructure must be resilient to both long-term climate projections and the growing intensity and frequency of extreme weather events, such as heatwave, flood, and bushfire.¹⁴²
- **Multiple scenarios:** climate change risks need to consider a range of climate change scenarios, from high to low emissions, to address the uncertainty of future conditions.¹⁴³

¹³⁹ Infrastructure Victoria, *Submission 126*, p. 1.

¹⁴⁰ ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p. 11.

¹⁴¹ *Submission 126, Attachment 1*, p. 34.

¹⁴² *Submission 46*, p. 3.

¹⁴³ Infrastructure Victoria, *Submission 126, Attachment 1*, p. 34.

Victoria's built environment and infrastructure will be resilient to climate change risk if it is designed and built with consideration for climate change modelling and projections.

FINDING 7: Victoria's built environment and infrastructure will be resilient to climate change risk if it is designed and built with consideration for climate change modelling and projections.

Chapter 3

Government responses to climate risk: governing climate resilience

3.1 Introduction

This Chapter examines the legislation and policies that structure the Victorian Government's climate risk governance framework. It provides an overview of the key State actors involved in managing climate change risk and resilience. This Chapter builds on the analysis of Chapter 2 and examines the Government's response to climate change risk. It considers the role of local government within this framework along with the broader influence of federal legislation and policy.

3.2 Victoria's climate risk governance framework

Victoria's climate risk governance framework is a network of interconnected legislation and policies aimed at managing Victoria's climate risk and improving resilience. The *Climate Change Act 2017* (Vic) (the Act) is the overarching piece of legislation in this framework. *The Environment and Planning Act 1987* (Vic) is another key piece of legislation that influences the State's capacity to manage climate change risk and foster a climate resilient built environment. The relationship between the Climate Change Act and the Environment and Planning Act has important implications on the State's ability to ensure that Victoria's built environment and infrastructure are resilient to climate change. This will be explored in greater depth in Section 3.3.2.

3.2.1 *Climate Change Act 2017*

The Climate Change Act establishes the legislative framework for managing Victoria's greenhouse gas emissions and addressing climate change risk. It has enshrined a long-term emissions reduction target of net-zero by 2050 and introduced a 'pledging model' to reduce emissions from government operations and across the economy (in place from 2020). The Act establishes a system of periodic reporting to ensure transparency, accountability, and to keep the community informed.¹

The Climate Change Act also lays the groundwork for developing strategies and Adaptation Action Plans to address climate change. It requires the Government

¹ Department of Energy, Environment and Climate Action, *Climate Change Act 2017*, 2025, <<https://www.climatechange.vic.gov.au/legislation/climate-change-act-2017>> accessed 21 July 2025.

to prepare, every five years, a Climate Change Strategy outlining how Victoria will meet its emissions targets and adapt to climate change impacts (see Figure 3.1). Additionally, the Victorian Government must set interim greenhouse gas emissions reduction targets in line with its long-term goal of net-zero by 2050 as well as develop Adaptation Action Plans for key systems vulnerable to climate change.

The Climate Change Act establishes new requirements in relation to climate change-related decision making, including policy objectives and guiding principles. These principles inform decisions, policies, processes, and programs in Victoria. The guiding principles include consideration of determinants such as informed decision-making, integrated decision-making, risk management, equity, community engagement, and compatibility.² Section 22 outlines the Act's policy objectives. In relation to the scope of this Inquiry, an important key objective (outlined in s 22(b) of the Act) is 'to build the resilience of the State's infrastructure, built environment, and communities through effective adaptation and disaster preparedness actions'.³

Section 17 of the Act requires specified decision-makers, as identified in the legislation listed in schedule 1 of the Act, to consider climate change and its potential impacts when making decisions or taking actions.⁴ Several of the Acts and decisions contained in the schedule also run parallel to the planning framework.⁵ The Climate Change Act and its relationship to Victoria's planning framework will be further discussed in Section 3.2.2.

Through the establishment of these requirements the Act provides the legal foundation and legitimacy for other mechanisms within Victoria's climate change governance framework. Refer to Figure 4.1: overview of Victoria's response to climate change in Chapter 4.

3.2.2 Victoria's Climate Change Strategy

Released in 2021, *Victoria's Climate Change Strategy* is the first strategy to be produced since the Climate Change Act was legislated. The Strategy outlines the Victorian Government's emission reductions pathway with the overarching goal being to reach a 'net-zero emissions future' by 2050.⁶ The Strategy sets out the Government's current and future responses to climate change (2021–2025) including:

- emission reduction targets for 2025 and 2030
- actions to reduce emissions
- measures to build Victoria's climate resilience.⁷

² *Climate Change Act 2017* (Vic) ss 22–8.

³ *Ibid* s 22(b).

⁴ *Ibid* s 17.

⁵ *Ibid* pt 9.

⁶ Victorian Government, *Victoria's Climate Change Strategy*, 2025, <<https://www.climatechange.vic.gov.au/victorias-climate-change-strategy>> accessed 21 July 2025.

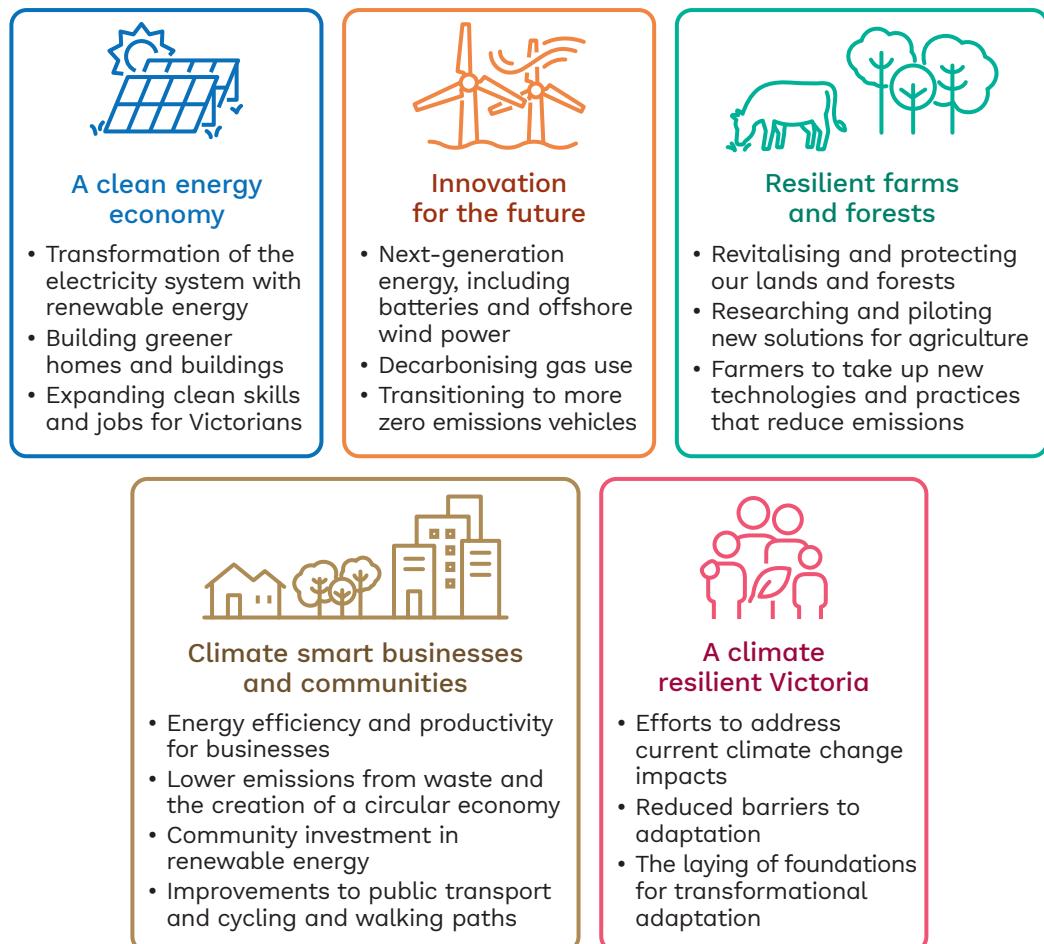
⁷ Victorian Government, *Victoria's Climate Change Strategy*, 2021.

The Strategy outlines a five-point plan with actions designed to support each component, shown in Figure 3.1. Most notably, point 5 in the plan focuses on Victoria's climate resilience (Box 3.1 provides a more detailed description).

The Government's 2030 and 2050 objectives for adaptation guide point 5 of the Strategy. Table 3.1 provides an overview of the Strategy's 2030 objectives. The Strategy's 2050 objectives are 'climate-resilient built and natural environments', 'prosperous, liveable and healthy communities' and 'an orderly and just adaptation process'.⁸

The adaptation priorities to 2025 are also outlined in point 5 of the plan (see Figure 3.2). The Strategy guides the Adaptation Action Plans for Victoria's seven key systems, establishing an overarching vision for adaptation. Section 3.2.3 continues to explore the role of the Adaptation Action Plans and Chapter 4 further considers these Plans.

Figure 3.1 Victoria's five-point plan, Victoria's Climate Change Strategy



Source: Adapted from Victorian Government, *Victoria's Climate Change Strategy*, 2021, p. 17.

⁸ Ibid., p. 41.

Box 3.1 Point 5: A climate resilient Victoria

‘As the climate changes, we need to strengthen our ability to withstand and recover from extreme weather events – by protecting landscapes, communities and ecosystems and by supporting jobs in emerging and changing industries.’

Point 5 of the Strategy is focused a ‘climate resilient Victoria’ and is focused on adaptation. The Government explains that climate change adaptation refers to ‘action taken to reduce the adverse consequences of climate change or harness opportunities’.

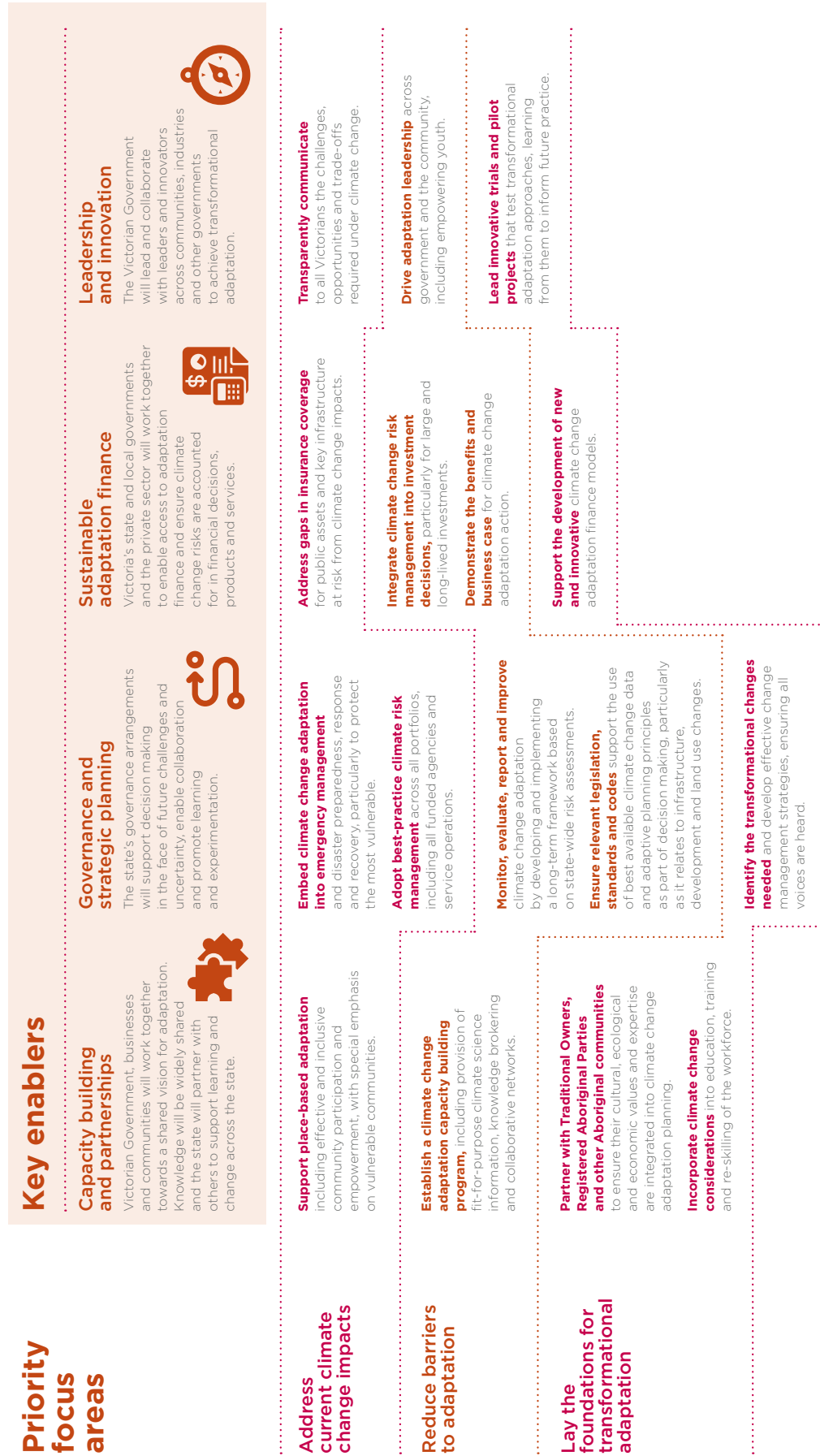
Source: Victorian Government, *Victoria’s Climate Change Strategy*, 2021, p. 17.

Table 3.1 2030 Objectives, A climate resilient Victoria, Victoria’s Climate Change Strategy

Objective	Explanation
Emergency management and disaster preparedness	Victoria’s communities will actively participate in disaster risk mitigation, response and recovery. Our emergency management sector will continue to improve its capability to address emerging risks, and will practise evidence-based disaster risk management in the context of a changing climate.
Built environment and infrastructure	Our built environment and infrastructure will have an improved ability to avoid, withstand and recover from climate change impacts, while continuing to provide essential services and support community wellbeing.
Industries and livelihoods	Victorian industries, businesses and workers will manage the risks and take advantage of the opportunities and new jobs created by the transition to a net-zero emissions and climate-resilient future.
Communities and regions	Our communities and regions will have the power, capacity and resources to adapt to climate change, leaving no one behind.
Biodiversity, ecosystems and natural resources	Victoria’s biodiverse ecosystems will be functional and resilient in the face of climate change. They will be actively managed and enjoyed, balancing sometimes competing values and uses.

Source: Victorian Government, *Victoria’s Climate Change Strategy*, 2021, p. 41.

Figure 3.2 Victoria's adaptation priorities to 2025

Source: Victorian Government, *Victoria's Climate Change Strategy*, 2021, p. 44.

3.2.3 Adaptation Action Plans and Regional Adaptation Strategies

Chapter 4 considers the Adaptation Action Plans and Regional Adaptation Strategies. They are also considered here to situate them within Victoria's governance framework for climate resilience. Under the Climate Change Act, the Victorian Government is mandated to develop Adaptation Action Plans for key systems vulnerable to the impacts of climate change.⁹ *Building Victoria's Climate Resilience* broadly outlines the Victorian Government's efforts to adapt to and strengthen Victoria's resilience to climate change and introduces the Adaptation Action Plans.¹⁰

The Adaptation Action Plans reflect the principles and policy objectives outlined in the Climate Change Act and represent a systems-based approach to climate change adaptation. Seven Adaptation Action Plans have been established. These are identified in Chapter 4.

Each Plan outlines the climate change challenges specific to its system and identifies priorities for action over a five-year period. All Adaptation Action Plans are required to be updated every five years until 2050. The first iterations of the Adaptation Action Plans came into effect in 2022.

In addition to the Adaptation Action Plans, six community-owned Regional Adaptation Strategies have been developed, incorporating key themes and values identified through community consultation. The six community-owned regional adaptation strategies have been created for the following regions:

- **Loddon Mallee:** Focuses on creating climate-ready people, places, and sectors.
- **Hume:** Prioritises emergency management, the natural environment, renewable energy, health and wellbeing, the built environment, and the economy and workforce.
- **Gippsland:** Aims to raise awareness of climate change impact on community and Country, foster flexibility in adaptation, and ensure communities are supported in adapting to climate change.
- **Grampians:** Centres on eight interconnected themes: agriculture, biodiversity, economy, fire, health and wellbeing, heat, storms and flooding, and water.
- **Greater Melbourne:** Takes a systems approach across 12 action areas, with a vision for the region to have the agency, will, skills, and resources to adapt to climate change.
- **Barwon South-West:** Features 12 comprehensive focus areas, guided by principles of inclusion, equity, use of the best available information and tools, and deliberative learning.

The Regional Strategies are also considered in Chapter 4.

⁹ *Climate Change Act 2017* (Vic) div 2.

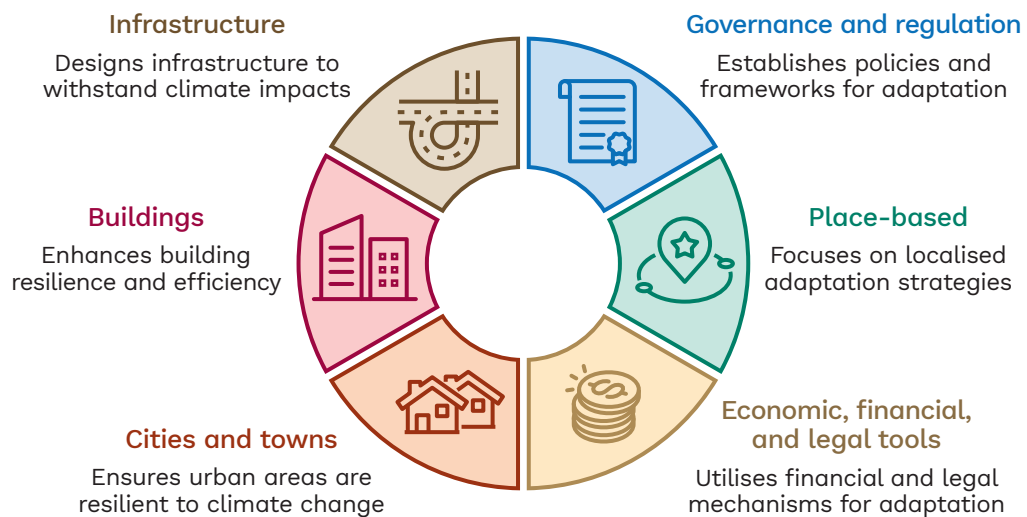
¹⁰ Victorian Government, *Building Victoria's Climate Resilience*, 2022, p. 3.

3.2.4 Built Environment Adaptation Action Plan

The Built Environment Adaptation Action Plan (Built Environment Adaptation Action Plan) is one of seven plans mandated under the *Climate Change Act*. It commenced in 2022 and aligns with the Victorian Government's policy framework outlined in *Plan Melbourne 2017–2050*. Strategies such as *Victoria's Climate Change Adaptation Plan 2017–2020* have also played a role in shaping the Built Environment Plan.

The Built Environment Adaptation Action Plan, including stakeholder perspectives on its effectiveness, is covered in Chapter 4. Figure 3.3 below covers the broad scope and focus of the Plan.

Figure 3.3 Key components of the Built Environment Adaptation Action Plan



Source: Legislative Council Environment and Planning Committee. Based on the Built Environment Adaptation Action Plan.

3.3 *Planning and Environment Act 1987 (Vic)*

The Built Environment Adaptation Action Plan identifies the Planning and Environment Act as a key piece of legislation that guides efforts to improve climate resilience in Victoria. The Act is integral to determining where and how the State builds and responds to hazards.¹¹

The Act establishes the overarching planning framework in Victoria as it provides for a system of municipal-based planning schemes. Under the Planning and Environment Act, councils create and amend planning schemes, which are statutory documents that form the basis of planning in Victoria. A Minister may also make and amend a planning scheme under Section 8 of the Act. Planning schemes apply to the land

¹¹ Victorian Government, *Built Environment Climate Change Adaptation Action Plan 2022–2026*, 2022, p. 16.

in the municipality and contain the framework for strategy implementation and decision-making by providing for:

- various levels of policy (State, regional and local)
- zoning controls (restrictions on the broader use of land)
- overlay controls (restrictions on specific aspects of development)
- other issue-based controls.

The Planning and Environment Act deals with other matters relevant to planning, such as compulsory acquisition of land and processes that support the planning scheme system.

Chapter 6 considers the planning system, including the role of the Planning and Environment Act, in greater detail.

3.3.1 *Climate Change and Energy Legislation Amendment (Renewable Energy and Storage Targets) Act 2024 (Vic): amending the Planning and Environment Act*

The *Climate Change and Energy Legislation Amendment (Renewable Energy and Storage Targets) Act 2024 (Vic)* amends the Planning and Environment Act 'to expressly require consideration of climate change when making certain decisions under that Act and for other purposes.'¹² It amended the Planning and Environment Act:

- Inserting new section 4(2)(da), a new objective of the planning framework established by the Planning and Environment Act is to consider climate change and the need to increase resilience to climate change when planning decisions are made.
- Inserting new section 12(2A) Imposing a new duty on planning authorities in preparing a planning scheme or amendment, to consider any significant climate change risks to the envisaged use or development.
- Inserting new section 12A which empowers the Minister to issue directions about climate change matters which planning authorities must have regard to in preparing a planning scheme or amendment.

The amended Act has important implications for the State's management of climate change risk and the resilience of the built environment and infrastructure. The Amended Act, including stakeholder perspectives, are discussed further in Chapter 5.

¹² *Climate Change and Energy Legislation Amendment (Renewable Energy and Storage Targets) Act 2024 (Vic)* s 1(c).

3.3.2 Role of the Planning and Environment Act in shaping the built environment's climate resilience

Although the Planning and Environment Act, as amended, now incorporates climate change considerations into the planning framework, no decisions made under the Act are listed in the schedule to the Climate Change Act.

While the Climate Change Act provides for the creation of policy documents such as the Adaptation Action Plans, the plans have not been incorporated in the Victoria Planning Provisions. The Adaptation Plans are referred to as relevant policy documents a few times in the planning provisions.¹³ Yet, the Adaptation Action Plans have not been incorporated, and the content has not been extracted and included in the scheme. Consequently, the Adaptation Action Plans:

- are given less weight
- may provide little guidance, since relevant parts of the policy document have not been identified for the decision-maker.

The Built Environment Adaptation Action Plan is not explicitly mentioned. It is unclear whether the Adaptation Action Plans have the potential to significantly influence decision-making under a planning scheme or if the Plans serve primarily as background documents, offering context for the development of policies or provisions.

Planning schemes

Planning schemes play a crucial role in enabling Councils and other decision-makers to make planning decisions that address climate change risks facing the built environment and as a result, strengthen the municipality's resilience.

The creation and amendment of planning schemes is subject to the Ministerial Direction on the Form and Content of Planning Schemes and the Victorian Planning Provisions.¹⁴ Together, these two documents prescribe and provide guidance for the required form and content of all Planning Schemes.

Planning provisions are not an applicable planning scheme, rather are statewide reference that the Minister has created to ensure consistency and coordination across all individual planning schemes. All planning schemes are structured according to the provisions. Most amendments to planning provision will by extension affect all schemes.

¹³ See, for example, Department of Transport and Planning, *Natural hazards and climate change*, 2025, <<https://planning-schemes.app.planning.vic.gov.au/Victoria%20Planning%20Provisions/ordinance/13.01-1S>>; Department of Transport and Planning, *Energy Supply*, 2025, <<https://planning-schemes.app.planning.vic.gov.au/Victoria%20Planning%20Provisions/ordinance/19.01-1S>>; Department of Transport and Planning, *Renewable energy*, 2025, <<https://planning-schemes.app.planning.vic.gov.au/Victoria%20Planning%20Provisions/ordinance/19.01-2S>>.

¹⁴ *Planning and Environment Act 1987* (Vic) ss 7(5)-(6), 12(2).

In addition to the content contained in a planning scheme, decision-makers are also guided by:

- Ministerial directions issued in relation to the preparation of planning scheme amendments, which the decision-maker must follow.
- The Practitioner's Guide to Victoria's Planning Schemes (Practitioner's Guide), which provides guidance about understanding and drafting a planning scheme
- Planning Practice Notes, which give technical advice about the planning system.

Amending planning schemes

A council can only prepare an amendment to a planning scheme by applying to and obtaining authorisation from the Minister. A council must consider and address various requirements when preparing an amendment. For example, if the amendment makes proper use of the Victorian Planning Provisions or implements planning objectives in Victoria. Councils must also give notice of the amendment to prescribed parties and parties that are materially affected by the amendment.¹⁵

If a council receives objections to its amendment, then the amendment must be referred to an appointed Planning Panel, which reviews submissions and provides non-binding recommendations. Following this process, the council may choose to abandon the amendment or adopt it, with or without changes, with the final decision to approve the amendment resting with the Minister.

Certain types of amendments are subject to special requirements. These include amendments to the urban growth boundary or those that allow green wedge land to be subdivided into more lots than permitted under the existing planning scheme. Such amendments only come into effect if ratified by Parliament.¹⁶

Planning schemes are required to undergo a review at least once every four years or as the Minister directs.¹⁷ The purpose of this review is to assess the effectiveness and efficiency of the scheme's provisions, including local planning policies, zones, overlays, and schedules, in achieving both the objectives of planning in Victoria and the Planning Policy Framework. There appears to be no formal review requirement or established mechanism for the Victoria Planning Provisions.

The importance of planning scheme amendments in the context of current and emerging climate change risk facing the built environment will be discussed further in Chapter 5.

¹⁵ Ibid s 19.

¹⁶ Ibid s 46AG.

¹⁷ Ibid s 12B.

3.3.3 *Inquiry into Victoria Planning Provisions amendments VC257, VC267 and VC274*

The Parliament of Victoria Legislative Council Select Committee for the *Inquiry into Victoria Planning Provisions amendments VC257, VC267 and VC274* tabled its Report on 13 May 2025. The Inquiry began on 14 April, by which time the Inquiry into climate resilience Report had been drafted for deliberation. Nevertheless, given areas of overlapping concern, the Environment and Planning Committee wished to reflect on the findings and recommendations of the Select Committee Inquiry in this Report. The Select Committee Inquiry considered whether:

the amendments to the Victoria Planning Provisions made through VC257, VC274 and VC267 give proper effect to the objectives of planning in Victoria, and the objectives of the planning framework, as set out in section 4 of the Planning and Environment Act 1987.¹⁸

Table 3.2 provides an overview of the three amendments to the Victoria Planning Provisions which were considered as part of the Inquiry.

Table 3.2 Overview of VC257, VC267 and VC274, the three amendments to the Victoria Planning Provisions

Amendment	Explanation
VC257	The Final Report stated that the Amendment ‘introduced a new zone and an overlay into the Victoria Planning Provisions: the Housing Choice and Transport Zone (HCTZ) and Built Form Overlay (BFO).’
VC267	The Final Report stated that the Amendment ‘implements new residential development planning assessment provisions to boost housing construction. The amendment commenced operation on 31 March 2025.’ Other key parts of the Amendment include: • Replacing ‘clause 55 of the Victoria Planning Provisions ... [with] The new clause 55 ... [which] now applies to residential buildings up to three storeys.’ • ‘Under the new clause 55, if a development meets the standards outlined in the clause, then it is deemed to comply, and the considerations outlined in clause 65 cannot be applied when granting planning permission.’ • It ‘introduces a new clause 57, which applies to four storey apartment standards. There is no ‘deemed to comply’ element in clause 57 ... the consideration of decision guidelines and policies ... remain in place.’
VC274	The Final Report stated that the Amendment ‘came into operation on 28 February 2025. It introduces a new zone, the Precinct Zone (PRZ) in new clause 37.10 of the Victoria Planning Provisions.’ The Final Report explained that the ‘PRZ is a special purpose zone that provides a framework for the implementation of strategic work in priority precincts.’ Moreover, when the PRZ is applied it will ‘support a streamlined assessment process for planning permit applications which will support improved housing affordability by facilitating additional housing supply and choice of housing type.’

Source: Parliament of Victoria, Select Committee on Victoria Planning Provisions Amendments VC257, VC267 and VC274, *Inquiry into Victoria Planning Provisions amendments VC257, VC267 and VC274*, May 2025, pp. 7–11.

18 Parliament of Victoria, Select Committee on Victoria Planning Provisions Amendments VC257, VC267 and VC274, *Inquiry into Victoria Planning Provisions amendments VC257, VC267 and VC274*, May 2025, p. vii.

The Victorian Government introduced these Amendments with the Committee’s Final Report noting that all three were accompanied with ‘explanatory reports stating that the purposes of the amendments included: to increase housing, and to implement Victoria’s Housing Statement.’¹⁹ Consequently, the amendments are intended to produce distinct built environments and infrastructure in areas where they apply through specific planning and development requirements.

As previously noted, the Built Environment Adaptation Action Plan identifies the *Environment and Planning Act 1987 (Vic)* as critical legislation for addressing climate change risk and encouraging a climate-resilient built environment in Victoria. Notably, as mentioned in Section 3.3.1, climate change considerations have now been incorporated into the planning framework objectives. A number of the Findings and Recommendations from the *Inquiry into Victoria Planning Provisions amendments VC257, VC267 and VC274* are particularly relevant for the *Inquiry into climate resilience*. The Findings and Recommendations assess the Amendments’ alignment with planning framework objectives and their potential to deliver climate-resilient built environments in affected areas. Chapter 5 will discuss the implications of the Findings and Recommendations from the *Inquiry into Victoria Planning Provisions amendments VC257, VC267 and VC274*, in greater detail.

3.4 State Actors involved in the Built Environment Adaptation Action Plan

The Built Environment Adaptation Action Plan identifies several key State Actors that play a critical role in delivering its objectives. Table 3.3 outlines the role of these actors in implementing the Built Environment Adaptation Action Plan.

Table 3.3 State Actors responsible for delivering the Built Environment Adaptation Action Plan

Actor	Explanation
Department of Energy, Environment and Climate Action (DEECA)	DEECA facilitates and monitors the adaptation of the built environment across the state by creating and executing policies, plans, strategies, and programs in critical areas such as energy, planning, biodiversity, forest fire management, water and catchments, and emergency management. Additionally, DEECA is instrumental in preventing, responding to, and recovering from emergencies that affect the built environment. This includes managing disruptions to electricity, natural gas, petroleum, and liquid fuel supplies, as well as issues with reticulated water and wastewater services. It also addresses fires in state forests, national parks, and protected public land.
Department of Energy, Environment and Climate Action Agencies	Many of the agencies in DEECA’s portfolio play a significant role in climate change adaptation across the built environment. Key agencies include water corporations, catchment management authorities, and the Victorian Building Authority, among others. These entities contribute to the implementation of various legislation and policies aimed at enhancing resilience and sustainability in the built environment.

¹⁹ Ibid., p. 13.

Actor	Explanation
Department of Transport and Planning (DTP)	The DTP leads the Built Environment Climate Change Adaptation Action Plan and shapes proposed changes to planning schemes. The DTP plays a critical role in advancing climate-responsive planning reform and establishes infrastructure delivery standards and service levels to ensure essential access is maintained during emergency incidents.
Essential Services Commission	Advocates for the long-term interests of Victorian consumers by safeguarding the reliability, quality, and cost-effectiveness of essential services. These services encompass electricity, gas, water, local government services, transport, Victorian energy upgrades, waste and recycling services, and domestic building insurance.
Emergency Management Victoria (EMV)	EMV oversees emergency management statewide by fostering collaboration within the sector and building community capacity to prepare for, endure, respond to, and recover from emergencies. EMV supports climate resilience by emphasising shared responsibility, community resilience, consequence management, and recovery efforts after emergencies. It integrates emergency management practices across government, agencies, and businesses.
Department of Health (DH)	The DH creates policies, programs, and services aimed at promoting and enhancing the health and wellbeing of Victorians. These initiatives address climate change impacts, such as extreme heat events and contamination of drinking water supplies.
Department of Families, Fairness and Housing (DFFH)	DFFH oversees community wellbeing and Victoria's social recovery efforts. A key responsibility includes determining the location and design of public and community housing, ensuring these decisions account for heightened risks posed by natural hazards.

Source: Victorian Government, *Built Environment Climate Change Adaptation Action Plan 2022–2026*, 2022, pp. 17–18.

3.5 Other legislation and policies

Table 3.4 depicts other legislation, policies and programs that are relevant to the State's management of climate change risk facing the built environment and infrastructure. This report will consider specific legislation, programs and policies where necessary.

Table 3.4 Other legislation and policies influencing the resilience of the built environment in Victoria

Where we live and how we build	Response to emergencies and climate change	Community services
Legislation		
• <i>Land Act 1958</i> • <i>Transfer of Land Act 1958</i> • <i>Valuation of Land Act 1960</i> • <i>Sale of Land Act 1962</i> • <i>Environment Effects Act 1978</i> • <i>Housing Act 1983</i> • <i>Land Acquisition and Compensation Act 1986</i> • <i>Planning and Environment Act 1987</i> • <i>Subdivision Act 1988</i> • <i>Building Act 1993</i> • <i>Project Development and Construction Management Act 1994</i> • <i>Regional Development Victoria Act 2002</i> • <i>Aboriginal Heritage Act 2006</i> • <i>Victorian Renewable Energy Act 2006</i> • <i>Major Transport Projects Facilitation Act 2009</i> • <i>Environment Protection Act 2017</i> • <i>Heritage Act 2017</i> • <i>Victorian Planning Authority Act 2017</i> • <i>Residential Tenancies Act 2018</i>	• <i>Country Fire Authority Act 1958</i> • <i>Fire Rescue Victoria Act 1958</i> • <i>Water Act 1989</i> • <i>Victoria State Emergency Service Act 2005</i> • <i>Charter of Human Rights and Responsibilities Act 2006</i> • <i>Emergency Management Act 2013</i> • <i>Climate Change Act 2017</i>	• <i>Public Health and Wellbeing Act 2008</i> • <i>Local Government Act 2020</i>
Policies and programs		
• Plan Melbourne 2017–50 • Plan for Victoria	• Victorian Emergency Management Strategic Action Plan	• Heat Health Plan for Victoria • Victorian Healthy Homes Program • Victorian public health and wellbeing plan 2019–2023
Utilities and infrastructure	Natural systems and environmental management	Finance and insurance risk
Legislation		
• <i>Water Act 1989</i> • <i>Water Industry Act 1994</i> • <i>Electricity Safety Act 1998</i> • <i>Electricity Industry Act 2000</i> • <i>Safe Drinking Water Act 2003</i> • <i>Road Management Act 2004</i> • <i>Water Efficiency Labelling and Standards Act 2005</i>	• <i>Crown Land (Reserves) Act 1978</i> • <i>Alpine Resorts Act 1983</i> • <i>Planning and Environment Act 1987</i> • <i>Water Act 1989</i> • <i>Catchment and Land Protection Act 1994</i> • <i>Environment Protection Act 2017</i>	• <i>Standard Insurance Company Limited Act 1962</i> • <i>Victorian Managed Insurance Authority Act 1996</i>

Utilities and infrastructure	Natural systems and environmental management	Finance and insurance risk
Legislation (Continued)		
• <i>Transport Integration Act 2010</i> • <i>Infrastructure Victoria Act 2015</i>	• <i>Marine and Coastal Act 2018</i> • <i>Great Ocean Road and Environs Protection Act 2020</i>	
Policies and programs		
• Critical Infrastructure Resilience Strategy • Energy Efficiency and Productivity Strategy • Powerline Bushfire Safety Program • Renewable Energy Action Plan • Community Microgrid and Sustainable Energy Program • Summer Preparedness	• Biodiversity 2037 • Marine and Coastal Policy 2020 • Water for Victoria • Victorian Floodplain Management Strategy	

Source: Victorian Government, *Built Environment Climate Change Adaptation Action Plan 2022–2026*, 2022, pp. 46–47.

3.6 Role of local government

Local government plays a critical role in addressing climate change risk and enhancing the resilience of their municipalities. They manage planning schemes, deliver localised mitigation and adaptation infrastructure, and develop Municipal Emergency Management Plans.²⁰ Councils can address localised climate risk and tailor adaptation policies and programs to meet the specific needs of their communities by leveraging local knowledge and community connections. This approach fosters resilience at a grassroots level, ensuring that climate action is practical and effective.

The *Local Government Act 2020* (Vic) reinforces council's role in managing climate change risk. Section 9 of the Act outlines overarching governance principles:

- Section 9(1) requires councils to give effect to these principles in the performance of their roles.²¹
- Section 9(2)(c) emphasises the promotion of economic, social, and environmental sustainability within the municipal district, including mitigation and planning for risk.²²

This legislative framework ensures that councils are both empowered and obligated to integrate climate change mitigation and adaptation into their governance and decision-making processes. Councils are provided with a framework to build climate resilient communities that can respond to risk by aligning their actions with these principles.

²⁰ Victorian Government, *Built Environment Climate Change Adaptation Action Plan 2022–2026*, p. 18

²¹ *Local Government Act 2020* (Vic) s 9(1).

²² *Ibid* s 9(2)(c).

Under the Climate Change Act, local councils can submit voluntary pledges to support state government climate change actions towards net-zero. Many Victorian Councils have set their own emissions reduction pledges and adaptation plans.

Under the Act, a Council’s pledge should include:

- Council actions over 5 years (1 January 2021 to 31 December 2025) aimed at reducing emissions.
- A reasonable estimate of expected emissions reductions from those actions.²³

From June 2021, pledges could also include:

- Inclusion of actions without identified emissions reductions.
- Collective pledges reflecting collaborative actions by multiple councils or partnership organisations.²⁴

Table 3.5 Local councils which have submitted Council Pledges under the Climate Change Act 2017

Local councils and council pledges	
• Alpine Shire Council – Climate Action Plan 2021–2024 • Bayside City Council – Climate Emergency Action Plan 2020–25 • Brimbank City Council – Brimbank Climate Emergency Plan 2020–2025 • Cardinia Shire Council – pledges to achieve targets in the Aspirational Energy Transition Plan 2014–24 • City of Ballarat – Carbon Neutrality and 100% Renewables Action Plan 2019–2025 • City of Glen Eira – Climate Emergency Response Strategy 2021–2025 • City of Kingston – Leadership in the Climate Emergency • City of Melbourne – Climate Mitigation Strategy to 2050: Melbourne together for 1.5°C • City of Melton – Environment Plan 2017–2027 • City of Merri Bek – Zero Net Carbon Action Plan • City of Monash – Commitment to climate action • Greater Dandenong City Council – Climate Emergency Strategy and Action Plan 2020–2030	• Hobsons Bay City Council – Community Greenhouse Strategy 2013–30 • Hume City Council – Greenhouse Action Plan 2018–22 • Knox City Council – Climate Response Plan 2021–2031 • Manningham Council – reduce council emissions by a further 20,047 tonnes by 2025 • Mount Alexander Shire Council – Roadmap to Carbon Neutrality 2020 –2025 • Murrindindi Shire Council – Climate Change Action • Strathbogie Shire Council – Climate Change Action Plan 2022–27 • Surf Coast Shire Council – Climate Emergency Corporate Response Plan 2021–2031 • Whittlesea City Council – Climate Change Plan 2022–2032 • Yarra City Council – Climate Emergency Plan 2020–2024 • Greater Shepparton City Council pledges to achieve zero carbon emissions by 2030 for council operations

Source: Department of Energy, Environment and Climate Action, *Submitted council pledges*, 2025, <<https://www.climatechange.vic.gov.au/local-government/council-pledges/submitted-council-pledges>> accessed 21 July 2025.

23 Department of Energy, Environment and Climate Action, *Council pledges*, 2022, <<https://www.climatechange.vic.gov.au/local-government/council-pledges>> accessed 2 August 2024.

24 Ibid.

3.7 Federal legislation and policies

Table 3.6 highlights key national legislation and policy informing federal responses to climate change. Table 3.7 highlights key national stakeholders supporting or delivering responses to climate change.

Table 3.6 National legislation and policy governing federal responses to climate change

Legislation or policy	Explanation
<i>Climate Change Act 2022</i> (Cth)	The main objective of the Act is to 'set Australia's greenhouse gas emissions reduction targets which contribute to the global goals of: 1. holding the increase in the global average temperature to well below 2°C above pre-industrial levels; 2. pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels;' The Act outlines Australia's greenhouse gas emissions reduction targets: 1. 'Reducing Australia's net greenhouse gas emissions to 43% below 2005 levels by 2030: a. implemented as a point target; and b. implemented as an emissions budget covering the period 2021–2030' The Act also gives the Climate Change Authority a role in providing advice on the preparation of the Minister's Annual Climate Change Statement to Parliament and emissions reduction targets to be included in NDCs.
National Climate Risk Assessment	The National Climate Risk Assessment is a three-stage risk assessment that will identify national level risks and impacts from climate change. The first risk assessment report was completed in 2023, and the second assessment is currently underway. Upon completion, the Final Risk Assessment Report will provide the basis for the National Adaptation Plan.
National Climate Resilience and Adaptation Strategy 2021–2025	The government is in the process of replacing this strategy with the National Adaptation Plan. However, as it stands, it is the most current strategy that outlines Australia's national climate change adaptation objectives. The strategy identifies four key domains where adaptation needs to occur: natural, built, social and economic. The strategy also states three overarching objectives to achieve effective adaptation across Australia: • Objective 1 – Drive investment and action through collaboration • Objective 2 – Improve climate information and services • Objective 3 – Assess progress and improve over time.
National Adaptation Plan	The National Adaptation plan will use the final risk assessment to shape Australia's adaptation actions and priorities. It will provide guidance on the national response, including: • Adapting to climate risks, scaling up adaptation efforts • building Australia's resilience to climate impacts. The Plan will be delivered in late 2024 and It will replace the existing governance framework on adaptation, the National Climate Resilience and Adaptation Strategy 2021–2025.
<i>Climate Change Authority Act 2011</i> (Cth)	The Act establishes the Climate Change Authority. Under the Act, the Authority also undertakes reviews and makes recommendations on: • the Carbon Farming Initiative (Emissions Reduction Fund) • the National Greenhouse and Energy Reporting System, including the Safeguard Mechanism. Other matters that the Minister responsible for climate change or the Australian Parliament may request.

Source: Department of Climate Change, Energy, the Environment and Water, *Climate change*, <<https://www.dcceew.gov.au/climate-change>> accessed 21 July 2025.

Table 3.7 Key national stakeholders supporting or delivering responses to climate change

Stakeholder	Stakeholder scope
Department of Climate Change, Energy, the Environment and Water (DCCEEW)	The responsibilities of the DCCEEW in relation to climate change governance include: • national climate change adaptation strategy, policy and programs • climate science coordination, policy and programs.
Climate Change Authority	An independent statutory body established under the <i>Climate Change Authority Act 2011</i> (Cth). It plays a key role in the governance of Australia's climate change policies including by providing independent advice on: • the preparation of the Annual Climate Change Statement to Parliament. • greenhouse gas emissions reduction targets to be included in NDCs.
Australian Climate Service	The Australian Climate Service is a partnership between the Bureau of Meteorology, CSIRO, the Australian Bureau of Statistics and Geoscience Australia. The partnership of the four governments agencies was established to support and advise decision-making on climate related risks and impacts.
First Nations Clean Energy and Climate Change Advisory Committee	The First Nations Clean Energy and Climate Change Advisory Committee provides advice about First Nations rights and interest in the energy transition and climate change. The 18-member committee advises the Minister for Climate Change and Energy and the department.
National Emergency Management Agency	Following severe natural disasters, the Australian Government combined the efforts of the National Recovery and Resilience Agency and Emergency Management Australia, to create a single end-to-end agency to better respond to emergencies, help communities recover, and prepare Australia for future disasters.

Source: Department of Climate Change, Energy, the Environment and Water, *Climate change*, <<https://www.dcceew.gov.au/climate-change>> accessed 21 July 2025.

Chapter 4

Key government responses to climate risk: how to adapt

This Chapter focuses on the concrete actions the Victorian Government has taken to build climate resilience. Building on the governance structure outlined in Chapter 3, Chapter 4 examines how policies and strategies translate into practical initiatives aimed at mitigating climate risk and enhancing adaptation capacity.

This Chapter assesses the effectiveness of efforts to addressing the State's climate resilience objectives. It provides an insight into the practical challenges faced in executing resilience-building strategies, including resource limitations, coordination across sectors, and the capacity to adapt to rapidly evolving climate threats.

The Chapter introduces stakeholder views on the operation and effectiveness of the Government's response, considering funding and resourcing challenges to meet objectives. Stakeholder recommendations for improvement will be discussed in other sections of the Report, where they are considered in relation to specific issues.

Victoria's climate resilience landscape is shaped by a range of government initiatives, programs, and policy. Given the scope of government efforts across agencies, this Chapter focuses on key strategies that most directly impact the State's ability to respond to climate challenges. Other chapters will address additional programs and policies where relevant, identifying specific resilience goals gaps in the broader framework.

4.1 Victoria's climate change governance framework

An August 2022 report on *The Goulburn Broken Catchment Workshop on Adaptation to Climate* (a copy of which was supplied with Dr Michael Spencer's submission) described Victoria's approach to climate change adaptation governance as 'tiered'.¹ The report stated:

It is based on separate state-wide action plans for seven key sectors, complemented by regional plans and support for local government and community action ... The Government says these plans will guide government action and help institutions, businesses, and individuals to respond to changing climate. While there is a considerable body of work on adaptation plans, there is little evidence if, and how, these plans are being implemented and less data on their success.²

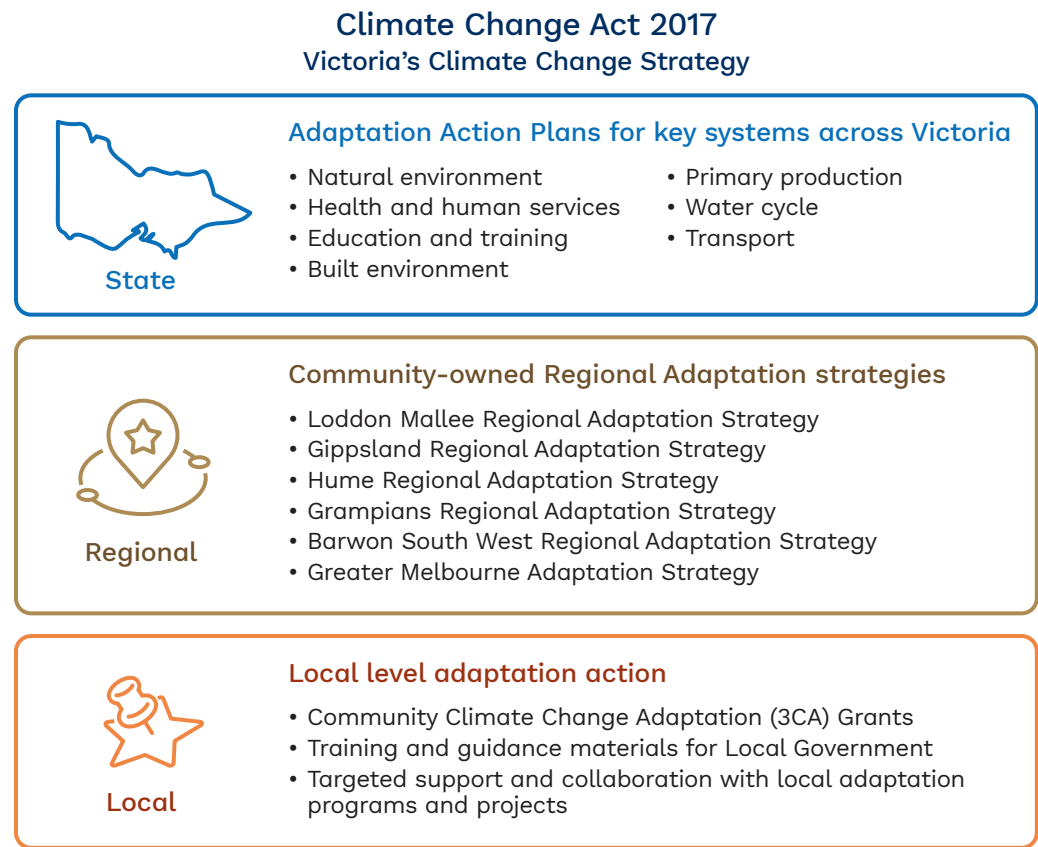
¹ Dr Michael Spencer, *Submission 225, Attachment A*.

² Melbourne Climate Futures, *Report on the Goulburn Broken Catchment Workshop on Adaptation to Climate Change*, August 2022, p. 16.

This Chapter concerns itself partly with the effectiveness in practice of current adaptation plans.

Figure 4.1 shows Victoria’s tiered governance approach to responding to climate change.

Figure 4.1 Overview of Victoria’s response to climate change



Source: Adapted from Victorian Government, *Barwon South West Regional Climate Change Adaptation Strategy 2020–2025*, 2021, p. 12.

4.2 Victoria’s *Climate Change Strategy*

Initiated in 2017, the Victorian Government’s *Climate Change Strategy* is the State’s principal strategy governing its goal of reaching a ‘net-zero emission future by 2050’.³ The Strategy outlines the Government’s emission reductions pathway. It establishes a five-point plan, including actions to support each component, shown in Figure 4.2.

³ Victorian Government, *Victoria’s Climate Change Strategy: implications for transport*, 2023, <<https://www.vic.gov.au/victorias-climate-change-strategy>> accessed 2 August 2024.

Figure 4.2 Five point plan under Victoria's Climate Change Strategy



Source: Victorian Government, *Victoria's Climate Change Strategy*, 2021, p. 17.

A key focus of the Strategy is building Victoria’s climate resilience through adaptation measures. In its Strategy, the Victorian Government explains that climate change adaptation refers to ‘action taken to reduce the adverse consequences of climate change or harness opportunities’.⁴ Table 4.1 below outlines the objectives of a ‘climate resilient Victoria’ under the Strategy.

Table 4.1 Objectives for a ‘climate resilient Victoria’, Victoria’s *Climate Change Strategy*

Objective	Explanation
Emergency management and disaster preparedness	Victoria’s communities will actively participate in disaster risk mitigation, response and recovery. Our emergency management sector will continue to improve its capability to address emerging risks, and will practise evidence-based disaster risk management in the context of a changing climate.
Built environment and infrastructure	Our built environment and infrastructure will have an improved ability to avoid, withstand and recover from climate change impacts, while continuing to provide essential services and support community wellbeing.
Industries and livelihoods	Victorian industries, businesses and workers will manage the risks and take advantage of the opportunities and new jobs created by the transition to a net-zero emissions and climate-resilient future.
Communities and regions	Our communities and regions will have the power, capacity and resources to adapt to climate change, leaving no one behind.
Biodiversity, ecosystems and natural resources	Victoria’s biodiverse ecosystems will be functional and resilient in the face of climate change. They will be actively managed and enjoyed, balancing sometimes competing values and uses.

Source: Victorian Government, *Victoria’s Climate Change Strategy*, 2021, p. 41.

Several stakeholders acknowledged the importance of the *Climate Change Strategy*.⁵ However, many of these stakeholders expressed concern that actions identified by the Strategy were underfunded and under-resourced. The lack of sufficient resourcing was seen as curtailing the effective implementation of the Strategy. This issue was most notably discussed in relation to the implementation of Adaptation Action Plans.

Sections 4.2.2 to 4.2.3 provide an overview of the Adaptation Action Plans and discuss stakeholder concerns about funding.

4 Victorian Government, *Victoria’s Climate Change Strategy*, 2021, p. 41.

5 See, for example: Labor Environment Action Network, *Submission 61*, p. 2; Warren Smith, Coordinator, Climate Change and Heritage, Cardinia Shire Council, public hearing, Emerald, 10 October 2024, *Transcript of evidence*, p. 2.

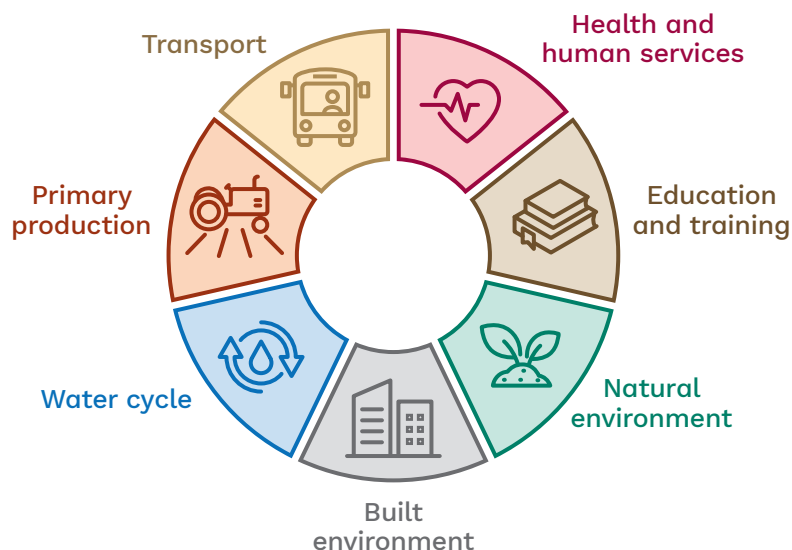
4.2.1 Building Victoria's climate resilience: Adaptation Action Plans

The Committee recommends that the government take immediate steps to improve the clarity and accessibility of reporting on the Adaptation Action Plans.

Under the Climate Change Act, the Victorian Government is required to develop Adaptation Action Plans for 'key systems that are vulnerable to the impacts of climate change'.⁶ The Plans embody principles and policy objectives from the Act and outline additional key themes and values obtained through community consultation.

Adaptation Action Plans exist alongside the development of Regional Adaptation Strategies and are described as a systems-based approach to climate change adaptation. There are seven Adaptation Action Plans covering the following key systems as shown in Figure 4.3.

Figure 4.3 Adaptation Action Plan systems



Source: Environment and Planning Committee. Adapted from Victorian Government, *Victoria's Climate Change Strategy*, 2021, p. 45.

Each Plan sets out the challenges of climate change for each system and establishes priorities for a 5-year period.

The Department of Energy, Environment and Climate Action provided a progress update on its responsibilities under the Adaptation Action Plans to the Public Accounts and Estimates Committee for its *Inquiry into the 2021-22 and 2022-23 Financial and Performance Outcomes*. The Department advised that 87% of actions it has responsibility for are 'in progress'.⁷

⁶ Change source to: Victorian Government, *Victoria's Climate Change Strategy: implications for transport*, 2025, <<https://www.vic.gov.au/victorias-climate-change-strategy>> accessed 2024.

⁷ Environment and Climate Action Department of Energy, *Response to the 2021-22 and 2022-23 Financial and Performance Outcomes General Questionnaire*, Public Accounts and Estimates Committee, received 15 November 2023, p. 166.

During the *Inquiry into climate resilience*, the Environment and Planning Committee raised questions to government witnesses seeking a detailed update on the progress of the Adaptation Action Plans. At a public hearing, John Bradley, Secretary of the Department of Energy, Environment and Climate Action, explained the progress and challenges associated with Victoria's climate Adaptation Action Plans. When questioned about the difficulty in finding accessible and detailed progress updates, Bradley told the Committee:

There is a reasonably formal process – the statutory requirement – to prepare the seven adaptation action plans and then to update them again, with the next review being required in 2026, and there is a formal requirement to report on the implementation of the climate change strategy which the actions plan sit under that is due in 2025. As you say, we are about halfway through the adaptation action plans at the moment. Each of them is being delivered under the leadership of the minister, and the minister is responsible in each of the action plans as they were released. There is also a coordinated oversight of the delivery of those occurring through reports to the Victorian Secretaries Board.⁸

Bradley also noted that several of the actions arising from the adaptation plans are integrated into the government's mainstream activities and therefore reflected in non-specific budget allocations, investment proposals, and departmental annual reports.⁹ The Department acknowledged concerns raised by the Committee regarding a perceived lack of transparency and accessibility of progress information for the broader community. While some information is disclosed through climate risk reporting and annual reports, Bradley stated that the cumulative impact of the 127 measures would be thoroughly assessed and reported on in 2025. He recognised the need for clearer communication to ensure the community can track progress effectively before the formal 2025 report.¹⁰

Given the centrality of Adaptation Action Plans to the State's response to climate resilience, the Committee is concerned about the lack of transparent and easily accessible progress updates. The Department's asserted to the Committee that progress will be provided in 2025. This may not be sufficient given the importance of these plans; noting that this progress report is due for release a year before the plans' lapse.

The Committee acknowledges the reasons provided for the lack of clear progress reporting to the public:

- **Integration into broader government activities:** The climate adaptation measures are embedded across various government activities and departments. This 'mainstreaming' approach, while aiming to ensure climate considerations are part of everyday government functions, makes it difficult to consolidate progress into a single, clear report that is accessible to the public.

⁸ John Bradley, Secretary, Department of Energy, Environment and Climate Action, public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 77.

⁹ Ibid.

¹⁰ Ibid., pp. 77–78.

- **Complexity of the measures:** The action plans involve 127 separate measures covering a wide range of areas, from energy efficiency in housing to infrastructure upgrades. Monitoring and reporting on such a broad scope of initiatives adds complexity, and much of the information is currently dispersed.
- **Legislative framework and reporting timeline:** Statutory requirements dictate specific timelines for formal reviews and progress reporting. The next major assessment of the climate change strategy, which includes the next iteration of the action plans, is scheduled for 2025. This structured reporting cycle may contribute to a perception of delay in providing accessible updates.
- **Public accessibility of information:** While some progress is reported through existing mechanisms like climate risk disclosures in annual reports, these formats may not be user-friendly or readily accessible to the public. The technical or dispersed nature of the information may limit its utility for those outside government or specialist audiences.
- **Focus on embedded processes:** The government's approach emphasises integrating climate considerations into its core decision-making and legislative processes. However, this approach can make it harder to isolate and present progress on climate-specific initiatives in a way that is transparent and easy to understand.

Whilst the Committee appreciates the scale and complexity of Adaptation Action Plans. Nevertheless, greater transparency and accessibility of progress updates is urgently needed to ensure accountability, public trust, and meaningful community engagement. The Committee recommends that the government take immediate steps to improve the clarity and accessibility of reporting on the Adaptation Action Plans. Providing regular, consolidated updates in a user-friendly format will strengthen public confidence and ensure that Victoria remains on track to achieve its climate resilience goals. The Committee believes that if the Government establishes new Adaptation Action Plans beyond 2026, they must also establish clear reporting processes which are more frequent, accessible and transparent.

FINDING 8: The lack of transparent and accessible progress updates on the Climate Adaptation Action Plans undermines public confidence and engagement in Victoria's climate resilience efforts.

RECOMMENDATION 2: That the Victorian Government provide regular, consolidated, and publicly accessible updates on their progress for all climate Adaptation Action Plans. This should include:

- development, with key stakeholders, of a set of performance indicators to assess the implementation of Adaptation Action Plans;
- the Secretary of DEECA being required to monitor and report on all Adaptation Action Plans and related;
- annual publication of the results of the assessment and monitoring of Adaptation Action Plans.

Whilst components of all the Adaptation Action Plans are relevant to the Inquiry, the one with the most direct relevance is the Built Environment Adaptation Action Plan. Where other Adaptation Action Plans are relevant, they will be discussed in other parts of the Report.

Built Environment Adaptation Action Plan

The Built Environment Adaptation Action Plan (The Built Environment Plan) commenced in 2022. The Plan aligns with the Victorian Government's policy in *Plan Melbourne 2017–2050*,¹¹ and is informed by strategies such as Victoria's *Climate Change Adaptation Plan 2017–2020*.¹²

The Built Environment Plan identifies three priority areas for adaptation:

- governance and regulation
- place-based
- harness economic, financial and legal tools.

The scope of the plan covers six components which are outlined in Table 4.2 below. The Table also shows the plan's desired long-term outcomes according to each component.

¹¹ Department of Transport and Planning, *Plan Melbourne 2017–2050*, 2017.

¹² Environment and Climate Action Department of Energy, *Victoria's Climate Change Adaptation Plan 2017–2020*, 2017.

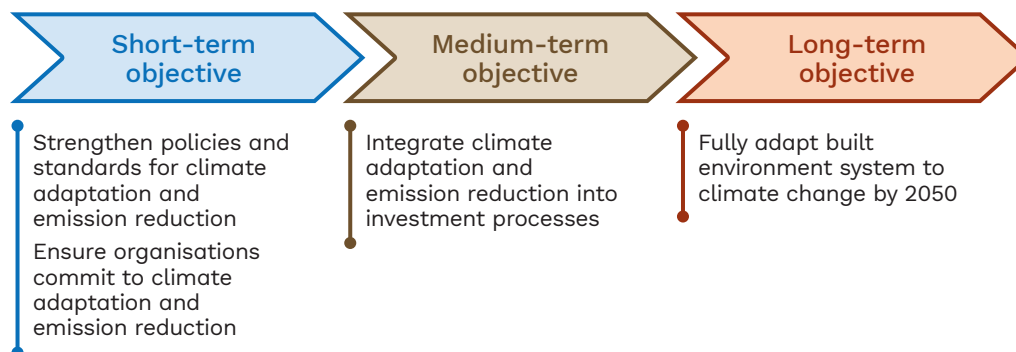
Table 4.2 Built Environment Adaptation Action Plan scope and long-term outcomes sought

Component	Adaptation outcomes sought
Cities, towns, suburbs and regional areas	• New precincts, growth areas and suburbs are resilient to climate change • Infrastructure for new and existing suburbs incorporates climate change adaptation measures • Climate-resilient regional and rural cities and townships • Climate change considerations incorporated into decision making about future land use planning for cities, towns, suburbs and regional areas
New and existing buildings	• Construct buildings resilient to climate-related hazards. • Retrofit existing buildings for better thermal performance and heatwave resilience, with future upgrade capacity and benefits like reduced bushfire smoke infiltration. • Upgrade to energy-efficient heating and cooling systems to lower climate-related costs. • Value the embodied energy in existing and heritage buildings.
Infrastructure	• Design resilient infrastructure for electricity, waste management, and telecommunications, considering interdependencies. • Protect or retrofit existing critical infrastructure, accounting for telecommunication and energy system interdependencies. • Use alternative water sources extensively for drought resilience and urban cooling. • Fund, design, and manage urban flood-reduction assets to handle flash flooding and sea-level rise. • Design community, sporting, and tourism sites to be climate resilient.
Urban green spaces	• Ensure climate-resilient urban green spaces. • Maintain vegetation and recreational spaces using alternative water sources during drought. • Provide at least 30% tree canopy coverage to support urban cooling and greening, minimising bushfire risks.
Heritage	• Incorporate climate change into conservation decisions for cultural heritage. • Develop policies for retrofitting heritage buildings with energy-efficient systems while preserving heritage values. • Create solutions to retrofit heritage buildings for energy efficiency and cost reduction. • Support conservation and adaptive reuse of heritage buildings over new construction. • Consider Traditional Owner and Aboriginal Victorian cultural values in decision making.
Contributions to issues across multiple Adaptation Action Plan systems	• Health, safety, liveability, and community resilience • Environmental and ecosystem impact • Financial, legal, and insurance risk of climate change • Greenhouse gas emissions from adaptation efforts • Needs of vulnerable and exposed communities • Impact of growth changes on biodiversity and primary production

Source: Victorian Government, *Built Environment Climate Adaptation Action Plan 2022–2026*, 2022.

Several key objectives are articulated in the Built Environment Plan, which support the Climate Change Strategy. Figure 4.4 below outlines these objectives.

Figure 4.4 Built Environment Adaptation Action Plan objectives



Source: Environment and Planning Committee. Adapted from Victorian Government, *Built Environment Climate Adaptation Action Plan 2022–2026*, 2022, p. 11.

In its response to a questionnaire for the *Inquiry into the 2021–22 and 2022–23 Financial and Performance Outcomes*, the Department of Transport and Planning (which is responsible for coordinating implementation of the Built Environment Plan) stated that ‘immediate work ... is in an early stage’.¹³ It noted several actions which were underway as of 15 November 2023:

- improving rented homes’ energy efficiency
- upgrading powerlines to reduce bushfire risks and supporting microgrids, batteries and community renewable energy projects in isolated areas
- mapping heat vulnerability and preparing advice for cooling our homes and streets
- updating planning provisions responding to climate change, including by applying best available climate data and science in planning schemes for coastal inundation and flood risk. This includes establishing a Standing Advisory Committee to implement completed flood studies into planning schemes.¹⁴

The Department of Energy, Environment and Climate Action, in its questionnaire response, provided an update on actions related to the energy portfolio which fall under the Built Environment Plan. The Department advised the Public Accounts and Estimates Committee:

Implementation of the Built Environment AAP focuses on protecting physical structure, assets and infrastructure. During 2021–22 and 2022–23, DEECA implemented minimum energy efficiency standards for rental homes (heating) and progressed analysis and a safety framework that would support an insulation minimum standard, which will make

¹³ Department of Transport and Planning, *Response to 2021–22 and 2022–23 Financial and Performance Outcomes General Questionnaire*, Public Accounts and Estimates Committee, received 15 November 2023, p. 261.

¹⁴ Ibid.

homes safer and more comfortable in hot weather. DEECA also oversaw powerline upgrades to reduce bushfire risks, and delivery of microgrids (energy back-up systems installed at community hubs in at least 19 high-risk towns ; work with AusNet Services in Mallacoota, Omeo and Corryong to increase their bushfire and Energy Resilience), batteries (Fitzroy battery installed June 2022) and community renewable energy projects in remote areas, to mitigate risks of energy supply disruption from climate impacts and extreme weather. This was complemented by the Distribution Network Resilience Review (2021–22) and consideration of a government response (2022–23).¹⁵

The Department further explained that:

In addition, each AAP lead is developing a Monitoring, Evaluation, Reporting and Improvement plan to assess the effectiveness and impact of AAP actions. A report on the implementation and effectiveness of each AAP will be reported in the next set of AAPs as required by the Act.¹⁶

In their evidence to the Inquiry, some stakeholders reflected on the Built Environment Plan. There was consensus that the Plan was an important step toward ensuring Victoria's built environment and infrastructure are climate resilient. In its submission, the Council Alliance for a Sustainable Built Environment stated:

The plan provides critical guidance for consideration of climate change impacts in decision-making in planning our communities, engaging with at risk cohorts and communities, and planning for resilience and recovery. The adaption actions are key to ensuring our built environment reduces devastating environmental, social and economic impacts of at-risk communities, by designing in protections early.¹⁷

However, it argued that 'progress under this plan is constrained because the proposed actions remain largely unfunded'.¹⁸

Some stakeholders believed that minimal progress on the plan had been made, with many actions not yet underway. Natash Palich, Executive Officer of the Council Alliance for a Sustainable Built Environment, told the Committee that from her perspective 'very little' of the Plan had been actioned.¹⁹

At the 20 November 2024 public hearing, the Legislative Council Environment and Planning Committee submitted a Question on Notice to the Department of Transport and Planning requesting an update on the Built Environment Plan. The Department of Transport and Planning is the Department responsible for the Plan.

¹⁵ Department of Energy, *Response to the 2021–22 and 2022–23 Financial and Performance Outcomes General Questionnaire*, pp. 165–166.

¹⁶ Ibid.

¹⁷ Council Alliance for a Sustainable Built Environment (CASBE), *Submission 111*, p. 9.

¹⁸ Ibid.

¹⁹ Natasha Palich, Executive Officer, Council Alliance for a Sustainable Built Environment, public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 57.

In its response to the Committee, the Department referred to the progress update available on its website and did not provide additional updates. However, it did reiterate specific measures being undertaken, such as:

- supporting councils to implement regional flood studies
- implementing actions from accepted recommendations to the *Inquiry into the 2022 flood event in Victoria*
- delivering the *Environmentally sustainable development of buildings and subdivisions: A roadmap for Victoria's planning system*
- introduction of energy projects into accelerated assessment pathways under the Department's Development Facilitation Program.²⁰

4.2.2 Regional Climate Change Adaptation Strategies

In addition to system-based Adaptation Action Plans, there are six Regional Climate Change Adaptation Strategies (regional strategies). These strategies are community-developed and owned, aiming to 'address the unique challenges and opportunities that climate change brings to Victoria's regions and guide locally relevant practical action'.²¹

Table 4.3 below identifies regions where adaptation strategies have been developed and their priority focus.

Table 4.3 Regional Climate Change Adaptation Strategies

Region	Focus
Loddon Mallee	Ensuring climate ready people, places and sectors.
Hume	Emergency management, the natural environment, renewable energy, health and wellbeing, the built environment, and the economy and workforce.
Gippsland	Awareness of climate change impacts on community and country and flexible adaptation.
Grampians	On eight interconnected themes: • agriculture • biodiversity • economy • fire • health and wellbeing • storms and flooding • water.

20 Department of Transport and Planning, *Response to question on notice 20 November 2024 hearing*, response received 6 January 2025, pp. 4–5.

21 Environment and Climate Action Department of Energy, *Supporting local action on climate change*, 2024, <https://www.climatechange.vic.gov.au/supporting-local-action-on-climate-change#toc_id_1_regional> accessed 15 November 2024.

Region	Focus
Greater Melbourne	Taking a systems approach to 12 action areas: • skill building • resilient service delivery • system wide issues • supporting at-risk communities • enhancing natural environment • continuous improvement • embracing transformation • climate change is an issue for everyone • problem-solving in at-risk locations • strengthening knowledge • adaptation investment.
Barwon South-West	Twelve focus areas: • maintain a functioning natural system • strengthen emergency preparedness • expand regenerative agriculture • coastal planning • investment in community health and wellbeing • upgrade urban environments • diversify water supply • ongoing capacity building • mainstream climate change across government • climate equity • monitor maladaptation • emissions reduction.

Source: Legislative Council Environment and Planning Committee. Adapted from the Regional Climate Change Adaptation Strategies.

Each of the regional strategies address the seven systems identified in the Adaptation Action Plans, including the built environment. It is clear across all regional strategies that the built environment is a priority area, with all regions facing significant but diverse risks. Table 4.4 summarises key built environment risks identified in each regional strategy.

Table 4.4 Built environment risks identified under the six Regional Climate Change Adaptation Strategies

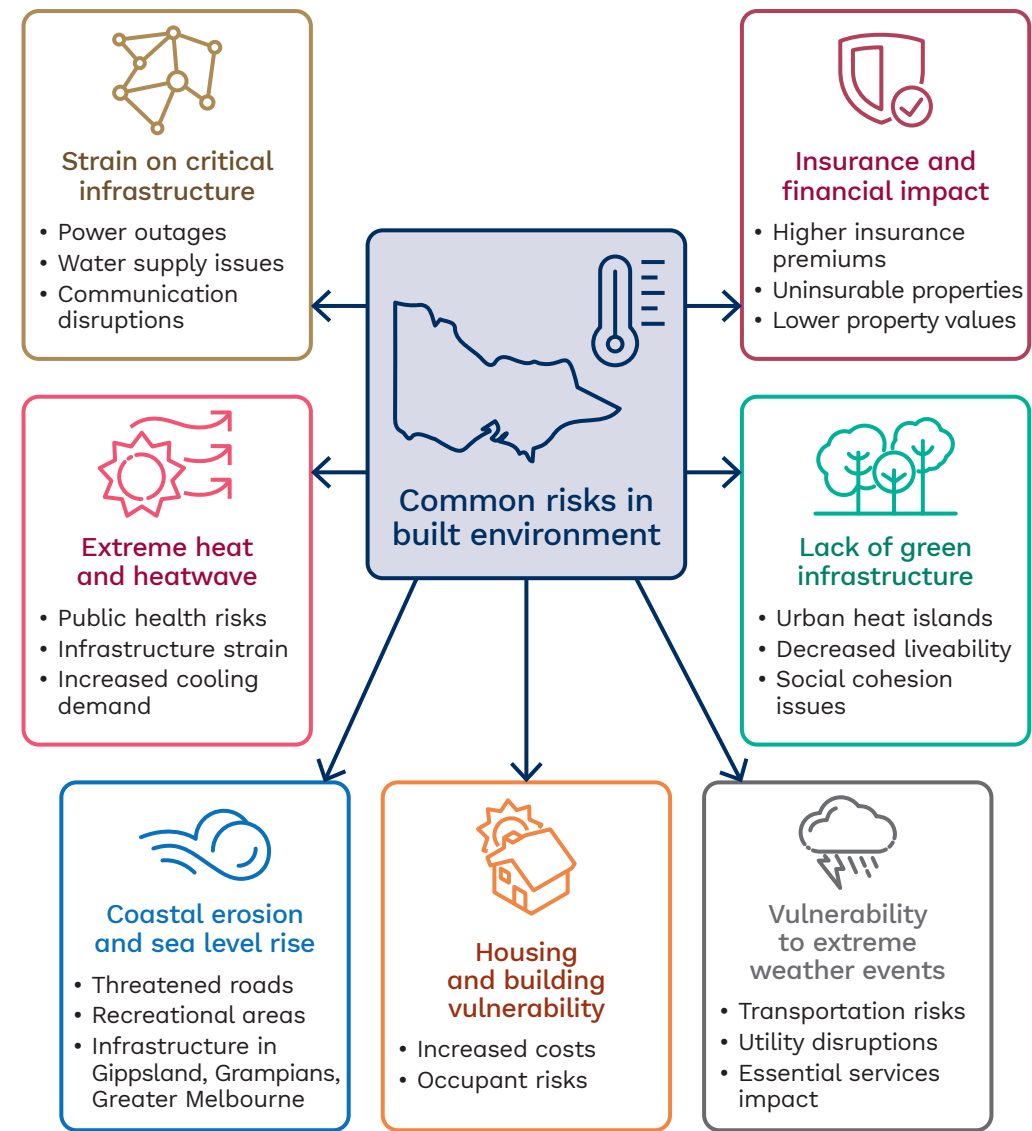
Region	Identified risks to the built environment
Loddon Mallee	• Impact to industry, agriculture, and jobs • Loss of green space and access to the environment • Thermal comfort of homes (including affordability of cooling) • Risks to heritage sites and tourism
Hume	• Increased temperatures and frequent heatwaves may overwhelm infrastructure, posing health risks, particularly for vulnerable groups. • Insufficient energy-efficient, climate-resilient buildings and retrofitting could undermine community resilience. • Poor urban design lacking green spaces and service accessibility can weaken social bonds and negatively affect public health. • Infrastructure that does not support age-friendly, climate-resilient features risks inadequately serving an ageing population. • Lack of green infrastructure and cooling strategies could intensify urban heat, compromising health and liveability. • Failure to adopt sustainable transport, circular economy, and adaptable infrastructure may undermine community resilience.
Gippsland	• Poor quality private and public housing lacks thermal safety. • Rising frequency and severity of bushfire, storms, and flooding threaten resilience of built assets. • Sea level rise and intensified storms risk damage to coastal infrastructure, including surf clubs, ports, jetties, roads, transport networks, and utilities. • Much of the current housing and building infrastructure is not designed for extreme temperatures. • Extreme weather events disrupt major highways, isolating communities, blocking supply chains, and affecting access to essential services. • Rising temperatures in urban areas amplify heat, particularly in business districts and residential zones. • Intense rainfall could overwhelm stormwater systems, causing urban flooding and infrastructure strain. • Critical infrastructure for power, communications, and utilities faces heightened risk during extreme events.
Grampians	• Extreme weather events can damage transport, utility, and public infrastructure. • More frequent and severe bushfire threatens buildings, transport routes, and critical services. • Lack of green spaces may intensify heat in urban areas. • Climate impacts on water availability and quality can strain water infrastructure, affecting urban, industrial, and agricultural needs. • Rising sea levels, coupled with extreme rainfall events, increase the risk of flooding in urban and coastal areas, straining stormwater systems and damaging buildings. • Sea level rise and intensified storms heighten the risk of coastal erosion, impacting coastal roads, housing, and recreational facilities. • Extreme temperatures and weather events threaten the resilience of power and utility infrastructure, potentially leading to frequent outages. • Higher risk of extreme weather events could drive up insurance premiums or make certain properties uninsurable. • Damage to major transport routes due to extreme weather can disrupt supply chains. • Infrastructure for healthcare and social services may be insufficient to handle increased demands from climate-driven health issues, such as heat stress and injuries from extreme events.

Region	Identified risks to the built environment
Greater Melbourne	- Increasingly frequent and intense heatwave place pressure on infrastructure, may cause rail tracks to buckle, roads to deteriorate, and increase the need for cooling systems in buildings. - Dense urban areas are prone to trapping heat, raising local temperatures and impacting public health, particularly in communities with limited access to green spaces or cooling infrastructure. - More intense rainfall and storm events increase the risk of flash flooding, overwhelming stormwater systems, causing water damage to infrastructure, and potentially disrupting transport routes and essential services. - Rising sea levels and intensified coastal storms threaten coastal infrastructure, such as roads, ports, and recreational areas, leading to erosion and damage to assets in low-lying urban areas. - Increased frequency of extreme weather events can disrupt power, water, and communications infrastructure, risking prolonged outages that affect residents and businesses. - Hospitals and healthcare facilities are at risk of being overwhelmed by increased demand during extreme weather events. - Urban fringes face bushfire risk that can threaten homes, transport networks, and utility services, posing safety risks to nearby communities and putting pressure on emergency services. - Extreme events such as flooding and heatwaves can disrupt supply chains, impacting the movement of goods and access to essential services, as well as causing delays in public transport. - Increased frequency and severity of climate-related events may drive up insurance premiums, reduce property values in high-risk areas, and make some properties uninsurable. - Projected population growth in Melbourne increases demand on infrastructure, which is further strained by climate impacts.
Barwon South-West	- Erosion and infrastructure damage along the coastline. - Increased maintenance costs. - Increased disruption to services. - Costs associated with retrofitting assets. - Increased use of facilities during extreme heat.

Source: Legislative Council Environment and Planning Committee. Adapted from the Regional Climate Change Adaptation Strategies.

Table 4.4 shows the common concerns across regional strategies about the risk Victoria's built environment and infrastructure faces from the impact of climate change. These are summarised in Figure 4.5 below.

Figure 4.5 Common built environment risks identified under the Regional Climate Change Adaptation Strategies



Source: Legislative Council Environment and Planning Committee. Adapted from the Regional Climate Change Adaptation Strategies.

Robyn Seymour, Chief Executive Officer for Surf Coast Shire, described their regional strategy as ‘really good’ and that it ‘talks to the holistic approach’ needed to build climate resilience.²² Seymour emphasised the importance of ensuring these plans are ‘supported by state government and resourced by state government’ because of their strategic importance’.²³

22 Robyn Seymour, Chief Executive Officer, Surf Coast Shire Council, public hearing, Aireys Inlet, 23 October 2024, *Transcript of evidence*, p. 10.

23 Ibid., p. 11.

In its submission, Yarra City Council highlighted that ‘state government coordination and financial support is necessary to build climate resilience at regional scales’.²⁴ The Council explained:

Some climate risks are so significant that they cross local government boundaries and require rapid and coordinated action. While local governments collaborate on these risks, their capacity to develop and fund large-scale projects at speed is limited. Effective State government coordination is necessary to address these spatially significant risks and build regional climate resilience.²⁵

Yarra City Council critiqued regional adaptation strategies as ‘aspirational and underfunded’.²⁶ It called on the Victorian Government to develop a ‘concrete regional approach to climate adaptation’ beyond the existing regional strategies.²⁷ The Council suggested that a stronger regional approach could ‘produce projects that have the potential to attract State or Federal grants funding, as well as private financing’.²⁸

Infrastructure Victoria’s *Weathering the Storm* report, which was published in April 2024, noted that the six regional strategies ‘use local knowledge to set out place-based climate change adaptation actions’.²⁹ It reported that, at the time of publication, the Victorian Government had allocated \$1.5 million to deliver projects identified in the strategies (collectively).³⁰

4.2.3 Funding and supporting the *Climate Change Strategy* and *Adaptation Action Plans*

Plans exist, but are largely uncoded, unfunded and often short on detail.

Doctors for the Environment Australia, *Submission 122*, p. 4.

The Victorian Government’s *Climate Change Strategy* and associated *Adaptation Action Plans* underscore the importance of collaborative efforts among government, businesses, and households to reduce emissions and adapt to climate change. Labor Environment Action Network Victoria recognised this, highlighting the need to ‘mobilise the community to be effective partners in this endeavour’.³¹ Despite this overarching framework, stakeholders reported a critical gap between planning and implementation, and the need for substantial funding to support these initiatives.

²⁴ Yarra City Council, *Submission 25*, p. 3.

²⁵ Ibid.

²⁶ Ibid.

²⁷ Ibid.

²⁸ Ibid.

²⁹ Infrastructure Victoria, *Weathering the Storm: Adapting Victoria’s infrastructure to Climate Change*, 2024, p. 19.

³⁰ Ibid.

³¹ Labor Environment Action Network, *Submission 61*, p. 13.

In its submission, The Nature Conservancy stated there has been ‘insufficient action and implementation of sustainable or long-term solutions’.³² They said that there is an ‘urgent need for the Victorian Government to scale up the size and speed of its work’.³³ The Conservancy further contended that there is:

a significant opportunity for increased focus on nature-based solutions, that will increase resilience while providing multiple additional benefits such as public amenity, species habitat, and carbon sequestration, often at lower cost than built infrastructure.³⁴

Doctors for the Environment Australia also voiced concerns about the adequacy of current funding. The organisation noted that while Adaptation Action Plans are intended to inform one another, they often function as ‘plans to have a plan’, with significant ‘gaps ... in lack of funding for development and implementation’.³⁵ This gap creates risks of accountability diffusion, with each government level potentially ‘abrogating responsibility to other levels’ or to private companies and individuals.³⁶ To strengthen resilience funding, Doctors for the Environment Australia made recommendations to improve resilience funding at the state level:

- revoking subsidies currently provided to fossil fuel industry and redirecting these funds to preparedness
- instituting a tax on polluting industries, including the fossil fuel industry, to fund preparedness
- considering models for insurance which could provide discounts on insurance premiums for infrastructure which is resilient to climate damage.³⁷

Similarly, Warren Smith, Coordinator of Climate Change and Heritage at Cardinia Shire Council, acknowledged the importance of the Strategy and Adaptation Action Plans. However, he called on the State to ‘continue to fund strategic resources – investment in proactive outcomes for our communities rather than reactive’.³⁸

The need for funding to support the integration of adaptation into infrastructure planning is also highlighted in *Weathering the Storm: Adapting Victoria’s Infrastructure to Climate Change*. The 2024 report discussed the State Government’s adaptation funding noting that there has been ‘little new funding for infrastructure adaptation to better prepare for events’.³⁹ However, it noted there has been substantial investment towards climate action but mostly for reducing emissions (over \$2 billion).⁴⁰

³² The Nature Conservancy, *Submission 48*, p. 2.

³³ Ibid.

³⁴ Ibid.

³⁵ Doctors for the Environment Australia, *Submission 122*, p. 2.

³⁶ Ibid.

³⁷ Ibid.

³⁸ Warren Smith, Coordinator, Climate Change and Heritage, Cardinia Shire Council, public hearing, Emerald, 10 October 2024, *Transcript of evidence*, p. 2.

³⁹ Infrastructure Victoria, *Weathering the Storm: Adapting Victoria’s infrastructure to Climate Change*, p. 19.

⁴⁰ Ibid.

Infrastructure Victoria advocated for a funding attachment to the '2026 updates of the system-wide adaptation action plans', encouraging government agencies to assess and prioritise assets for climate adaptation and incorporate resilience measures into business cases.⁴¹ These measures would provide a more consistent approach to embedding climate resilience within Victoria's infrastructure projects.

Figure 4.6 below provides an overview of the *Climate Change Strategy* by numbers, including many funding commitments from the Victorian Government to support its objectives. Notably, the Government outlined in its Strategy that it has committed:

- \$1.6b in a clean energy package
- \$1.3b in the Solar Homes program
- \$108m in the Energy Innovation Initiative
- \$10m for enhancing local hydrogen industry
- \$100m for zero emissions vehicles
- \$120m to phase out commercial native forest harvesting by 2030
- \$515m to transform the waste and recycling industry.⁴²

The Committee notes that the majority of the Government's investments in climate change are related to reducing greenhouse gas emissions.

⁴¹ Ibid., p. 5.

⁴² Victorian Government, *Victoria's Climate Change Strategy: Strategy by numbers infographic*, <<https://www.climatechange.vic.gov.au/victorias-climate-change-strategy>> accessed 13 November 2024.

Figure 4.6 Victoria's Climate Change Strategy: Strategy by numbers

Our pathway to achieve net-zero emissions by 2050 and build resilience to the impacts of climate change



Source: Victorian Government, Victoria's Climate Change Strategy: Strategy by numbers infographic, <<https://www.climatechange.vic.gov.au/victorias-climate-change-strategy>> accessed 13 November 2024.

2024–25 State Budget commitments

The Victorian Government has a variety of commitments in the 2024–25 State Budget which meet objectives under the *Climate Change Strategy* and adaptation plans. It is difficult to determine the exact amount of State funding for climate resilience activities. It is likely that many funding commitments for Victoria's infrastructure or built environment may also interact with resilience activities, but where it has not been attributed to these objectives it is difficult to assess.

Nonetheless, Table 4.5 below outlines 2024–25 State Budget commitments which have been designated as directly responding to the Climate Change Strategy or adaptation strategies. The Committee notes that many of these commitments are only tangentially relevant to the built environment and largely address other components of the Strategy.

Table 4.5 Overview of recent State Budget commitments towards Victoria's Climate Change Strategy and Adaptation Action Plans

Initiative	Budget allocation	Description	Recurrent?
2024/25 State Budget			
Energy efficient hot water rebates	\$37.7 million (over 2 years)	an additional 27,000 solar hot water rebates available	Non-recurrent
VicCoasts volunteers	\$1 million (2024–25)	- contributes directly to Climate Resilient Victoria pillar of the Strategy - support environmental stewardship - enable volunteers and communities to participate in marine and coastal planning	Non-recurrent
Resource Smart Schools	\$8.9 million (over 3 years)	- funding Sustainability Victoria to provide support to schools - enabling school communities to achieve reduction targets	Non-recurrent
Preventing waste crime	\$44.4 million (over 4 years)	maintain the EPA's ability to detect and prevent environmental waste crime	Non-recurrent
Supporting a circular economy	\$14.9 million (over 4 years)	- continue improving Victoria's waste and recycling system - provide information to waste, resource recovery and recycling section - implement the Victorian Recycling Infrastructure Plan	Non-recurrent
Future Drought Fund	\$10.2 million (over 4 years)	support agriculture industries and communities to prepare for drought	Non-recurrent
Maintaining water cycle climate action: become net zero and disaster ready	\$11.6 million (over 4 years)	- develop and implement a Victorian Water Sector Emissions Transition Plan - support realisation of Victoria 2030 adaptation objectives - boost resilience through a legislated Water Cycle Adaptation Action Plan	Non-recurrent

Initiative	Budget allocation	Description	Recurrent?
2024/25 State Budget (Continued)			
Delivering the offshore wind program	\$18.3 million (over 2 years)	- replace exiting fossil fuel generation - help meet renewable energy and climate change targets	Non-recurrent
Improving Victorian Energy Upgrades	\$5.9 million (over 2 years)	support households and businesses to reduce energy use	Non-recurrent
State funding commitments to national energy market bodies	\$22.2 million (over 2 years)	- provide energy market transformations - contribute to achieving emissions reductions and renewable energy targets	Non-recurrent
Future Forests Program	\$115.7 million (over 4 years)	implement Natural Environment Adaptation Action Plan	Non-recurrent
Securing the forest firefighting workforce	\$36.9 million (over 4 years)	- maintain skilled frontline forest and fire operations workforce - contributes directly to Climate Resilient Victoria pillar of the Strategy	Non-recurrent
Critical bushfire and emergency asset maintenance and replacement	\$20 million (over 2 years)	maintain and renew critical bushfire and emergency response assets	Non-recurrent
2023/24 State Budget			
100 neighbourhood batteries	\$42.2 million (over 4 years)	- enable storage of local solar generation - improve energy system resilience, as outlined in the Built Environment Adaptation Action Plan	Non-recurrent
Wind worker training centre	\$6 million (over 4 years)	- supports Victoria's New Energy Technology Sector Strategy - supports establishment of: - the VicGrid - Offshore Wind Energy Victoria - the State Electricity Commission	Non-recurrent
Hydrogen worker training centre	\$10 million (over 2 years)	- supports: - Victoria's Renewable Hydrogen Industry Development Plan - the National Hydrogen Strategy - Victoria's Climate Change Strategy	Non-recurrent
Maintaining strategic fuel breaks	\$3.8 million (over 4 years) \$1 million (ongoing)	- developing a strategy to maximise ecosystem resilience - integrating the climate adaption lens into bushfire preparedness, response and recovery	Recurrent

Initiative	Budget allocation	Description	Recurrent?
2023/24 State Budget (Continued)			
VicCoasts: Building a safer, healthier and more resilient marine and coastal environment for the community	\$13.7 million (2023–24)	• updating climate vulnerability assessments related to natural environment assets with latest climate model data • developing a framework for monitoring and assessing emerging threats • developing a strategy to maximise ecosystem resilience • developing guidance on applying adaptation pathways in the natural environment context • exploring opportunities to incorporate the climate adaption lens into behavioural change initiatives	Non-recurrent
Delivering climate action	\$20 million (over 4 years)	• enabling leadership • coordinating initiatives to meet Victoria's emission reduction goals • developing climate action policy across government	Non-recurrent
Resource Smart Schools	\$2.9 million (2023–24)	• funding Sustainability Victoria to provide education and training • enabling school communities to achieve reduction targets	Non-recurrent
2022/23 State Budget			
Implementation of the Central and Gippsland Region Sustainable Water Strategy	\$56.6 million (over 2 years)	• increase resilience of water resources • update water supply planning • embed climate change adaptation and Indigenous knowledge principles into water corporation • link waterway health and other on-ground projects with co-benefits for climate change mitigation	Non-recurrent
Wildlife care and protection	\$5.3 million (over 2 years)	• improve colony management of select threatened species • undertake research into select threatened species populations • support wildlife emergency response practitioners	Non-recurrent
Securing Victoria's Alpine Future	\$5 million (2022–23)	• governance reforms for alpine resorts • establish a single entity to manage Victoria's six alpine resorts	Non-recurrent
Solar Homes boost	\$26.3 million (2022–23)	• support up to 778,500 Victorian households over 10 years to install solar systems	Non-recurrent
Victorian Renewable Energy Target	\$4.2 million (2022–23)	• deliver projects and programs which will assist Victoria to achieve a 45–50% reduction in emissions by 2030	Non-recurrent

Initiative	Budget allocation	Description	Recurrent?
2022/23 State Budget (Continued)			
Unlocking offshore wind, renewable hydrogen and new energy manufacturing to create jobs	\$6.7 million (over 2 years)	- investigate regulatory arrangements and development pathways to deliver offshore wind - support hydrogen development in Victoria	Non-recurrent

Source: Department of Energy, Environment and Climate Action, *Response to the 2024-25 Budget Estimates General Questionnaire*, Public Accounts and Estimates, 14 May 2024; Department of Energy, Environment and Climate Action, *Response to the 2023-24 Budget Estimates General Questionnaire*, Public Accounts and Estimates Committee, 29 May 2023; Department of Environment, Land, Water and Planning, *Response to the 2022-23 budget estimates General Questionnaire*, Public Accounts and Estimates Committee, 10 May 2022.

Along with funding and resourcing concerns, the Committee was made aware of other potential improvements to the Strategy and Adaptation Action Plan. These are discussed throughout the Report in the context of specific issues raised by stakeholders, particularly in Chapter 8.

FINDING 9: While the Victorian Government’s *Climate Change Strategy* and Adaptation Action Plans contain significant investments in emissions reduction, stakeholders identified gaps in implementation and funding for resilience and adaptation initiatives.

FINDING 10: Assessing funding for resilience activities is challenging, as funding allocations may be dispersed across various budget initiatives and portfolios, and not explicitly designated for resilience work. This lack of clear attribution makes it difficult to evaluate the extent of resources committed to adaptation and preparedness efforts.

RECOMMENDATION 3: That the Victorian Government implement a transparent funding framework that explicitly identifies and tracks budget allocations for climate resilience and adaptation initiatives across all relevant departments and programs. This tracking should be reported in updates on Victoria’s progress in implementing the *Climate Change Strategy*.

4.3 Victoria’s Asset Management Accountability Framework

The *Asset Management Accountability Framework* (AMAF), established by the Victorian Department of Treasury and Finance in 2016, guides public sector asset management across Victoria to support effective service delivery. The AMAF applies to non-current assets, such as infrastructure, providing guidelines to help agencies align asset management with government objectives.⁴³ The guiding principles include:

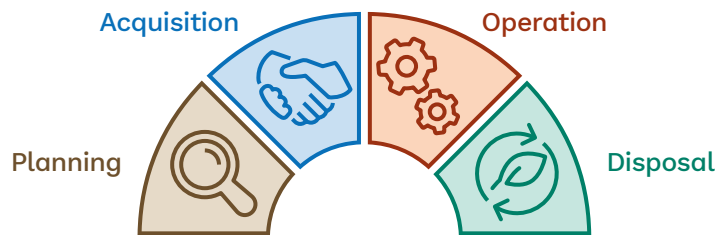
- a service delivery focus

⁴³ Department of Treasury and Finance, *Asset Management Accountability Framework*, February 2016.

- a whole lifecycle approach to asset management (covering planning, acquisition, operation, and disposal)
- integration of asset planning within organisational and government frameworks.⁴⁴

It also emphasises informed decision-making and accountability, with clear roles and responsibilities. The asset lifecycle is divided into four phases as shown in Figure 4.7 below.

Figure 4.7 Four phases of the asset lifecycle



Source: Environment and Planning Committee. Adapted from Department of Treasury and Finance, *Asset Management Accountability Framework*, February 2016, p. 2.

Under the AMAF, accountable officers are required to follow specific governance and risk management standards, regularly review asset performance and ensure compliance through annual reporting.⁴⁵ The AMAF mandates the use of asset information management systems to support decision-making and compliance. Further, the AMAF encourages alignment with international standards, such as ISO 55000, promoting continuous improvement and adaptability.⁴⁶

At a public hearing, Infrastructure Victoria highlighted the need for ensuring plans interacting with Victoria's infrastructure processes appropriately consider climate resilience and adaptations. Whilst adaptation plans exist under the Climate Change Act, there is room for improvement in oversight and a particular gap in energy infrastructure adaptation, which is critical given the cascading impact on other infrastructure. Dr Jonathan Spear, Chief Executive Officer of Infrastructure Victoria, told the Committee that Victoria's AMAF does not have strong climate change considerations. He stated:

there is a need to use our existing asset management systems to improve resilience. The Victorian government has an asset management framework, and departments and agencies have policies and protocols about how they manage their assets. Climate change guidance is not really strong in those currently, and given what we are already facing and are likely to in the future, a greater emphasis and clearer guidance about how the asset management frameworks and policies should account for climate change and increasingly adapting our infrastructure would be really useful.⁴⁷

⁴⁴ Ibid.

⁴⁵ Ibid.

⁴⁶ Ibid.

⁴⁷ Dr Jonathan Spear, Chief Executive Officer, Infrastructure Victoria, public hearing, Melbourne, 9 October 2024, *Transcript of evidence*, p. 26.

Similarly, the Weathering the Storm report also found that asset management in Victoria could be strengthened by ‘integrat[ing] climate adaptation into asset management practices’.⁴⁸ The report recommended that Victoria:

Use asset management systems to improve resilience:

- Release climate change guidance on assessing climate vulnerability and risk, designing for resilience, and adopting preventative maintenance.
- Support agencies to develop the processes, tools and expertise to embed climate considerations in asset management practice.⁴⁹

The Victorian Greenhouse Alliances also advocated asset management practices be updated to include climate resilience as part of ‘regular asset management operations’.⁵⁰ It noted that additional and ongoing funding may be required to enable incorporation.⁵¹

Merri-bek City Council identified the lack of consideration of climate resilience in asset management as a key barrier to upgrading Victoria’s infrastructure. It called on the Victorian Government to implement Recommendation 3 of the Weathering the Storm report (outlined above).⁵²

As noted by Infrastructure Victoria and other stakeholders, the AMAF does not directly consider climate change or resilience. However, it does outline principles and requirements for asset management that may indirectly support resilience by encouraging adaptable, lifecycle-focused management strategies. For example, it refers to:

- **Risk management and contingency planning:** encouraging proactive risk identification and management, which may apply to various types of risks, potentially including those posed by climate change, though the climate is not explicitly mentioned.⁵³
- **Planning for uncertainty and using ‘real options’:** promoting planning for uncertain future service demands and suggests ‘real options’ for flexibility in asset management, allowing for adjustments in response to changes in demand or asset performance over time. The Framework states that ‘future service delivery demand may depend on demographic, environmental or technological outcomes’.⁵⁴

In the Committee’s view, the Victorian Government should update the AMAF to include explicit climate resilience considerations to strengthen infrastructure adaptation and preparedness. This update would promote climate vulnerability assessments,

⁴⁸ Infrastructure Victoria, *Weathering the Storm: Adapting Victoria’s infrastructure to Climate Change*, p. 37.

⁴⁹ Ibid.

⁵⁰ Victorian Greenhouse Alliances, *Submission 129*, p. 2.

⁵¹ Ibid., p. 5.

⁵² Merri-bek City Council, *Submission 186*, p. 5.

⁵³ Department of Treasury and Finance, *Asset Management Accountability Framework*, p. 16.

⁵⁴ Ibid.

resilience-focused design standards, and preventative maintenance protocols across all stages of asset management. Furthermore, a resource framework should be developed to provide agencies with the tools, funding, and expertise needed to embed climate resilience within asset management, ensuring that Victorian infrastructure remains robust in the face of future environmental challenges.

RECOMMENDATION 4: That the Victorian Government update the Asset Management Accountability Framework to include climate resilience as a consideration. Alongside this, it should develop resources to equip agencies with the necessary tools, funding, and expertise to safeguard infrastructure against future environmental challenges.

The Committee acknowledges submitters' concerns in relation to the implementation of strategies and plans and therefore suggests an independent evaluation.

RECOMMENDATION 5: That this Committee invites the Victorian Auditor-General to review the Government's implementation of Adaptation Action Plans and Climate Change Strategies to assess whether they are achieving their aims and objectives.

4.4 Community-led initiatives

A critical component of Victoria's efforts to strengthen its climate resilience is community-led projects, responding to local risks and needs. These are explored in greater detail throughout the Report in the context of specific challenges and opportunities. This Section provides an overarching view of their importance. These initiatives demonstrate the critical role of local leadership in fostering resilience by focusing on locally driven approaches that address unique risks and leverage community strengths.

Stakeholders consistently emphasised the pivotal role of community-led initiatives in building climate resilience. Mayor Tom Crook of East Gippsland Shire Council highlighted that communities with robust preparedness recover more quickly and exhibit greater long-term resilience:

Climate change requires us to think differently about how we design communities and infrastructure but so too our investment in community resilience and social capital, which help our communities manage the impacts of climate change, meaning they are lessened and that our communities recover faster. Those communities better prepared, from our experience, recover quicker and are ultimately more resilient to the impacts of a changing climate. This includes investment in community capacity and connectedness, ensuring that they have the information they need during an event, training communities to set up their own relief centres, improving communication facilities, including satellite communications.⁵⁵

⁵⁵ Cr Tom Crook, Mayor, East Gippsland Shire Council, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, p. 2.

Some local government stakeholders highlighted that many of their strategies and plans responding to climate risk have been community-led. For example, Robyn Seymour, Chief Executive Officer of Surf Coast Shire, noted that the municipality's Climate Emergency Corporate Response Plan 2021–2031 'was really a community-led initiative'. The Shire emphasised the importance of climate resilience to the community:

This is something that is very important to our community, and looking at how we build resilience and respond to our climate challenges is something that is very important to us as an organisation and also our community.⁵⁶

Throughout the Inquiry, the Committee was made aware of many community-led initiatives responding to the challenge of building climate resilience. Some were jointly administered between community groups and local government; others were grassroots initiatives. Box 4.1 highlights programs and initiatives across Victoria which are seeking to increase local climate resilience. The Committee notes these are only a small snapshot of significant efforts of community members across Victoria.

Box 4.1 Examples of community-led initiatives

Port Fairy Coastal Group

The Port Fairy Coastal Group was established in 2011 by community members concerned about beach and dune erosion. Its purpose is to encourage community involvement in coastal management decisions, allowing both residents and visitors to contribute to shaping the future of Port Fairy's coastline.

The Group has two ongoing projects:

- **Beach Monitoring Program:** every six weeks a drone is used to accurately measure beach profiles along about 4km of East Beach.
- **Year 6 School Science Project:** students from St Patrick's Catholic School and Port Fairy Consolidated School use a laser to monitor beach profiles at Pea Soup, South Beach.

(Continued)

⁵⁶ Robyn Seymour, *Transcript of evidence*, p. 2.

Box 4.1 Continued

Emerald Community House Centre of Resilience

The Centre of Resilience (<https://www.monash.edu/muarc/research/disaster-resilience/compendium-case-studies/centre-of-resilience>), based at Emerald Community House, focuses on community continuity by leveraging local assets (social, natural, and built environments) to enhance disaster resilience. The Centre operates like a 'business continuity model' but is applied at the community level, fostering local participation, partnerships, and governance. It aims to build self-reliance through proactive community engagement, sustainability initiatives, and infrastructure investments, such as solar power and heritage restoration.

Some of the projects outcomes have included:

- solar power projects
- the Dig-In Community Café
- local markets
- festivals
- heritage site restoration.
- establishment of a Community Resilience Task Group.

Geelong Sustainability

Geelong Sustainability is a not-for-profit community organisation supporting Geelong and its surrounding regions. Established in 2007, it is the region's leading sustainability group and has established networks with community, government and business.

It comprises 240 financial members and more than 50 active volunteers. Geelong Sustainability has delivered grant projects totalling over \$1.4 million, facilitated \$9.3 million of renewable energy investment and helped mitigate over 120,000t of cumulative CO2 emissions.

Source: Port Fairy Coastal Group, *About Us*, <https://www.pfcg.org.au/about_us> accessed 17 December 2024; Monash University, *Centre of Resilience*, 2024, <<https://www.monash.edu/muarc/research/research-areas/home-and-community/disaster-resilience/compendium-case-studies/centre-of-resilience>> accessed 17 December 2024; Geelong Sustainability, *Submission 202*.

In its evidence, Federation University underscored the importance of integrating local knowledge into resilience planning. Associate Professor Jessica Reeves highlighted the cumulative impacts of disasters on regional communities, stressing that recovery efforts should scaffold existing human and built infrastructure rather than replace or overburden them.⁵⁷ Dr Reeves recommended creating community inventories to leverage local skills and resources during emergencies. Such initiatives not only build resilience but also foster community autonomy and preparedness:

Community inventories can be developed to gain a quick understanding of who has the skills, knowledge, tools, resources and networks in an emergency, and this certainly played out in my hometown of Mirboo North earlier this year. The key here is the cumulative impact of multiple events. For example, the algal blooms that follow the floods, that follow the fires, that follow the drought are not isolated events and have a larger impact than the one that makes news headlines and captures public imagination. Recovery has a very long tail and is more frequently being interrupted by subsequent compounding events, so new infrastructure should also be mindful of trauma from past events and not cause further triggers – for example, clearing trees in preparation for widening roads. Context of place and people is essential for successful climate resilience.⁵⁸

A place-based approach to climate resilience is imperative to ensure the most pressing needs of local communities are addressed.

The benefits of community-led initiatives were clear in evidence but stakeholders identified several challenges that impede their implementation. Lack of clear guidance and leadership at the State level was a recurring theme. Challenges raised included:

- Absence of consistent state-level frameworks and methodologies for climate risk assessments, leaving councils to navigate approaches individually.
- Difficulty in securing community support for climate resilience projects, especially when they involve property loss, development restrictions, or significant lifestyle changes.
- Limited financial capacity of councils to fund both infrastructure upgrades and community-based programs, compounded by rate capping and insufficient access to grants.
- Repeated and overlapping disaster events disrupt recovery efforts, creating long recovery tails and exacerbating vulnerabilities.
- Lack of clear state or federal leadership to guide councils and communities, especially in managing cumulative disaster impacts and integrating multiple climate risks.

⁵⁷ Associate Professor Jessica Reeves, Future Regions Research Centre, Federation University, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, p. 16.

⁵⁸ Ibid.

- Outdated planning schemes and insufficient integration of climate risk data into regulatory frameworks, delaying proactive community-led initiatives.
- Environmental sustainability design standards vary across councils, creating inefficiencies and gaps in resilience planning.
- High costs and complexities associated with conducting climate risk assessments, including accessing and interpreting data at a local level.
- Diverse levels of knowledge, skills, and resources across communities, leading to uneven preparedness and resilience.

Community-led initiatives are a cornerstone of Victoria's efforts to build climate resilience, addressing local risks with tailored, grassroots solutions. The Committee's Inquiry revealed that these initiatives are not only vital for effective resilience planning but also instrumental in fostering community autonomy, preparedness, and connectedness. Witnesses highlighted the importance of leveraging local knowledge, assets, and networks to build robust social and physical infrastructure capable of withstanding and recovering from climate-related impacts. The Committee commends local governments, organisations, community groups and residents in their efforts to build a climate-resilient Victoria.

While community-led initiatives have demonstrated significant benefits, the Committee recognises the challenges that must be addressed to maximise their impact. The Committee notes that these issues are explored further in subsequent chapters, which provide detailed recommendations to enhance community resilience and support the development of place-based, community-led solutions across Victoria.

FINDING 11: Community-led initiatives are crucial for building climate resilience, but their success depends on consistent guidance, adequate resources, and effective integration with broader frameworks.

4.4.1 Local adaptation strategies

Many local governments have established their own climate adaptation strategies, setting out priorities and actions to build climate resilience within their jurisdictions. Box 4.2 provides examples of actions embedded in local climate adaptation strategies.

Box 4.2 Example actions in local government climate adaptation strategies

City of Melbourne: *Climate Change Adaptation Strategy Refresh 2017*

- Create a water-sensitive, low-carbon, climate-adaptive precinct in the Elizabeth Street Catchment.
- Advocate for climate change adaptation plans and area-specific recommendations in urban renewal precincts to be incorporated into planning and development.
- Conduct a vulnerability assessment of City of Melbourne-owned buildings to improve performance in extreme weather and share results with private building owners.
- Update existing design standards to ensure infrastructure and buildings are resilient, adaptive, and climate hazard resistant.

City of Greater Geelong: *Climate Change Response Plan 2021–2030*

- Allocate resources for establishing community climate change officers.
- Establish a climate action strategic partnership fund to support community climate action partnerships.
- Advocate for additional resources and investment for regional climate action from government, businesses, and philanthropic organisations.
- Allocate resources to support local businesses in developing clean technology and circular economy solutions.

Macedon Ranges Shire Council: *Climate Emergency Plan*

- Promote programs that enable businesses to adopt sustainable practices such as Power Purchase Agreements, Zero Emissions Vehicle programs, and eco-tourism initiatives.
- Ensure Council buildings meet best environmental performance standards, embedding climate considerations in all new designs and retrofits.
- Build capacity for delivering Water Sensitive Urban Design assets and explore stormwater treatment options at larger catchment scales.
- Explore introducing an Environmental Sustainable Design (ESD) policy into planning schemes for new developments and subdivisions.

Source: City of Melbourne, *Climate Change Adaptation Strategy Refresh*, 2017; City of Greater Geelong, *Climate Change Response Plan 2021–2030*, 2021; Macedon Ranges Shire Council, *Climate Emergency Plan*, 2023.

These local strategies typically complement regional or statewide adaptation strategies, focusing on the risks and needs of the community.

Several local governments with strategies in force emphasised the difficulty of adequately funding and implementing these strategies. Funding local strategies and initiatives is discussed further on in the Chapter.

4.4.2 Establishing a Climate Adaptation Fund

Many stakeholders were concerned that recent government funding has not prioritised infrastructure or built environment adaptation. Infrastructure Victoria's *Weathering the Storm* stated that:

The Victorian Government says it has provided over \$2 billion over several budgets towards climate action. The vast majority of identified spending is for reducing greenhouse gas emissions.

The Victorian Government allocated \$166 million in the 2023–24 budget to climate resilience, largely for revegetation projects, waterways management or drought resilience projects for agriculture. We could not separately identify Victorian Government spending on infrastructure adaptation projects.

This funding might feasibly be included as part of other infrastructure spending or maintenance activities, but not separately accounted for.⁵⁹

To signal its serious commitment to climate adaptation, Infrastructure Victoria called on the State Government to establish a Climate Adaptation Fund. It argued:

This will allow agencies to bid for funding for adaptation projects that they cannot fund from existing budgets and give confidence that priority projects will be considered. This can encourage government departments and agencies to incorporate adaptation in their business cases.⁶⁰

Infrastructure Victoria outlined how priority adaptation projects could be identified for investment under the Climate Adaptation Fund:

- Conduct risk and vulnerability assessments to understand climate change impacts.
- Select and implement high-performing adaptation measures based on these assessments.
- Audit infrastructure to identify high-risk assets in agency portfolios.
- Prioritise high-risk assets and identify appropriate adaptation strategies for each.
- Develop adaptation action plans with concrete measures for assets facing immediate climate risks.

⁵⁹ Infrastructure Victoria, *Weathering the Storm: Adapting Victoria's infrastructure to Climate Change*, p. 19.

⁶⁰ *Ibid.*, p. 53.

- Ensure adaptation actions provide a return on investment.
- Engage community and stakeholders for input on draft plans to help prioritise actions and determine funding needs.⁶¹

A number of other stakeholders also supported establishing a Climate Adaptation Fund, including individual community members and organisations. In its submission, Friends of the Earth Melbourne advocated for the establishment of the fund. It recommended an initial investment of \$5 million. The environmental advocacy group reflected on the potential benefits of the Climate Adaptation Fund, stating:

The fund would distribute grant money annually to community groups that apply to undertake localised adaptation and resilience projects. This would help the Government meet its obligations to the Victorian Climate Change Act (2017) and ensure Victorian communities can enhance their capacity to adapt to impacts.⁶²

Friends of the Earth noted previous adaptation funding provided by the Victorian Government when the adaptation strategies were initially established. Reflecting on the previously available funding, Friends of the Earth explained that it ‘unearthed strong demand for government investment in climate change projects — it was dramatically oversubscribed, but could only support 24 projects’.⁶³ Box 4.3 below summarises grant funding that was previously available.

Box 4.3 Previous funding initiatives for adaptation strategies

Community Climate Change Adaptation (3CA) grants program

In 2019, the Victorian Government established the 3CA grants program which provided one-off adaptation project funding. The Department of Environment, Land, Water and Planning (DEWLP) (now the Department of Energy, Environment and Climate Action) delivered \$1 million in grant funding to 17 community-led adaptation projects.

Under the grants program, six regions received the following funding allocation for various projects:

- Barwon South West: \$149,238
- Gippsland: \$132,000
- Grampians: \$100,000
- Hume: \$125,430

(Continued)

⁶¹ Ibid.

⁶² Friends of the Earth Melbourne, *Submission 192*, p. 18.

⁶³ Ibid.

Box 4.3 Continued

- Loddon Mallee: \$299,062
- Port Phillip (Greater Melbourne): \$266,206.

An example project funded by the 3CA grants program was the ‘Greenlink’ project led by Hindmarsh Shire Council. Landscaped public, multi-purpose open spaces were established in Dimboola and Jeparit to create a strategic link between the two towns as part of the Wimmera River Discovery Trail. These spaces provide places of respite from adverse weather for residents and visitors and also offer educational opportunities about the local natural environment and culture.

To see a summary of all 3CA funded projects refer to:

https://www.climatechange.vic.gov.au/_data/assets/word_doc/0033/583359/3CA-Grants-Funded-Projects.docx.

Supporting Our Regions to Adapt program

To support the implementation of Regional Climate Change Adaptation Strategies, the Victorian Government invested \$9.32 million from the Sustainability Fund to develop the strategies. To support initial implementation, it also invested a one-off \$1.5 million for priority projects.

Each region had a total \$250,000 available to them (with an additional \$38,979 provided by DELWP Gippsland Region for that area). Funded projects were selected by the Regional Adaptation Stakeholder Working Group.

An example of a project funded under the program was Gippsland’s ‘Sealing the Gap’ project. This project supported low-income households in Bass Coast and South Gippsland by helping them to make their homes more comfortable, reduce energy costs, and take advantage of government rebates. Using a volunteer peer-to-peer learning model, the initiative encouraged participants to share knowledge, enabling others to benefit as well. A series of “Energy Workshops” provided information and skills to over 100 participants, while direct assistance was offered to at least 30 households to implement simple changes, enhancing comfort and resilience during extreme weather events.

To see a summary of all projects which received initial implementation funding refer to: https://www.climatechange.vic.gov.au/_data/assets/pdf_file/0026/552275/Regional-Climate-Change-Adaptation-projects-2021-22.pdf.

(Continued)

Box 4.3 Continued

Climate Change Innovation Challenge Grants Program

In 2019, the Victorian Government invested \$3.8 million in competitive grants funding for climate change innovation grants. Funding was available across three innovation categories: Explore, Show and Grow. Projects selected for funding received between \$50,000 to \$300,000.

The grants program funded 24 projects across regional Victoria and metropolitan Melbourne. Under the program, six regions received the following funding allocation for various projects:

- Barwon South West: \$1,157,154
- Gippsland: \$502,236
- Grampians: \$300,000
- Hume: \$499,000
- Loddon Mallee: \$123,000
- Port Phillip (Greater Melbourne): \$1,356,082.

An example project was the Climate Safe Rooms in Barwon South West, led by Geelong Sustainability. The Climate Safe Rooms initiative offers free energy upgrades to low-income households where at least one resident received home care support due to a chronic health condition.

To see a summary of all projects which received grant funding refer to:

https://www.climatechange.vic.gov.au/_data/assets/pdf_file/0018/123507/Climate-Change-Innovation-Grants_funded-projects.pdf.

Source: Department of Energy, Environment and Climate Action, *Supporting local action on climate change*, 2024, <https://www.climatechange.vic.gov.au/supporting-local-action-on-climate-change#toc_id_2_community> accessed 15 November 2024; Department of Energy, Environment and Climate Action, *Community Climate Change Adaptation (3CA) Grants Program: 2019 Grant Recipients*, <https://www.climatechange.vic.gov.au/_data/assets/word_doc/0033/583359/3CA-Grants-Funded-Projects.docx> accessed 15 November 2024; Department of Energy, Environment and Climate Action, *Regional Climate Change Adaption 2021-22 projects*, <https://www.climatechange.vic.gov.au/_data/assets/pdf_file/0026/552275/Regional-Climate-Change-Adaptation-projects-2021-22.pdf> accessed 15 November 2024; Department of Energy, Environment and Climate Action, *Climate Change Innovation Grants – funded projects*, <https://www.climatechange.vic.gov.au/_data/assets/pdf_file/0018/123507/Climate-Change-Innovation-Grants_funded-projects.pdf> accessed 15 November 2024.

Geelong Sustainability contended that a Climate Adaptation Fund ‘recognises the highly localised nature of climate impacts’:

It would ensure community-led climate adaptation, taking a bottom-up approach by distributing funds to local groups familiar with their community’s unique needs. Every step toward helping communities adapt, secures a safer future, reduces the cost of climate disasters, and builds resilience.⁶⁴

The Victorian Trades Hall Council contended that the adaptation fund could be used to ‘build and improve social infrastructure’, such as ‘green spaces, public centres and recreational areas’.⁶⁵ Climate Action Merri-bek emphasised the important role of communities most affected by climate change. It also said that to have a ‘voice in planning decisions empowers ... [people] and their communities’.⁶⁶ It also believed establishing a dedicated adaptation fund could ensure locally lead adaptation efforts.

Some stakeholders suggested that financing the fund could come from contributions from the fossil fuel industry redirected back to the community via grants.⁶⁷

As clearly articulated by stakeholders to the Inquiry, the establishment of a Climate Adaptation Fund can significantly strengthen Victoria’s climate resilience. A fund would provide a transparent mechanism for prioritising and financing adaptation projects, ensuring critical infrastructure projects and communities are equipped to face climate risk. By supporting community-led initiatives and integrating climate adaptation into infrastructure planning, the Climate Adaptation Fund can address gaps in existing funding frameworks, reduce the economic and social costs of climate impacts, and build long-term resilience across the state.

Many submissions recommended to the Committee that climate adaptation funding should be sourced from those who contribute the most to climate change, particularly the fossil fuel industry. For example, in their submission, Doctors for the Environment Australia suggest that funding climate resilience measures could be raised at the state level by revoking subsidies currently provided to fossil fuel industry, and instituting a tax on polluting industries, including the fossil fuel industry.⁶⁸ That the Victorian Government establish a Climate Adaptation Fund to fund priority adaptation projects identified under the Adaptation Action Plans and Regional Climate Change Adaptation Strategies.

4.4.3 Land management

In Victoria, land management governance plays a critical role in building climate resilience through the careful stewardship of public and private lands. A key aspect is the management of Crown land, which makes up approximately one-third of Victoria’s

⁶⁴ Geelong Sustainability, *Submission 202*, p. 2.

⁶⁵ Victorian Trades Hall Council, *Submission 233*, p. 6.

⁶⁶ Climate Action Merri-bek, *Submission 197*, p. 8.

⁶⁷ See, for example: Friends of the Earth Melbourne, *Submission 192*; Liz Keen, *Submission 231*; Mathew Nelson, *Submission 132*; Vicky Ellmore, *Submission 139*.

⁶⁸ Doctors for the Environment Australia, *Submission 122*, p. 2.

total land area. Crown land is governed by the *Crown Land (Reserves) Act 1978* and the *Land Act 1958*, with oversight provided by the Department of Energy, Environment and Climate Action. The Victorian State delegates management responsibilities to local councils and committees of management, ensuring that land use aligns with environmental and community needs. Climate resilience is embedded in these management practices, focusing on sustainable land use, biodiversity preservation, and risk reduction from extreme weather events.

Land management is vital for building climate resilience by ensuring ecosystems are used, protected, and restored sustainably to mitigate climate change impacts. Key strategies include preserving wetlands and biodiversity, which act as natural buffers against flooding, heatwaves, and habitat loss. Thoughtful land use planning integrates climate adaptation by balancing urban development with the protection of green spaces, reducing heat retention in cities and supporting cleaner air. Effective bushfire management, including practices like cultural burning by Traditional Owners, helps reduce wildfire risks and maintain landscape health. These approaches collectively enhance the ability of communities and natural systems to adapt to, and recover from, climate change impacts.

Chapter 3 outlines key legislation relevant to land management in Victoria. A variety of actors are involved in land management in Victoria, and are part of broader efforts towards climate resilience. Table 4.6 below outlines some of the key actors.

Table 4.6 Key actors involved in land management in Victoria

Actor	Role in land management	Key focus area
Department of Energy, Environment and Climate Action	Oversees public land, biodiversity, forestry and water resources.	Crown land management, biodiversity conservation and climate resilience initiatives.
Local governments	Manage local planning schemes, reserves and urban development.	Urban planning, green space preservation and sustainable development at the community level.
Catchment Management Authorities	Manage waterways, wetlands and catchments.	Water quality, flood mitigation, soil health and sustainable land practices.
Parks Victoria	Manages national parks, state parks and marine reserves.	Conservation, recreation, and protection of biodiversity and ecosystems.
Environmental Protection Authority	Regulates activities to prevent pollution and manage environmental impacts.	Air, soil, and water protection, pollution control and industrial impacts on land.
Emergency Management Victoria	Coordinate responses to land-related risks like bushfires and floods.	Risk reduction, disaster response and community resilience to climate impacts.
Committees of management	Administer specific parcels of Crown land on behalf of the State Government.	Maintenance of public reserves, recreational facilities and environmental conservation on Crown land.
Traditional owner groups	Collaborate on co-management of land and the integration of cultural practices.	Cultural heritage protection, sustainable land use and bushfire risk management through cultural burning.

Actor	Role in land management	Key focus area
Landholders and farmers	Apply sustainable practices to manage private and agricultural land.	Soil health, water conservation, biodiversity protection and climate-adaptive farming.

Source: Legislative Council Environment and Planning Committee. Adapted from various sources.

Stakeholders’ perspectives of the role of different actors involved in land management in Victoria will be discussed throughout the Report, in the context of specific issues.

Caring for Country: First Nations’ land management practices

Many stakeholders emphasised the importance of embedding First Nations’ land management practices into Victoria’s broader efforts to build climate resilience. First Nations’ land management, also referred to as ‘caring for country’, involves a ‘wide range of environmental, natural resource, commercial, economic and cultural resource management activities undertaken by individuals, groups and organisations across Australia’.⁶⁹ The practices have historic origins in the:

holistic relationships between traditional Aboriginal and Torres Strait Islander societies and their customary land and sea estates that have evolved over at least 50,000 years.⁷⁰

According to Fisheries and Forestry Department of Agriculture, First Nations’ land management practices are very diverse, encompassing activities such as:

- **customary and cultural resource management**
- **actions to improve settlement conditions**
- **commercial activities**
- **threat abatement.**⁷¹

Aboriginal land management practices, informed by thousands of years of knowledge and connection to the land, provide valuable approaches for addressing contemporary environmental challenges. Daniel Miller, Chief Executive Officer of the Gunnaikurnai Land and Water Aboriginal Corporation, highlighted the practises extensive cultural and environmental legacy:

we have the longest continuous cultural practice on the planet – some 12,000 years – and that is one part of Gunaikurnai culture and it is across the whole landscape. But those sorts of impacts are going to be felt more and more often. Our ability to partner with the state, for example, to be able to deal with those sorts of climate events – I will continue to refer to a major wind event on the lakes – is a challenge. We are not funded

69 Fisheries and Forestry Department of Agriculture, *Indigenous Land Management in Australia: A summary of the extent, barriers and success factors*, (n.d.), <<https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/natural-resources/landcare/submissions/ilm-factsheet.pdf>> accessed 2024.

70 Ibid.

71 Ibid., p. 2.

to do that. We are not resourced to do it. We are well equipped and we are able and we have the expertise to do it, but we do not have the resources to do it, so we rely on a partnership with particularly State Government to be able to activate and be part of the remediation works, I suppose.⁷²

The application of Aboriginal land management practices also offers valuable insights into fire management. Vicky Ellmore explained that practices such as cool burning and back burning are informed by traditional knowledge and protocols, which provide a deeper understanding of fire impacts and behaviour. These practices illustrate the potential to manage fire risk effectively while drawing on both cultural knowledge and contemporary approaches.⁷³

Stakeholders provided examples of the positive benefits of First Nations' land management practices. Infrastructure Victoria's *Weathering the Storm* report—which was cited by several stakeholders—outlined the Nangak Tamboree project undertaken by the Wurundjeri Woi-Wurrung Cultural Heritage Corporation. The report outlined the practical benefits of incorporating cultural land management practices. By reintroducing cultural burning, the project cleared invasive plant species, supported the regeneration of native vegetation, and improved the health of the ecosystem. Following burns in 2021, the critically endangered Matted Flax-lily, previously unrecorded in the area, was observed growing in the wetlands. This recovery highlights how cultural burning can enhance biodiversity and improve ecosystem resilience to challenges such as drought and flooding.⁷⁴

Daniel Miller went on to explain the different tiers of managed fire in the landscape:

We actively participate in fire as it stands. We have described 'fire' in three ways with the State, and we have done that in a way that includes the State.

We recognise that the State has some fuel management targets, so that is DEECA business as usual. We have got a level of fire that we do together, and then we have a level of fire that Gunaikurnai people want to do, which may be cultural fire, or it might be just any type of fire.⁷⁵

First Nations' communities are often particularly vulnerable to climate change impacts and climate-related issues.⁷⁶ For many stakeholders, this underscored the need to ensure that First Nations' people are actively involved in land management, especially activities which build Victoria's climate resilience. Box 4.4 highlights a sample of stakeholders' perspectives to showcase their support for First Nations' land management leadership.

⁷² Daniel Miller, Chief Executive Officer, Gunaikurnai Land and Water Aboriginal Corporation, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, p. 27.

⁷³ Vicky Ellmore, *Submission 139*, p. 7.

⁷⁴ Infrastructure Victoria, *Weathering the Storm: Adapting Victoria's infrastructure to Climate Change*, p. 42.

⁷⁵ Daniel Miller, *Transcript of evidence*, pp. 27–28.

⁷⁶ See, for example: Victorian Council of Social Service, *Submission 237*; Headspace National, *Submission 125*.

Box 4.4 Stakeholders' views on increasing involvement of First Nations people in land management in Victoria

First Nations people with their ancient connection to country should be prioritised as leaders for local projects.

Hamish Macrae, *Submission 67*.

Consult local community and First Nations community members in major decisions that impact them.

Sarah Powers, *Submission 92*.

We must ask our First Nations people for guidance and wisdom, learned from living and nurturing this land for 60,000 years. And then we must action their suggestions.

Melinda Radcliffe, *Submission 107*.

Embedding First Nations' land management practices, such as cultural burning and resource management, into Victoria's climate resilience efforts offers proven environmental, cultural, and biodiversity benefits while addressing the challenges of climate change.

RECOMMENDATION 6: That the Victorian Government ensure First Nations land management practices are firmly embedded in climate resilience efforts, including adaptation plans.

The Committee acknowledges that while it is essential for government to invest in enhancing the resilience of the built environment to mitigate the impacts of bushfires, a key priority must be the proactive reduction of risk to communities and critical infrastructure. This can be most effectively achieved through strategic fuel reduction and planned burns. These measures play a vital role in managing fuel loads, reducing fire intensity, and ultimately safeguarding lives, property, and essential services before a fire even starts.

RECOMMENDATION 7: That the Victorian Government mitigate the impact of bushfire on the built environment by appropriately using strategic fuel reduction and planned burns, and fuel load removal to better manage fuel loads.

RECOMMENDATION 8: That the Victorian Government work with First Nations communities to support First Nations fire management practices, through accredited training programs, to upskill individuals on topics including Indigenous land, fire, and water management and incorporate insurance for cultural burning activities.

4.5 National response to climate risks and adaptation

Chapter 3 examines federal legislation governing the national response to climate risk, such as the *Climate Change Act 2022* (Cth) and *Climate Change Authority Act 2011* (Cth). This Section considers national actions and initiatives responding to risk and enhancing resilience.

Various national agencies and bodies are involved in supporting or delivering Australia’s response to climate change risk. Table 4.7 shows the key national stakeholders.

Table 4.7 Key national stakeholders supporting or delivering Australia’s response to climate change

Stakeholder	Scope
Department of Climate Change, Energy, the Environment and Water (DCCEEW)	The climate change governance responsibilities of the Department include: • national climate change adaptation strategy, policy and programs • climate science coordination, policy and programs.
Climate Change Authority	An independent statutory body established under the Climate Change Authority Act. It plays a key role in the governance of Australia’s climate change policies including by providing independent advice on: • the preparation of the Annual Climate Change Statement to Parliament. • greenhouse gas emissions reduction targets to be included in National Determined Contributions.
Australian Climate Service	The Australian Climate Service is a partnership between the Bureau of Meteorology, CSIRO, the Australian Bureau of Statistics and Geoscience Australia. The Service was established to support and advise decision-making on climate related risks and impacts.
First Nations Clean Energy and Climate Change Advisory Committee	The First Nations Clean Energy and Climate Change Advisory Committee provides advice about First Nations rights and interest in the energy transition and climate change. The 18-member committee advises the Minister and Department for Climate Change and Energy.
National Emergency Management Agency	Following severe natural disasters, the Australian Government combined the National Recovery and Resilience Agency and Emergency Management Australia to: • better respond to emergencies • help communities recover • prepare Australia for future disasters.

Source: Legislative Council Environment and Planning Committee.

The Climate Change Authority is discussed further in Section 4.5.4 below. This Report will consider the role and operation of other federal stakeholders where relevant to specific issues, in particular their efforts to collaborate.

4.5.1 National Adaptation Plan

The Committee was made aware that the *Climate Resilience and Adaptation Strategy 2021–2025* (Cth) is being replaced with the *National Adaptation Plan*. In March 2024, the Department of Climate Change, Energy, the Environment and Water released an issues paper on the proposed new Adaptation Plan. In explaining its decision to develop a new plan, the Department stated on its website that:

Australia needs to ‘mainstream’ adaptation action, drive private sector investment and support people and communities in disproportionately vulnerable situations.

The National Adaptation Plan will set the frameworks to drive this change, and respond to the findings of the first pass risk assessment. It will provide guidance on how we adapt to climate risks and build our national resilience to climate impacts.⁷⁷

The proposed plan was released for public consultation. The issues paper outlined that the new Plan is based on risks identified in the National Climate Risk Assessment. Key focus areas for the plan include:

- improving infrastructure resilience
- addressing biodiversity loss
- enhancing health and social systems
- empowering First Nations peoples through the integration of traditional knowledge.

Regarding improving infrastructure and built environment resilience, the issues paper explained that:

Climate change has many direct and indirect impacts through acute, chronic and slow onset changes which drive a variety of risks to this system, ranging from individual dwellings through to entire supply and service chains with local, regional, national and international implications.⁷⁸

It outlined what ‘mainstreaming adaptation’ may look like in the context of the built environment. This could include actions such as:

- **Embed climate risks in policies:** Incorporate climate risks and adaptation planning into land use planning, construction policies, and building codes.
- **Future-proof asset locations:** Base decisions about new asset locations on future climate scenarios.
- **Resilient infrastructure and buildings:** Ensure new and existing infrastructure and buildings are resilient to climate change impact, focusing on critical infrastructure and heritage sites.

⁷⁷ Energy Department of Climate Change, the Environment and Water, *Climate adaptation in Australia - National Adaptation Plan Issues Paper*, 2024, <<https://consult.dccceew.gov.au/climate-adaptation-in-australia-national-adaptation-plan-issues-paper>> accessed 19 November 2024.

⁷⁸ Energy Department of Climate Change, the Environment and Water, *National Adaptation Plan: Issues Paper*, March 2024, p. 22.

- **Routine risk management:** Make managing material climate risks a standard practice across the workforce, supported by high-quality, practical climate data.
- **Climate-ready design:** Implement designs for buildings, infrastructure, and equipment that consider future climate extremes, such as temperature spikes.
- **Dynamic regulations and standards:** Adapt building and infrastructure regulations over time to maintain safety and performance levels as natural hazard intensity and frequency increase.⁷⁹

The issues paper emphasises that building climate resilience is a ‘shared responsibility’:

The owners of assets – whether private or public – are responsible for managing the climate risks to them. Each level of government has responsibilities for setting part of the standards and rules that govern the location and resilience of new and existing assets.⁸⁰

The Department’s issues paper outlined several actions undertaken by the Australian Government to strengthen the built environments resilience. Box 4.5 outlines these actions.

Box 4.5 Building climate resilience in the built environment: Australian Government

Legislative and Policy Frameworks

- **Security of Critical Infrastructure Act 2018:** provides a framework for managing risks across critical sectors including communications, energy, transport, water, and healthcare.
- **Critical Infrastructure Risk Management Program:** mandates owners/operators of critical infrastructure assets to identify and mitigate risks.
- **2023 Critical Infrastructure Resilience Strategy and Plan:** enhances security and resilience of Australia’s critical infrastructure in collaboration with all government levels.
- **National Construction Code:** updated to include stricter energy efficiency requirements to reduce energy consumption and greenhouse gas emissions.
- **Trajectory for Low Energy Buildings (2019):** a national plan aiming for zero-energy, carbon-ready buildings, updated in 2024.

(Continued)

⁷⁹ Ibid.

⁸⁰ Ibid., p. 23.

Box 4.5 Continued

Sustainability and Energy Efficiency Programs

- **Nationwide House Energy Rating Scheme (NatHERS):** rates energy performance of homes; expanded in 2025 to rate existing homes and recommend energy performance improvements.
- **National Australian Built Environment Rating System (NABERS):** focuses on energy efficiency and sustainability for commercial buildings.
- **National Energy Performance Strategy:** a Commonwealth-led plan to enhance energy efficiency, demand flexibility, and electrification.
- **Energy Savings Package:**
 - \$1 billion for low-cost finance for home energy upgrades.
 - \$300 million for energy upgrades to social housing.
- **Community Energy Upgrades Fund:** \$100 million partnership with local governments.

Infrastructure and Resilience Planning

- **2023 Infrastructure Policy Statement:** focuses on nationally significant projects, including resilience themes.
- **Infrastructure Priority List:** maintained by Infrastructure Australia to identify investment-ready proposals with productivity and resilience benefits.
- **National Freight and Supply Chain Strategy:** coordinates infrastructure and actions across all freight modes for resilience.
- **National Urban Policy:** guides liveable, sustainable, and resilient city planning; complemented by the State of the Cities Report.

Water and Climate Resilience

- **National Water Initiative:** strengthens links between climate science and water planning, and increases First Nations influence in water management.
- **Water Efficiency Labelling and Standards (WELS) Scheme:** expands product identification to promote urban water efficiency.

Disaster Management and Recovery

- **Disaster Recovery Funding Arrangements:** co-finance betterment funds to rebuild public assets to resilient standards; demonstrated success in Queensland.

Climate Adaptation and Research

- **State of the Cities Report:** provides insights into urban sustainability and resilience.

Source: Department of Climate Change, Energy, the Environment and Water, *National Adaptation Plan: Issues Paper*, March 2024, pp. 23–25.

Federal initiatives and programs are discussed throughout this Report in relation to specific issues.

In its submission, the Centre for Safe Air described the forthcoming National Adaptation Plan as a 'roadmap for enhancing national resilience'. The Centre contended that the plan will detail 'strategic actions to mitigate and adapt to identified risks, thus strengthening the country's defences against the impacts of climate change'.⁸¹

Climate Resilience and Adaptation Strategy 2021–2025

The new National Adaptation Plan will replace the Climate Resilience and Adaptation Strategy 2021–2025. Whilst this strategy is lapsing, the Committee believes that reflecting on its effectiveness remains worthwhile. Reflecting on the lapsing strategy is essential to identify successes, challenges, and areas for improvement, ensuring the new National Adaptation Plan is well-informed, effective, and aligned with evolving priorities.

Box 4.6 summarises the Strategy, and outlines specific areas of focus on the built environment and infrastructure.

Box 4.6 Climate Resilience and Adaptation Strategy 2021–2025

The National Climate Resilience and Adaptation Strategy 2021–2025 outlines Australia's approach to anticipating, managing, and adapting to the impacts of climate change. Recognising the increasing challenges posed by climate change to the nation's economy, environment and communities, the strategy emphasises the necessity of building resilience to ensure future prosperity.

The strategy is structured around three primary objectives:

1. **Drive Investment and Action Through Collaboration:** This objective focuses on enhancing national leadership and coordination by establishing a National Adaptation Policy Office. The aim is to foster partnerships among governments, businesses, and communities to promote collective action and investment in adaptation initiatives.
2. **Improve Climate Information and Services:** To support informed decision-making, the strategy commits to delivering coordinated climate information and services to a broader audience. This includes continuing to provide world-class climate science and research that inform successful adaptation efforts.

(Continued)

⁸¹ Centre for Safe Air, *Submission 253*, p. 5.

Box 4.6 Continued

3. **Assess Progress and Improve Over Time:** Recognising the dynamic nature of climate challenges, this objective involves implementing a regular cycle of national assessments to evaluate climate impacts and adaptation progress. Monitoring and independent evaluations are intended to ensure continuous improvement in adaptation responses.

The strategy acknowledges that effective adaptation requires a collaborative approach, involving all levels of government, businesses, and communities. It also highlights the importance of integrating adaptation efforts across natural, built, social, and economic domains to drive comprehensive resilience-building actions.

Source: Department of Climate Change, Energy, the Environment and Water, *National Climate Resilience and Adaptation Strategy 2021–2025*, 2021.

Some stakeholders raised concerns that the federal strategy was not detailed enough. Dr Michael Spencer from Monash University provided his co-authored 2022 *Report on the Goulburn Broken Catchment Workshop on Adaptation to Climate Change*. The report reflected on the strategy, describing it as a ‘high-level document that provides little guidance on systematic climate adaptation’. It argued that ‘almost all [Commonwealth] government activity and resources are currently given over to emergency responses and rehabilitation, rather than to prevention and adaptation’.⁸²

The report asserted that the Climate Resilience and Adaptation Strategy 2021–2025 has several areas for improvement:

- **Focus on reactive measures:** majority of Australia’s adaptation activity prioritises emergency responses and rehabilitation over prevention and systematic adaptation measures. This limits proactive and transformative approaches to climate resilience.
- **Governance challenges:** such as a lack of intergovernmental collaboration, misaligned roles, and insufficient resources to support local governments in their critical role in implementation.
- **Need for better funding models:** long-term, programmatic funding rather than ad hoc grants would lead to more robust partnerships and consistent capacity building at local levels.
- **Monitoring and evaluation:** the strategy lacks a robust mechanism for tracking progress and outcomes, which is vital for assessing the effectiveness of adaptation actions.
- **Integrative and collaborative approaches:** the strategy should better integrate across all government levels and sectors to promote holistic and equitable climate adaptation solutions.⁸³

⁸² Dr Michael Spencer, *Submission 225, Attachment A*, p. 10.

⁸³ Ibid.

4.5.2 National Climate Risk Assessment

Delivered by the Commonwealth Government alongside the National Adaptation Plan, the National Climate Risk Assessment identifies and prioritises national climate risks. The purpose of the assessment was to ‘provide an objective, evidence base for decision-making’.⁸⁴ The risk assessment was delivered in two parts (the first and second pass assessments), and it:

- covered a wide range of risks driven by climate change
- consolidated national understanding of climate risk
- delivered a baseline of current and emerging risks
- delivered a ‘granular’ analysis of significant risks
- established a consistent approach.⁸⁵

Figure 4.8 outlines the timeline of delivering the National Climate Risk Assessment.

Figure 4.8 A National Climate Risk Assessment for Australia: Program Overview



Source: Department of Climate Change, Energy, the Environment and Water, *A National Climate Risk Assessment for Australia: Program Overview*, 2025, <<https://www.dcccew.gov.au/sites/default/files/documents/ncra-roadmap.pdf>> accessed 2024, p. 2.

First Pass Assessment: Infrastructure and built environment system

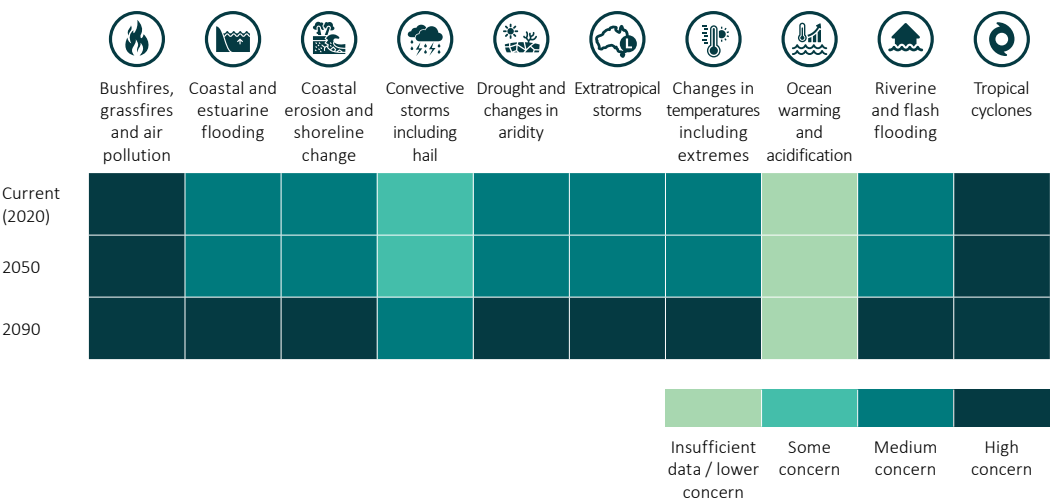
Conducted between July 2023 and December 2023, the First Pass Assessment reviewed climate risks within seven systems of national importance, including ‘infrastructure and the built environment’.⁸⁶ Figure 4.9 summarises the findings of the First Pass Assessment in relation to the built environment.

⁸⁴ Department of Climate Change, Energy, the Environment and Water, *Assessing and adapting to Australia’s climate risks*, 2024, <<https://www.dcccew.gov.au/climate-change/policy/adaptation/ncra>> accessed 16 December 2024.

⁸⁵ Department of Climate Change, Energy, the Environment and Water, *A National Climate Risk Assessment for Australia: Program Overview*, 2025, <<https://www.dcccew.gov.au/sites/default/files/documents/ncra-roadmap.pdf>> accessed 2024, p. 2.

⁸⁶ Australian Climate Service, *First pass assessment findings: nationally significant climate risks* <<https://www.acs.gov.au/pages/first-pass-assessment-findings>> accessed 27 November 2024.

Figure 4.9 Hazard concern-level for the infrastructure and built environment system



Source: Department of Climate Change, Energy, the Environment and Water, *National Climate Risk Assessment: First pass assessment report*, 2024, p. 20.

4.5.3 Climate Change Authority

The Climate Change Authority is a statutory body established under the *Climate Change Authority Act 2011*. Its role is to ‘provide expert advice to the Australian Government on climate change policy’.⁸⁷ The Authority plays an important role in supporting the nation’s climate response by conducting independent research, engaging in public consultation, and delivering informed recommendations to the Australian Parliament.⁸⁸

The Authority’s key responsibilities are to provide advice on:

- the preparation of the Annual Climate Change Statement presented to Parliament
- recommending greenhouse gas emissions reduction targets for Australia’s nationally determined contributions under international climate agreements.⁸⁹

Chapter 2 provides an overview of the determinations of the recent Climate Change Statement and current reduction targets.

The Authority also undertakes policy reviews and provides recommendations on key programs, including the Carbon Farming Initiative (Emissions Reduction Fund) and the National Greenhouse and Energy Reporting System, which incorporates the Safeguard Mechanism. The Authority responds to requests from the Minister responsible for climate change or the Parliament to examine specific climate-related matters.⁹⁰

87 Climate Change Authority, *The Climate Change Authority*, 2024, <<https://www.climatechangeauthority.gov.au>> accessed 16 December 2024.

88 Climate Change Authority, *About the Authority*, <<https://www.climatechangeauthority.gov.au/about-cca>> accessed 16 December 2024.

89 Ibid.

90 Ibid.

4.5.4 Stakeholders' views on the Federal response to climate change risks and adaptation

The Federal Government's role in climate resilience remains a central concern for stakeholders, with recurring calls for improved coordination, targeted funding, and a multilevel governance approach to address adaptation challenges effectively.

One of the principal concerns raised by stakeholders was the need for a collaborative, multilevel governance approach to climate resilience involving federal, state, and local governments. There were differing opinions about which tier of government should lead adaptation and resilience efforts. Some stakeholders contended that a national approach is more ideal than state-focused approaches.

At a public hearing, Dr Jillian Carroll, Vice President of the Wellington Climate Action Network, observed a longstanding accountability gap, noting that environmental responsibilities are not explicitly embedded in the federal constitution.⁹¹ She contended this has led to a 'shunt[ing]' of responsibilities from the federal government to the states—and ultimately to local governments—who often lack the 'resources, training, and capability to look at the big picture'.⁹² This fragmented delegation of responsibilities has exacerbated inefficiencies in addressing climate risks.

Donna Taylor from Bass Coast Shire Council called for better alignment of legislative frameworks to provide clearer policy settings for councils facing climate-related challenges:

it is critical that there is coordination among key regulatory frameworks, whether that be the Climate Change Act, the Planning and Environment Act, the building code and the Marine and Coastal Act, so that we can provide our residents with greater surety and confidence when they purchase land in and around the coast in the Bass Coast as to whether a planning permit for a dwelling could be realised or not.⁹³

The Victorian Trades Hall Council echoed concerns about a lack of alignment, stating that:

local government plans to improve infrastructure resilience are often not suitably coordinated with state and federal governments. This can lead to wasteful competition, duplication of expenditure, inefficient expenditure, and poor prioritising.⁹⁴

However, other stakeholders argued that adaptation should be led at the local level with funding and resource support from federal and state governments. The Committee consistently heard that local governments are critical actors in climate adaptation. The Victorian Greenhouse Alliance stated that 'adaptation works best if

⁹¹ Dr Jillian Carroll, Vice President, Wellington Climate Action Network, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, pp. 59–60.

⁹² Ibid.

⁹³ Donna Taylor, Acting General Manager, Place Making, Bass Coast Shire Council, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, p. 4.

⁹⁴ Victorian Trades Hall Council, *Submission 233*, p. 4.

the solutions are designed and implemented as close as possible to where the impacts are being felt'.⁹⁵ It highlighted that local councils are well-positioned to drive climate adaptation but lack the necessary resources and support.⁹⁶

However, stakeholders also recognised that local governments' capacity to act is constrained by resource shortages and legislative misalignment. Michael Nolan, Director of Climate Physical Risk and Resilience at Aurecon, advocated for federal funding to support local climate resilience efforts, noting that this had historically been available. He told the Committee:

I think if there was some way of funding and supporting initiatives linked at a town or a local government level. It has been a gap. A number of years ago there was some funding and support for climate adaptation with councils from the federal government, and that was good to help get people to start looking at it. But now they are at the stage where they need to implement. They know that there are a bunch of things they need to do.⁹⁷

Robyn Seymour, Chief Executive Officer of Surf Coast Shire Council, highlighted an imbalance in federal funding priorities, noting that 97% of federal funding has historically been allocated to disaster response, with only 3% directed toward mitigation. Whilst this figure has improved to 13%, Seymour argued that 'a better balance' is needed to build community resilience before disasters occur.⁹⁸

The Yarra City Council called for the establishment of federal financing mechanisms for 'large climate-adapted infrastructure grants backed by sound business cases', as well as incentives to attract private investment into adaptation projects.⁹⁹ The Council stated that 'the need to fund improved public infrastructure is urgent and requires rapid capital mobilisation', underscoring the critical role of federal leadership in enabling infrastructure resilience.¹⁰⁰

The Victorian Greenhouse Alliance advocated for a 'multilevel governance approach' to climate resilience (see Box 4.7 below for an overview of this approach). The Alliance's submission outlined several key benefits of introducing a multilevel climate resilience governance framework. The governance framework could:

- facilitate collaboration between all tiers of government, ensuring cohesive and unified climate adaptation strategies
- empower local councils to contribute to decision-making processes, addressing localised climate impacts effectively

⁹⁵ Victorian Greenhouse Alliances, *Submission 129*, p. 10.

⁹⁶ Ibid.

⁹⁷ Michael Nolan, Director, Climate Physical Risk and Resilience, Aurecon, public hearing, Melbourne, 6 November 2024, *Transcript of evidence*, p. 27.

⁹⁸ Robyn Seymour, *Transcript of evidence*, p. 8.

⁹⁹ Yarra City Council, *Submission 25*, p. 1.

¹⁰⁰ Ibid.

- reduce duplication of efforts and streamlines resource allocation across government levels
- encourage data-sharing and unified methodologies to support consistent and effective adaptation planning
- provide local governments with autonomy and resources to develop and implement targeted climate responses
- support capacity building within local governments through shared tools, research, and best practices
- foster cross-sector partnerships for innovative climate adaptation solutions
- elevate climate considerations in planning systems to promote sustainable development and emissions reductions
- enhance access to funding for local governments to assess and address climate risks
- promote shared financial responsibility for investment in resilience
- strengthen resilience through coordinated actions
- provide a structured framework to adapt to diverse and evolving climate risks effectively.¹⁰¹

Box 4.7 Multilevel governance framework for climate resilience

A multilevel governance framework is a structured approach that integrates the efforts, resources, and decision-making capabilities of all levels of government to address complex issues like climate change. This framework promotes collaboration, efficiency, and effectiveness in climate adaptation and mitigation efforts. This framework could:

- define roles and responsibilities across government levels to ensure accountability and prevent overlap
- encourage joint planning and coordination across all levels of government
- involve diverse stakeholders in decision-making, including NGOs, the private sector and communities
- share financial, technical, and knowledge resources across jurisdictions
- provide access to consistent, localised, and up-to-date data for evidence-based decisions

(Continued)

¹⁰¹ Victorian Greenhouse Alliances, *Submission 129*.

Box 4.7 Continued

- align climate policies across governance levels and integrate them into broader policy areas
- empower local governments with resources, tools, and autonomy to address community-specific risks
- support innovative and adaptable responses to evolving climate challenges
- build local government capacity through training and knowledge exchange.
- establish benchmarks and transparent reporting to monitor progress and outcomes.

Source: Victorian Greenhouse Alliance, *Submission 129*.

A number of other stakeholders also supported the implementation of a multilevel governance framework for climate resilience and called on the Victorian Government to take a lead role in advocating for this approach.¹⁰² Sue Phillips, Executive Officer from the Barwon South West Climate Alliance, advocated for a multilevel governance framework:

we joined with the [Victorian Greenhouse Alliance] in asking for a more harmonised approach to climate change mitigation and adaptation across all levels of government – so all working more closely together, from local government to state, including statutory authorities, and to federal, embracing a multilevel governance approach to climate change to streamline policies and approaches and remove fragmentation. Funding support and efforts would then be more cohesive and unified to achieve more targeted outcomes. We have limited time; we have limited money. So we need to be as targeted and as strategic as we can, and working together is one way to do this.¹⁰³

The Centre for Safe Air contended that there is a ‘pressing need for a more collaborative and comprehensive approach that engages all levels of government’.¹⁰⁴ Similarly, in the context of climate change challenges facing homeowners, the Housing Industry Association believed that it is:

Imperative that a national approach is taken to guide a consistent set of policies and actions for all levels of government, to achieve their commitment to Australia reaching a goal of net zero emissions. This national approach should be underpinned by an appropriate evidence base that verifies how the policy or action will directly achieve the intended outcome and deliver a net cost benefit to the home owner.¹⁰⁵

¹⁰² See, for example: Cr Tom Crook, *Transcript of evidence*; Warren Smith, *Transcript of evidence*; Municipal Association of Victoria, *Submission 232*.

¹⁰³ Sue Phillips, Executive Officer, Barwon South West Climate Alliance, public hearing, Aireys Inlet, 23 October 2024, *Transcript of evidence*, p. 5.

¹⁰⁴ Centre for Safe Air, *Submission 253*, p. 6.

¹⁰⁵ Housing Industry Association, *Submission 26*, p. 4.

The City of Melbourne called on the Victorian Government to act as the ‘the bridge between local government and the federal government to ensure access to secure long-term funding for climate resilience reaches communities’.¹⁰⁶

it is essential that all levels of government strive for best practice rather than minimum standards. Business as usual will not cut it when it comes to planning and futureproofing for our communities.

Bernie O’Sullivan, Chief Executive Officer, Macedon Ranges Shire Council, public hearing, Mount Macedon, 3 December 2024, *Transcript of evidence*, p. 3.

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The Committee acknowledges the vital role of all levels of government in building climate resilience and the recurring calls from stakeholders for a coordinated, multilevel governance approach to address the challenges posed by climate change. A unified framework is essential to streamline policy alignment, resource allocation, and collaborative action across federal, state, and local governments. Stakeholders consistently highlighted the critical need for stronger federal leadership to address gaps in funding, legislative coherence, and capacity-building, while also empowering local governments to implement tailored and community-specific solutions.

The Committee recognises that effective climate adaptation requires equitable distribution of responsibilities, clear policy settings, and enhanced support mechanisms to reduce duplication, foster innovation, and ensure targeted outcomes. It is evident that establishing a cohesive multilevel governance framework, supported by secure and sustainable funding, will enable all tiers of government to better address the diverse and evolving climate risks facing Victoria.

The Committee emphasises the urgency for the Federal Government to take decisive action in fostering collaborative governance, investing in proactive mitigation, and prioritising the long-term resilience of communities and infrastructure. Only through a united approach can governments at all levels effectively address the complexities of climate change and safeguard the wellbeing of current and future generations.

FINDING 12: A coordinated multilevel governance approach, with enhanced federal leadership and equitable resource allocation, is essential to effectively address climate resilience challenges across all levels of government.

That the Victorian Government advocate to the Federal Government for the establishment of a multilevel governance framework for climate resilience, ensuring clear roles, collaborative planning, and equitable resource allocation across all levels of governments to effectively address climate risks and adaptation challenges.

¹⁰⁶ City of Melbourne, *Submission 75*, p. 9.

4.6 Committee reflection: Challenges in government responses to climate risks

Effective governance of climate resilience presents a complex challenge that demands coordination across sectors, integration of strategies, and the allocation of adequate resources to achieve measurable outcomes. The Committee has identified significant barriers to governance and implementation, as highlighted in evidence to the Inquiry. Stakeholders emphasised the need for stronger leadership, transparent reporting, and equitable resource allocation to address climate risks effectively.

One of the primary challenges identified was the fragmented and overlapping frameworks governing climate resilience. The Victorian Government's tiered approach—encompassing state-wide strategies, regional adaptation plans, and local government initiatives—demonstrates the importance of multilevel responses. However, stakeholders noted that insufficient coordination among key regulatory frameworks and agencies creates gaps and inefficiencies. The mainstreaming of climate adaptation into broader government processes has resulted in dispersed reporting, limiting public understanding of progress. Additionally, local councils face significant resource disparities, navigating complex climate challenges with limited financial capacity and inconsistent methodologies.

Another key issue is the lack of transparency and accountability in reporting progress on Adaptation Action Plans. The existing statutory requirement for progress reporting is insufficient, too infrequent and too delayed, hindering public trust and engagement. The monitoring of 127 discrete actions across diverse portfolios adds to the complexity of delivering clear and comprehensive updates. Climate adaptation measures embedded within various government activities lack consolidated reporting, further complicating public transparency.

Funding shortfalls represent a critical barrier to implementing climate resilience initiatives. Stakeholders highlighted that many actions under key frameworks, such as the Built Environment Climate Adaptation Action Plan, remain constrained by limited financial resources. Non-recurrent funding for resilience projects restricts long-term capacity building and strategic outcomes. Additionally, the dispersal of resilience funding across multiple budget lines and portfolios impedes the clear evaluation of resource allocation.

There were different views amongst stakeholders regarding the need to establish an independent body to oversee climate resilience strategy and implementation (versus a whole-of-government approach). For example, the Victorian Marine and Coastal Council's submission suggested the establishment of an independent taskforce or commission.¹⁰⁷

¹⁰⁷ Victorian Marine and Coastal Council, *Submission 194*, p. 3.

On the other hand, Infrastructure Victoria in their evidence to the Committee felt that an integrated approach better reflected the fact that responsibility for climate resilience was the new ‘business as usual’, although indicated a stronger oversight role for the Department of Treasury and Finance.¹⁰⁸

Coordination challenges across levels of government further complicate the governance of climate resilience. Role ambiguity and disparate responsibilities among federal, state, and local governments can often lead to duplication of effort and inefficient resource use. Local governments, while positioned to lead community-driven responses, can lack the necessary support from state and federal governments to implement targeted solutions. Varied environmental sustainability design standards and climate risk assessment methodologies across councils create further inefficiencies.

Strengthening multilevel collaboration is crucial. Advocating for a multilevel governance framework to streamline collaboration among federal, state, and local governments would ensure cohesive efforts. This could be done within existing intergovernmental frameworks. The National Adaptation Policy Office (NAPO) coordinates climate adaptation work across all governments in Australia. Funding was allocated in the 2023–2024 budget to a national climate adaptation strategy which will replace the National Climate Resilience Strategy.¹⁰⁹

Empowering local governments with tools, training, and financial support would enable them to implement tailored solutions effectively. Community-led initiatives play a vital role in building climate resilience. Stakeholders emphasised the importance of local capacity building through community inventories, education, and partnerships. Ensuring that state-level leadership provides consistent guidance for place-based adaptation efforts is essential. Additionally, integrating First Nations knowledge and actively involving First Nations communities in land management practices would significantly contribute to climate resilience strategies.

Addressing governance challenges in climate resilience requires bold and coordinated action across all levels of government. By implementing the Committee’s recommendations, the Victorian Government can enhance accountability, foster collaboration, and empower communities to build a climate-resilient future. These measures are essential to mitigate risks, safeguard infrastructure, and ensure that all Victorians are prepared to adapt to the challenges of a changing climate.

FINDING 13: Addressing climate resilience in Australia requires a bold and coordinated approach across all levels of government, with the essential goal of empowering local communities to build a climate-resilient future.

¹⁰⁸ Dr Jonathan Spear, Chief Executive Officer, Infrastructure Victoria, public hearing, Melbourne, 9 October 2024, *Transcript of evidence*, p. 33.

¹⁰⁹ Department of Climate Change, Energy, the Environment and Water, *Climate adaptation in Australia*, 2025, <<https://www.dcceew.gov.au/climate-change/policy/adaptation>> accessed 4 March 2025.

RECOMMENDATION 9: That the Victorian Government review climate governance and oversight mechanisms, including consideration of establishing an independent oversight body, to ensure clear lines of responsibility and accountability for monitoring and implementation of climate resilience strategies.

Chapter 5

Victoria's planning and building systems

Victoria's planning and building systems are essential for guiding sustainable development and ensuring resilience to emerging challenges. Together, these systems shape the state's urban and regional landscapes, balancing economic, environmental, and social objectives. The *Planning and Environment Act 1987* (Vic) underpins land use decisions, addressing issues such as housing affordability, climate resilience, and infrastructure needs through planning schemes and overlays. The *Building Act 1993* (Vic) and the National Construction Code ensure construction meets safety, quality, and sustainability standards, protecting communities from risks.

This Chapter examines how these systems are evolving to meet challenges such as climate change and population growth. It highlights the need for streamlined processes, statewide consistency, and stronger state-led reforms to enhance their effectiveness. By exploring current gaps and recent reforms, this Chapter outlines what the Committee believes are critical steps needed to future-proof Victoria's planning and building frameworks for a more sustainable and resilient future.

5.1 The Victorian systems

Victoria's building and planning systems are closely interconnected, working together to regulate and shape the development of infrastructure and the built environment in the state. While each system serves distinct purposes, they complement one another to ensure that construction projects are safe, functional, and aligned with broader urban planning and environmental goals.

5.1.1 Planning system

Victoria's planning system is governed by the *Planning and Environment Act 1987* (Vic), which establishes a framework for the use, development, and protection of land in the state. The primary objectives of this system include:

- promoting fair, orderly, economic, and sustainable land use
- safeguarding natural and cultural resources
- ensuring safe and efficient living and working environments
- facilitating the provision of affordable housing.¹

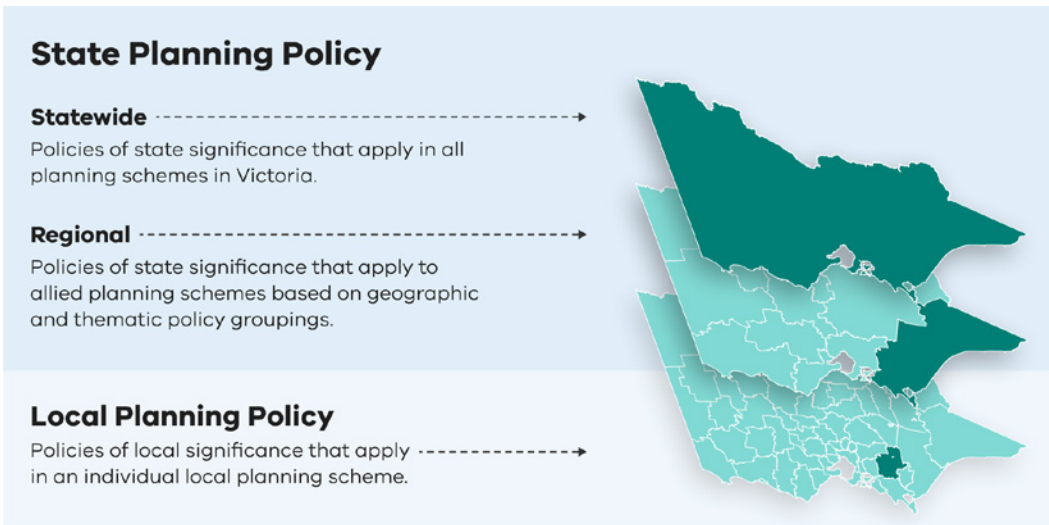
¹ Department of Transport and Planning, *Guide to Victoria's Planning System: Introduction*, 2024, <<https://www.planning.vic.gov.au/guides-and-resources/guides/guide-to-victorias-planning-system/introduction>> accessed 20 December 2024.

Central to this framework are the Victoria Planning Provisions and individual planning schemes. The Victoria Planning Provisions serve as a comprehensive template of standard provisions from which all local planning schemes are derived, ensuring consistency across municipalities. Each planning scheme is a legal document that outlines policies, zones, overlays, and other provisions specific to a municipality, dictating how land can be used and developed.²

Planning schemes apply to both private and public land throughout Victoria, and are binding on all individuals and public authorities, including government departments and councils. These schemes encompass various components:

- **Zones:** Define the primary use of land (e.g., residential, commercial, industrial) and stipulate the types of developments permitted within each zone.³
- **Overlays:** Provide additional controls that address specific site characteristics or issues, such as heritage significance, environmental concerns, or flood risks.⁴
- **Policies:** Articulate state and local planning policies that guide decision-making processes to achieve desired outcomes (see Figure 5.1 for an overview of Victoria's planning policy framework).⁵

Figure 5.1 Planning Policy Framework



Source: Department of Transport and Planning, *Using Victoria's planning system*, March 2024, p. 12.

An essential component of Victoria's planning system is planning scheme amendments, which are sometimes necessary to address evolving community needs, environmental considerations, or policy directions.⁶

² Ibid.

³ Department of Transport and Planning, *Using Victoria's planning system*, March 2024, p. 13.

⁴ Ibid.

⁵ Ibid.

⁶ Ibid., p. 19.

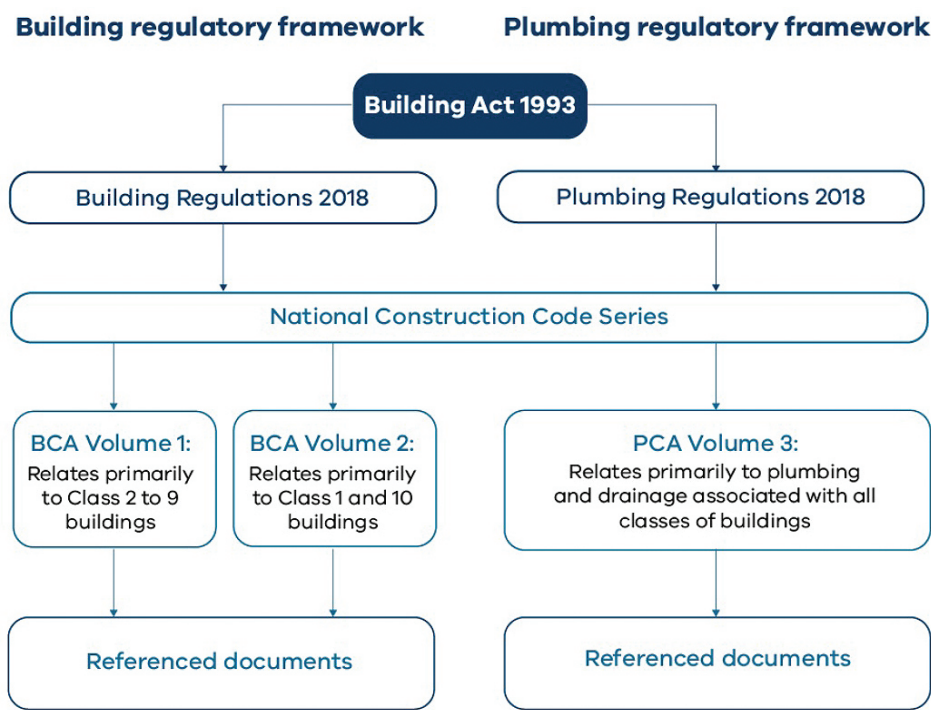
For specific developments, planning permits may be required. The permit application process involves submitting detailed proposals, undergoing assessments by the responsible authority (typically the local council), and may include public notification and opportunities for objections. Decisions on permit applications are guided by the relevant planning scheme provisions, policies, and any applicable overlays.⁷

Victoria’s planning system also incorporates mechanisms for enforcement, dispute resolution, and public participation, ensuring that land use and development align with established policies and community expectations.⁸

5.1.2 Building system

Victoria’s building system is governed by a comprehensive regulatory framework designed to ensure safety, quality, and sustainability in construction practices across the state (see Figure 5.2 below). Central to this framework are the Building Act 1993 (Vic) and Building Regulations 2018, which establish the legal foundation for construction standards, practices, and responsibilities. These legislative instruments outline the duties of building practitioners and owners, providing a clear regulatory basis for all building work conducted in Victoria.⁹

Figure 5.2 Victoria’s building regulatory framework



Source: Victorian Building Authority, *Building regulatory framework*, 2024, <<https://www.vba.vic.gov.au/building/regulatory-framework>> accessed 20 December 2024.

7 Ibid.

8 Ibid.

9 Victorian Building Authority, *Building regulatory framework*, 2024, <<https://www.vba.vic.gov.au/building/regulatory-framework>> accessed 20 December 2024.

Another key component of the system is the National Construction Code, which sets the minimum requirements for building design, construction, and performance across Australia. The Building Code of Australia, which is part of the National Construction Code, provides 'technical provisions for the design and construction of buildings and other structures'.¹⁰ The Building Code permits state variations to provide additional requirements. In Victoria, the Building Code has been adopted by the Victorian Building Authority as Building Regulations.¹¹

In Victoria, the National Construction Code is legally enforced through the Building Act and Regulations, with the goal of ensuring national consistency in standards while addressing specific state requirements.¹²

The Victorian Building Authority serves as the primary regulator overseeing the building and plumbing industries in the state. The Authority's responsibilities include:

- registering building practitioners
- enforcing compliance with legislation
- conducting inspections and audits
- offering guidance to industry professionals and consumers.¹³

The Authority plays a crucial role in maintaining standards and addressing issues within the industry.

Obtaining a building permit is mandatory for most construction work in Victoria, ensuring compliance with established standards. These permits are issued by building surveyors, who can be either private or municipal, and who also oversee the adherence of projects to relevant regulations. This process is essential for maintaining safety and quality in construction.¹⁴

Victoria is currently undergoing significant reforms to improve its building regulatory system. A major initiative includes the establishment of the Building and Plumbing Commission, which consolidates functions such as oversight of builders and plumbers, domestic building insurance, and dispute resolution into a single agency.¹⁵

The Housing Industry Association (HIA) has voiced concerns about the Victorian Government's planned replacement of the Victorian Building Authority (VBA) with the Building and Plumbing Commission (BPC).

¹⁰ Ibid.

¹¹ Ibid.

¹² Ibid.

¹³ Ibid.

¹⁴ Ibid.

¹⁵ Ibid.

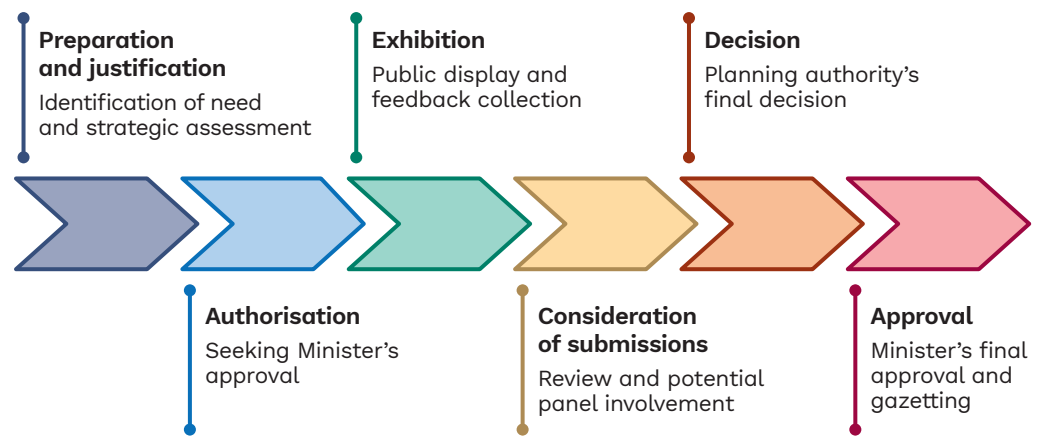
5.2 Planning scheme amendments

Under the Planning and Environment Act, the Minister for Planning has authority to prepare planning scheme amendments. The following actors are also authorised to prepare amendments which are ultimately considered by the Minister:

- another Minister where relevant to their portfolio (s 9)
- a public authority (s 9)
- a local council (ss 8A and 8B)
- the Suburban Rail Loop Authority (s 9A).¹⁶

The amendment process involves several stages, including requesting authorisation, public exhibition, review by planning panels, and approval by the Minister for Planning.¹⁷ This structured process ensures transparency, public participation, and thorough evaluation of proposed changes. Figure 5.3 shows the planning amendment process.

Figure 5.3 The planning scheme amendment process



Source: Legislative Council Environment and Planning Committee. Based on information from Department of Transport and Planning, *Guide to Victoria's Planning System: Chapter 2 - Amendments*, 2024, <<https://www.planning.vic.gov.au/guides-and-resources/guides/guide-to-victorias-planning-system/amendments>> accessed 24 December 2024.

The Committee notes under provisions of the Environment and Planning Act, provision 20 (2), that the Minister for Planning may exempt a planning authority (including where the Minister is the planning authority) from the requirement to publicly exhibit a planning scheme amendment if they believe compliance with the exhibition requirements is not warranted or that the exemption serves the broader interests of Victoria, or a part of it. This exemption power allows the Minister to bypass the normal public exhibition process.

16 Department of Transport and Planning, *Guide to Victoria's Planning System: Chapter 2 - Amendments*, 2024, <<https://www.planning.vic.gov.au/guides-and-resources/guides/guide-to-victorias-planning-system/amendments>> accessed 24 December 2024.

17 Department of Transport and Planning, *Using Victoria's planning system*.

There are four types of planning scheme amendments:

- a **V** amendment: which makes amendments to the Victoria Planning Provisions
- a **VC** amendment: which amends the Victoria Planning Provisions and one or more planning schemes
- a **C** amendment: which amends a single planning scheme
- a **GC** amendment: which amends more than one planning scheme.¹⁸

5.2.1 Improving consideration of climate risk in planning schemes

It is really critical that the planning scheme adequately addresses the risks associated with natural hazards and the opportunities for planning and design to mitigate against the effects of a changing climate.

Cr Tom Crook, Mayor, East Gippsland Shire Council, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, p. 2.

The success of Victoria's planning scheme process in considering climate change is mixed. While mechanisms such as the recent integration of climate resilience into the Planning and Environment Act and the use of overlays and zones for environmental management are in place, significant limitations hinder its overall effectiveness.

While climate resilience is a stated objective, the guidance on how to achieve resilience often remains vague. Broad principles without specific, actionable measures leave room for inconsistent application by councils and decision-makers. The Victoria Planning Provisions' integrated decision-making allows for balancing competing objectives, which can result in climate considerations being deprioritised in favour of economic or development goals. Furthermore, the system's focus on new developments means that existing built environments—often facing significant climate risks—are excluded from its scope, limiting the ability to address legacy issues.

Many stakeholders called for greater and clearer consideration of climate risks in the planning scheme process. The Yarra City Council reflected on how the planning scheme process has historically considered climate risks, contending that:

State government decisions have created and transferred climate risk to local government. Historically, the Planning Scheme (which is a State Government instrument) has not been appropriate to creating climate adapted and resilient communities and currently does not include adequate provisions to allow statutory planners to require climate adaptation in new developments, especially at the precinct scale. This resulted in developments which create significant local climate risks (e.g., urban flash flooding and urban heat islands) which are managed by local governments, and expose residents to climate impacts (e.g., through the construction of thermally unsafe housing).¹⁹

¹⁸ Department of Transport and Planning, *Guide to Victoria's Planning System: Chapter 2 - Amendments*.

¹⁹ Yarra City Council, *Submission 25*, p. 2.

In its submission, the Council Alliance for a Sustainable Built Environment contended that planning decision-makers 'need specific content in planning schemes to support them in delivering climate responsive outcomes'.²⁰ It argued that:

If there is no reference in the scheme, the ability to deliver particular outcomes is compromised and inconsistent and relies more heavily on individual decision-making and capacity.²¹

The Alliance called for climate consideration to be 'made explicit' in Victoria's planning system, or risk that they 'will continue to be overlooked in favour of policy considerations that are more explicitly spelled out'.²² It recommended that the Victorian Government:

Update *Minister's Direction No. 11 – Strategic Assessment of Amendments* and *Practice Note 46: Strategic Assessment Guidelines* for Planning Scheme amendments to ensure that Explanatory Reports prepared for every amendment include an explicit assessment against relevant climate change considerations including consistency with emission reduction targets over the life of any potential development, and any relevant adaptation measures.²³

The Victorian Greenhouse Alliances' submission echoed calls for climate change to be an explicit consideration 'at all levels of the Victorian planning system, commensurate with the threat it poses'.²⁴ The submission emphasised that:

In responding to climate change, planning needs to look to longer-term impacts and requires greater consideration of the impacts on future generations. This is sometimes incompatible with other objectives of planning, and with the interests and obligations of some decision-makers. Climate change considerations must be made explicit, or they will continue to be overlooked in favour of policy considerations that are more explicitly spelled out within planning schemes.²⁵

This ensures that land use and development align with sustainability objectives, transitioning towards zero emissions, promoting energy-positive projects where feasible, and enhancing resilience to climate change impacts.²⁶

The need for mandatory consideration of climate change impacts extends to all planning processes, including amendments, applications for new uses, changes of use, and development proposals. The Emerald Village Association advocated:

Planning schemes need to provide for the mandatory consideration of climate change impacts, and community resilience standards in the consideration of planning scheme amendments, applications for new uses, changes of use and development proposals

²⁰ Council Alliance for a Sustainable Built Environment (CASBE), *Submission 111*, p. 17.

²¹ Ibid.

²² Ibid., p. 18.

²³ Ibid., p. 21.

²⁴ Victorian Greenhouse Alliances, *Submission 129*, pp. 5–6.

²⁵ Ibid., p. 6.

²⁶ Ibid., pp. 5–6.

including proposals for infrastructure provision by statutory authorities and private providers.²⁷

This approach could ensure that the broader implications of development on community resilience and environmental sustainability are formally addressed.

Stakeholders emphasised that there is an urgent need to explicitly embed climate change considerations into planning frameworks. As Sue Phillips, Executive Officer of the Barwon South West Climate Alliance, asserted:

Given that we need to really have transformational adaptation, building climate change into the planning scheme is really critical.²⁸

By integrating mandatory climate considerations and resilience standards, planning schemes can evolve to meet the challenges posed by climate change, fostering resilience and sustainable development for Victoria's communities.

To increase consideration of climate change in the planning system, the Victorian Greenhouse Alliances recommended:

- Requiring every planning scheme amendment, at all levels of government, and at all levels of the planning framework, to include an assessment against relevant climate change considerations
- Introducing mandatory climate change related minimum standards into planning schemes²⁹

Several stakeholders noted that the *Climate Change and Energy Legislation Amendment (Renewable Energy and Storage Targets) Act 2024* (Vic) has enhanced consideration of climate change in the planning system. The legislation amended the Planning and Environment Act to include climate change as an explicit objective. The Committee notes that the legislated changes came into effect on 26 March 2025.

However, it is important to acknowledge that objectives of the planning system are only required where a project requires a planning permit. This issue was raised by Trevor Budge from the Emerald Village Association who told the Committee that:

One of the weaknesses in the way in which a lot of people look at the planning system is that they forget that a planning scheme only comes into action if somebody proposes a development that needs a planning permit. In respect to your Cowes example, if the Act and the planning scheme did not require that information, the person would simply build the house. It highlights the problem that we have got: it is so black and white. If it is in the planning scheme, you have to address it; if it is not in the planning scheme,

²⁷ Emerald Village Association, *Submission 168*, p. 2.

²⁸ Sue Phillips, Executive Officer, Barwon South West Climate Alliance, public hearing, Aireys Inlet, 23 October 2024, *Transcript of evidence*, p. 8.

²⁹ Victorian Greenhouse Alliances, *Submission 129*, p. 6.

it does not get addressed; and if nobody's proposing any development, the planning scheme sits there silent.³⁰

FINDING 14: Providing specific guidance on how to achieve climate-resilient buildings, will assist and encourage builders and owners to make progress towards more resilient buildings. Guidance on how to achieve climate resilience must include specific, actionable measures that can be applied consistently by councils and decision-makers.

FINDING 15: The Victoria Planning Provisions' integrated decision-making allows for balancing competing objectives, which can result in climate considerations being deprioritised in favour of economic or development goals.

FINDING 16: The planning system's focus on new developments means that existing built environments—often facing significant climate risks—are excluded from its scope, limiting the ability to address legacy issues.

5

5.2.2 Impact of delays

One of the most prominent concerns raised by stakeholders in relation to the planning scheme amendment process was the impact of delayed approval and implementation. The Committee was informed that some proposed planning scheme amendments have taken years to progress, some even taking years to open for exhibition and public consultation.

Significant concerns about the impact of these delays on Victoria's ability to respond to climate change was raised by several stakeholders, particularly local councils. When planning scheme amendments are delayed, it delays Victoria's capacity to build our climate resilience. This can be particularly problematic as climate risks evolve, leaving Victoria's planning and building sectors lagging, and unable to implement best practice measures. Consequently, these delays can hinder the ability to promptly address emerging climate risks, leaving communities vulnerable to extreme weather events or long-term environmental changes. Furthermore, as climate risks intensify over time, delays in planning amendments can exacerbate existing vulnerabilities in communities, making it harder to recover or adapt in the future. The impact of compounding climate risks was considered in Chapter 2.

Joel Leister, Manager of Flood Plain Implementation at Goulburn Broken Catchment Management Authority, noted that:

planning needs to be kept up to date regularly, and it is a constant challenge to keep those planning schemes up to date. We are working through a process now with all our

³⁰ Trevor Budge, Chair, Planning, Tourism and Environment sub-committee, Emerald Village Association, public hearing, Emerald, 10 October 2024, *Transcript of evidence*, p. 17.

councils to try and get some of this backlog through with the program the state has put in, but it is still a prolonged process. We would like to see that accelerate quicker, and we are trying to look for our councils to do that as best as possible.³¹

The impact of these delays can be especially problematic for areas at high risk of climate-related events such as flooding or bushfires, for example alpine areas. Annie Volkering, General Manager of Alpine Resorts Victoria, emphasised that 'much of the alpine resorts planning scheme content is outdated'. While a review is underway, she contended that:

it has been hampered by the strong competition for available funding and resources. Currently, the alpine resorts planning scheme does not adequately reflect contemporary climate change risks, adaptation, resilience and mitigation needs. An update to encourage and facilitate climate-ready developments, asset renewals and upgrades is needed.³²

At the City of Melbourne, similar frustrations have been observed. Tiffany Crawford, Co-Director of Climate Change and City Resilience, explained that the traditional methodology for planning amendments 'slows down the planning system'. She noted that delays in ministerial approvals can prevent councils from advancing proposals that already have community support. Crawford also stressed the mismatch between the pace of the system and the urgency of climate resilience, noting that 'the speed and agility are not there to keep pace'.³³

Delays have the risk of not only stalling necessary updates but can also render proposals obsolete. In its submission, the City of Melbourne referenced two examples of delayed planning scheme amendments to contextualise the consequences of delay:

While these delays are happening new data and information on climate and community impacts have been released, meaning that proposals are rapidly out of date. Urban planning needs to be able to respond dynamically to local level data and information in the absence of leadership from the state.³⁴

Whilst reduced responsiveness to climate risks was the primary concern raised, the Committee was advised that delays in the planning scheme amendment process can also lead to:

- **Increased costs:** Prolonged amendment processes may escalate costs for both local governments and developers due to inflation, prolonged consultations, or required updates to initial assessments.
- **Stalled infrastructure adaptation:** Delays can postpone critical infrastructure projects designed to mitigate climate impacts, such as flood defences or fire-resistant developments.

³¹ Joel Leister, Manager, Flood Plain Implementation, Goulburn Broken Catchment Management Authority, public hearing, Wangaratta, 4 December 2024, *Transcript of evidence*, p. 16.

³² Annie Volkering, General Manager, Assets, Land Management and Strategic Development, Alpine Resorts Victoria, public hearing, Wangaratta, 4 December 2024, *Transcript of evidence*, p. 34.

³³ Tiffany Crawford, Co-Director, Climate Change and City Resilience, City of Melbourne, public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 8.

³⁴ City of Melbourne, *Submission 75*, p. 9.

- **Missed funding opportunities:** Timely amendments are often required to access government grants or funding aligned with climate resilience objectives. Delays can result in missed deadlines for such opportunities.
- **Erosion of public trust:** Lengthy and unpredictable amendment processes can frustrate stakeholders, leading to reduced trust in the planning system and its ability to address climate resilience effectively.
- **Inflexibility in zoning and development:** Without timely updates, planning schemes may fail to reflect current needs for climate-resilient zoning or building codes.
- **Impact on housing and community planning:** Delayed amendments may prevent the development of climate-resilient housing or community designs, leaving residents exposed to future risks.

Recommendations to address delays in the planning scheme amendment process often emphasised the need for streamlined and state-led approaches and enhanced coordination among key stakeholders. One key suggestion is for the Victorian Government to implement updated overlays, such as flood or climate-related overlays, through minister-led statewide planning scheme amendments rather than leaving this responsibility to individual councils.³⁵ This is discussed further in Section 5.4.

Enhancing guidance and support for councils is also critical. This includes providing consistent methodologies for risk assessments and clear guidelines to navigate amendments effectively. For example, councils highlighted that securing resources and expertise for localised amendments often delays progress by years. The need for better guidance and support from the Victorian Government is considered throughout this chapter.

Stakeholders suggested that fostering community engagement is essential to secure the social licence needed for implementing these changes. Resistance to planning scheme amendments often arises from inadequate communication about risks and benefits. The role of social licence in updating planning schemes is discussed in Section 5.6 and Chapter 6.

In the Committee's view, delays in progressing planning scheme amendments can significantly hamper the ability of planning decision-makers to respond to climate change. To build resilience effectively, the process must be streamlined, adequately resourced, and updated regularly to reflect the realities of contemporary climate risks.

FINDING 17: Delays in planning scheme amendments hinder effective responses to climate change. Streamlining the process, ensuring adequate resourcing, and maintaining regular updates are essential to building climate resilience.

³⁵ City of Port Phillip, *Submission 135*, p. 3.

5.2.3 Improving consistency through statewide guidance

The Victoria Planning Provisions (discussed further in Section 5.3 below) provide guidance on the preparation and necessary components for planning schemes. However, there were calls from stakeholders to improve how planning schemes consider climate resilience through statewide guidance or baselines.

Stakeholders expressed the need for improved guidance and coordination to address climate resilience in planning schemes. The Nature Conservancy noted that the planning system has opportunities to better support adaptation activities and mitigate climate change impacts across the state. They emphasised that the Victorian Government should provide 'greater statewide direction' to ensure development considers future risks, such as sea level rise. According to their submission:

There are opportunities for the Victorian planning system to better support delivery of adaptation activities as well as broader reduction and mitigation of climate change impacts across the State ... A more active role from State and Federal government will reduce confusion and support local government and land managers to reduce future issues. This can build on the guidance that has already been developed by the State government.³⁶

An important tool for ensuring that planning scheme amendments recognise climate risks is using data gathered through climate risk assessments. These assessments were identified as a principal area which could benefit from statewide guidance. The City of Greater Bendigo highlighted the challenges faced by smaller councils in conducting climate risk assessments due to limited resources. They advocated for:

guidance and support with undertaking local government climate risk and vulnerability assessments would help standardise the process while enabling these assessments to be completed by smaller councils with less resources.³⁷

The City of Port Phillip pointed out systemic barriers within the planning system that hinder the adaptation of existing building stock to improve climate resilience. They emphasised the need for stronger exemptions, standards, and policies to facilitate redevelopment, particularly in areas affected by overlays such as design and development, neighbourhood character, or heritage overlays. Their submission contended that 'a stronger suite of exemptions, standards, policies, and practice note guidance is required to facilitate redevelopment'.³⁸

Bass Coast Shire Council raised concerns about the lack of coordination from the State regarding key climate risks, including inundation and coastal erosion. They called for a statewide framework similar to the bushfire resilience framework introduced post-Black Saturday to ensure consistency and instil community confidence.³⁹ They

³⁶ The Nature Conservancy, *Submission 48*, p. 3.

³⁷ City of Greater Bendigo, *Submission 158*, p. 9.

³⁸ City of Port Phillip, *Submission 155*, p. 6.

³⁹ Bass Coast Shire Council, *Submission 181*, p. 3.

also noted the absence of guidance linking adaptation plans under the Climate Change Act to the Planning and Environment Act, emphasising that such guidance would facilitate more consistent planning responses across Victoria.⁴⁰

there is a noticeable absence of a practice note or guidance on connecting adaptation plans prepared under Division 2, Part 5 of the Climate Change Act 2017 to the Planning and Environment Act. Such guidance would facilitate more coherent and consistent planning responses across the State.

Bass Coast Shire Council, *Submission 181*, p. 5.

More generally, stakeholders raised concerns about the lack of alignment between the Climate Change Act and the Planning and Environment Act, with many contending this weakened the capacity for planning processes (including amendments) to consider climate change. The Climate Change Act and the Planning and Environment Act, despite overlapping in their aims to address climate change, are not fully aligned in their implementation and scope. Examining the legislation, the Committee has identified several areas of misalignment:

1. **Decision-Making Requirements:** Section 17 of the Climate Change Act mandates that specific decision-makers listed in its schedule must consider the impacts of climate change.⁴¹ However, no decisions under the Planning and Environment Act are included in this schedule. This omission means that the direct integration of climate change considerations into planning decisions under the Planning and Environment Act relies on the Act's internal provisions rather than the broader mandates of the Climate Change Act.
2. **Policy and Guidance Integration:** While the Climate Change Act requires the creation of a climate change strategy⁴² and Adaptation Action Plans every five years,⁴³ these policy documents are not formally incorporated into the Victoria Planning Provisions or the Planning and Environment Act's framework. As a result, their influence on planning decisions is limited, and they provide minimal practical guidance to planners and decision-makers under the Planning and Environment Act.
3. **High-Level Objectives versus Practical Implementation:** The Climate Change Act outlines broad policy objectives, such as building resilience and preparing for disasters, but these objectives are not directly enforceable within the planning system under the Planning and Environment Act.⁴⁴ Although recent amendments to the Planning and Environment Act include resilience to climate change as an objective,⁴⁵ these provisions remain high-level and lack detailed guidance.

⁴⁰ Ibid., p. 5.

⁴¹ *Climate Change Act 2017* (Vic) s 17.

⁴² Ibid., pt 5 div 1.

⁴³ Ibid., pt 5 div 2.

⁴⁴ Ibid.

⁴⁵ *Climate Change and Energy Legislation Amendment (Renewable Energy and Storage Targets) Act 2024* (Vic).

4. **Integrated Decision-Making Conflicts:** The Planning and Environment Act's integrated decision-making framework, as outlined in cl 71.02–3 of the Victoria Planning Provisions, allows decision-makers to balance competing objectives, such as economic development and environmental considerations. Stakeholders raised concerns that this flexibility often results in climate change considerations being deprioritised in favor of more tangible or immediate objectives, undermining the Climate Change Act's focus on resilience and long-term climate adaptation.
5. **Sectoral Silos:** The Planning and Environment Act amendments address climate resilience primarily within the planning framework, but they do not create explicit links to the broader, cross-sectoral approaches outlined in the Climate Change Act. This siloed approach reduces the effectiveness of coordinated climate action across the state.

Aligning these Acts would require legislative amendments to include Planning and Environment Act decisions under the Climate Change Act's schedule, integrate Climate Change Strategy and Adaptation Action Plans into the Victoria Planning Provisions, and develop detailed, enforceable standards and guidelines for climate resilience within the planning framework. Such alignment would strengthen the state's ability to address climate risks holistically and consistently.

Jonathan Spear from Infrastructure Victoria underscored the need for better integration of climate risk into the Victorian government's risk management framework. He compared Victoria's approach unfavourably with New South Wales, where detailed guidance on risk management approaches is provided for infrastructure:

we have high-level guidance around risk management, climate risk is not particularly integrated into the Victorian approach to climate risk management, and in our report we point to a counterexample in New South Wales where they have very clear guidance around risk management approaches across their infrastructure. We think that the Victorian government risk management framework should have detailed guidance about how to assess climate-related risks in infrastructure and integrate that into decision-making, and there are some international standards that exist that could be also brought into this.⁴⁶

Infrastructure Victoria's *Weathering the Storm* report recommended using asset management systems to improve resilience by releasing guidance on assessing climate vulnerability and risk, designing for resilience, and adopting preventative maintenance. The report also called for supporting agencies to develop the processes, tools, and expertise to embed climate considerations in asset management practice.⁴⁷

To address stakeholders' concerns about a lack of standard guidance on considering climate risk in the planning process, it is essential to enhance coordination and

⁴⁶ Dr Jonathan Spear, Chief Executive Officer, Infrastructure Victoria, public hearing, Melbourne, 9 October 2024, *Transcript of evidence*, p. 24.

⁴⁷ Infrastructure Victoria, *Weathering the Storm: Adapting Victoria's infrastructure to Climate Change*, 2024, p. 5.

guidance among key legislative and regulatory frameworks. Greater alignment between these frameworks will ensure that climate change considerations are embedded into all aspects of planning and development.

Suggestions raised in evidence to improve the consistency of climate risk consideration in planning scheme processes included:

- developing a statewide standard framework for addressing climate risks, including inundation and coastal erosion, modelled on the bushfire resilience framework implemented post-Black Saturday
- introducing practice notes or guidelines that link adaptation plans under the Climate Change Act to planning scheme requirements under the Planning and Environment Act
- releasing detailed guidance for assessing climate-related risks in infrastructure and integrating these assessments into decision-making processes.

Furthermore, there were clear calls from stakeholders for the Victorian Government to consider developing a standardised methodology or baseline for climate risk assessments. The need for statewide climate risk assessment methodology is discussed in detail in Chapter 8.

The Committee acknowledges the clear and consistent calls from stakeholders to improve how planning decision-makers address climate resilience within planning processes. Developing a standard framework, providing detailed guidance, and aligning legislative and regulatory frameworks are critical steps to ensure consistency and support across all levels of government. By prioritising these measures, the Victorian Government can build greater confidence in the planning system, better prepare communities for climate risks, and strengthen the State's capacity to adapt to the challenges of climate change.

FINDING 18: Stakeholders called for statewide guidance to improve consistency in integrating climate resilience into planning schemes.

RECOMMENDATION 10: That the Victorian Government, through collaboration with key planning stakeholders including councils, improve the consistency of how climate resilience is considered in planning processes at the state government level. This should include considering the need for actions such as:

- developing a clear statewide framework for addressing climate risks
- developing practice notes or guidelines for adaptation which establish clear links between the *Climate Change Act 2017* (Vic) and the *Planning and Environment Act 1987* (Vic).

5.2.4 Minister-led planning scheme amendments or directions

Section 8 of the Planning and Environment Act designates the Minister for Planning as a 'planning authority', giving them power to prepare or amend planning schemes.⁴⁸ The Minister has the power to draft or amend any planning scheme, including VC amendments which can change more than one planning scheme.

Box 5.1 Section 8 of the *Planning and Environment Act 1987* (Vic)

8 Minister is planning authority

- (1) The Minister may prepare—
 - (a) a planning scheme for any municipal district or other area of Victoria; or
 - (b) amendments to any provision of a planning scheme.
- (2) The Minister is a planning authority under this Act.
- (3) This Act applies to a planning scheme prepared by the Minister as if it were an amendment to a planning scheme.

Source: *Planning and Environment Act 1987* (Vic) s 8.

One of the principal concerns about the planning scheme process is its vulnerability to lengthy delays. To alleviate delays, some stakeholders suggested that Minister-led planning scheme amendments could be applied statewide where important measures are needed, especially as they relate to climate resilience. For example, some stakeholders suggested a Ministerial amendment to implement updated flood overlays and controls. Mayor Tom Crook from East Gippsland Shire Council told the Committee:

We feel very strongly that the Victorian government needs to implement updated flood overlays and controls through a minister-led statewide planning scheme amendment rather than requiring councils to do this work in their own right and on an individual basis. This would ensure consistency in the approach and fairness, particularly given the technical nature of the issue. A similar approach was obviously adopted to the management of bushfire risk in the bushfire management overlays. With ever-increasing pressure on our council to approve developments on land vulnerable to coastal inundation and flooding risk, this work by the state we feel simply cannot happen fast enough.⁴⁹

The Planning and Environment Act also empowers the Minister to issue 'directions and guidelines as to the form and content of any planning scheme or planning schemes'.⁵⁰ All planning authorities are required to comply with ministerial directions.⁵¹

⁴⁸ *Planning and Environment Act 1987* (Vic) s 8(1).

⁴⁹ Cr Tom Crook, Mayor, East Gippsland Shire Council, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, p. 3.

⁵⁰ *Planning and Environment Act 1987* (Vic) s 7(5).

⁵¹ *Ibid.*, p. 7(6).

Several stakeholders suggested that ministerial directions could be used to improve the planning systems consideration of climate change. It was suggested that these directions could be used to address issues, for example addressing delays in implementing the National Construction Code.⁵²

There are existing ministerial directions in place which require specific consideration of climate change where relevant to a planning scheme proposal or amendment. Ministerial Direction No. 13 sets out requirements for 'consideration of the impacts of climate change within coastal Victoria as part of an amendment which would have the effect of allowing non-urban land to be used for an urban use and development'.⁵³

The Committee notes that the Victorian Government has also recently legislated to increase climate change considerations through ministerial directions. The *Climate Change and Energy Legislation Amendment (Renewable Energy and Storage Targets) Act 2024* (Vic) introduced the power for the Minister to issue directions which have regard to climate change considerations. This Act is discussed in greater detail in Section 5.7.

Box 5.2 Section 18 of the *Climate Change and Energy Legislation Amendment (Renewable Energy and Storage Targets) Act 2024* (Vic)

18 New section 12A inserted

After section 12 of the Planning and Environment Act 1987 insert—

12A Ministerial directions for having regard to climate change

- (1) The Minister may issue written directions to planning authorities in relation to matters relating to climate change to which planning authorities must have regard in preparing a planning scheme or amendment.
- (2) Without limiting subsection (1), the Minister's directions may set out—
 - (a) circumstances in which planning authorities must have regard to a matter relating to climate change; and
 - (b) matters to which planning authorities are not required to have regard under section 12(2A); and
 - (c) how the requirement under section 12(2A) is to be met in relation to a particular matter.

(Continued)

⁵² Polar Environ, *Submission 131*, p. 29.

⁵³ Minister for Planning, *Ministerial Direction No. 13: Managing Coastal Hazards and the Coastal Impacts of Climate Change*, VC171, 6 December 2021, p. 1.

Box 5.2 Continued

- (3) The Minister's directions may apply, adopt or incorporate, with or without modification, any matter contained in any document, code, standard, rule, specification or method published by any authority or body whether as published at the time that the direction is made or as published from time to time.

Source: *Climate Change and Energy Legislation Amendment (Renewable Energy and Storage Targets) Act 2024* (Vic) s 18.

Several stakeholders commended this change, highlighting the greater capacity for the Minister to prescribe how climate change should be considered in the planning scheme process.⁵⁴

5.3 Victoria Planning Provisions

The Victoria Planning Provisions (VPPs) lack strength and depth, leaving individual Councils to progress suitable controls.

City of Melbourne, *Submission 75*, p. 9.

The Victoria Planning Provisions play a central role in guiding local councils in the preparation of planning schemes and amendments. Designed as a 'template document of standard state provisions', the Victoria Planning Provisions outline essential components for planning schemes.⁵⁵ However, evidence presented to the Committee highlights significant limitations in the current framework, particularly in addressing climate-related challenges and ensuring climate resilience across the built environment.

The City of Melbourne expressed concern that the Victoria Planning Provisions 'lack strength and depth', making local councils responsible for developing suitable planning controls. Similarly, Bass Coast Shire Council noted that there is a gap in the provisions on managing 'climate related issues effectively', it argued that:

Specific zones, overlays, and particular provisions that account for climate adaptation and resilience are necessary to translate high-level strategies into actionable measures.⁵⁶

Other stakeholders also believed that the Victoria Planning Provisions do not adequately promote consideration of climate risk. These stakeholders called for enhanced flexibility and stronger integration of climate considerations into the

⁵⁴ See, for example: Municipal Association of Victoria, *Submission 232*; La Trobe University Climate Change Adaptation Lab, *Submission 236*; Victorian Greenhouse Alliances, *Submission 129*.

⁵⁵ Department of Transport and Planning, *Guide to Victoria's Planning System: Introduction*.

⁵⁶ Bass Coast Shire Council, *Submission 181*, p. 6.

provisions. The City of Stonnington said state planning provisions could empower councils to amend schemes that reflect localised climate risks.⁵⁷ This sentiment is echoed by Urban Futures (RMIT University):

Much of the state's climate change policy is not integrated into the [Victoria Planning Provisions] as incorporated documents and is instead being presented as reference documents only. Other policies are yet to be referenced.⁵⁸

One of the objectives of the Victoria Planning Provisions is to 'minimise the impacts of natural hazards and adapt to the impacts of climate change through risk-based planning'. However, the lack of incorporated documents means there is little enforceability. Clause 72.04 of the Victoria Planning Provisions allows for 'incorporated documents'. Documents that guide decision-making can be incorporated into the planning scheme via amendment. Unlike documents that are only referred to in the scheme, incorporated documents form part of the scheme and carry statutory weight.

Referenced documents specified in cl 13.01-1S of the Victoria Planning Provisions (but not incorporated) that provide for the consideration of climate change as an objective are:

- Climate change data and information maintained by the Department of Energy, Environment and Climate Action.
- Adaptation action plans prepared under Division 2 of Part 5 of the *Climate Change Act 2017*.
- Climate science report prepared under Part 6 of the *Climate Change Act 2017*.⁵⁹

The Committee notes that there is no explicit mention of the Built Environment Adaptation Action Plan in the provisions.

The use of referenced documents instead of incorporated documents calls into question the weight given to climate resilience by the provisions. Stakeholders contended that other priorities are favoured by planning authorities. In its submission, Bayside City Council suggested that:

Whilst there are tools within the Victoria Planning Provisions that enable local environmental outcomes to be considered, these are consistently overlooked in favour of the objectives of the Act to facilitate development, as the environmental outcomes at the micro scale are often insignificant, allowing this to be overlooked or given lesser weight.⁶⁰

⁵⁷ City of Stonnington, *Submission 42*, p. 5.

⁵⁸ Urban Futures (RMIT University), *Submission 222*, p. 14.

⁵⁹ Victoria Planning Provisions cl 13.01-1S.

⁶⁰ Bayside City Council, *Submission 200*, p 4.

The Victorian Trades Hall Council made several recommendations to strengthen the Victoria Planning Provisions' capacity to consider climate resilience, namely:

- amending planning scheme purposes to explicitly ensure climate resilience in the built environment
- including climate resilience alongside adaptation and mitigation in relevant clauses
- enhancing provisions for renewable energy infrastructure through updated clauses and categorisations.⁶¹

The Committee acknowledges that the Victorian Government has recently improved recognition of climate resilience in planning decisions through the passing of the *Climate Change and Energy Legislation Amendment (Renewable Energy and Storage Targets) Act 2024*. This Act is discussed in detail in Section 5.5 below.

FINDING 19: The Victoria Planning Provisions (VPPs) have the capacity for stronger integration of climate considerations and enforceable measures to support local councils in managing climate risk.

RECOMMENDATION 11: That the Victorian Government undertake a review of the Victoria Planning Provisions (VPP) to specifically examine climate resilience including compliance measures.

5.4 Land overlays

Land overlays, such as flood, bushfire management, and environmental significance overlays, are critical tools in the Victorian planning system for identifying and managing climate risk. These overlays guide land use and development to minimise exposure to hazards like flooding, bushfire, and erosion, thereby supporting resilient development and protecting both environmental and community assets. As Martin Gill, Chief Executive Officer of the Borough of Queenscliffe, highlighted:

the Victorian planning system has made some strides in preventing people from living in the places where they are most at risk. So the bushfire management overlay was a good tool and the significant inundation overlay is a good tool.⁶²

These overlays also play a vital role in preserving ecologically sensitive areas, agricultural land, and heritage sites, ensuring that critical ecosystems and biodiversity are safeguarded while balancing the demands of development. Overlays can also assist with avoiding development (or rebuilding) in high-risk areas.

⁶¹ Victorian Trades Hall Council, *Submission 233*, p. 5.

⁶² Martin Gill, Chief Executive Officer, Borough of Queenscliffe, public hearing, Aireys Inlet, 23 October 2024, *Transcript of evidence*, p. 7.

Despite their importance, several challenges hinder the effective implementation of land overlays. A primary issue is the complexity and delays associated with updating overlays. The process is often lengthy and resource-intensive, leaving councils unable to implement necessary protections against emerging climate risk. In the context of Special Building Overlays, the Council Alliance for a Sustainable Built Environment outlined procedural and resource challenges councils face navigating overlays:

To update a Special Buildings Overlay (SBO) councils must undertake a long and resource-intensive planning scheme amendment process. Many Victorian councils do not have resources to do this regularly and this increases climate risks related to flooding for both private property owners and local government. There are also some issues about consistency of engineering assumptions and the modelling used to generate updated SBO flooding maps.⁶³

To address these challenges, stakeholders recommended several improvements. Streamlining the approval processes for planning scheme amendments would allow for more timely updates to overlays in response to emerging risks. The Council Alliance for a Sustainable Built Environment suggested implementing a 'streamlined process with a consistent set of engineering assumptions and a fast-tracked Ministerial amendment, such as using a 20(4)⁶⁴ amendment'.⁶⁵ Additionally, it contended that:

The State Government resources involved in processing these amendments is also significant and long delays have been experienced. As rainfall intensity and frequency continues to change over time, the need to regular updates to the SBO mapping will also continue.⁶⁶

Protecting the integrity of planning controls was also emphasised. Ensuring strong controls remain intact and are not diluted by external pressures is critical to preventing developments that increase vulnerability to climate risk. Martin Gill from the Borough of Queenscliffe contended that there is the potential for overlays, or other planning controls, to be undermined because of competing economic or planning priorities:

What tends to happen, though, is that they are quite – not blunt, but they are quite pure processes, and then what tends to happen because developers and property owners get involved is that slowly some of those quite strong controls get undermined because of the need to deal with other things in the economic or planning systems.⁶⁷

To expedite planning approval processes and reduce burdens on local government, using other actors to issue permits for certain projects was suggested. At a public hearing, Brett Franke, a registered building designer from Better Building Design,

⁶³ Council Alliance for a Sustainable Built Environment (CASBE), *Submission 111*, p. 12.

⁶⁴ A s 20(4) amendment refers to the ability for the Minister for Planning to exempt planning scheme amendments from notice and exhibition provisions if they deem these requirements are 'not warranted' or in the interests of Victorians.

⁶⁵ Council Alliance for a Sustainable Built Environment (CASBE), *Submission 111*, p. 12.

⁶⁶ Ibid.

⁶⁷ Martin Gill, *Transcript of evidence*, p. 7.

emphasised the need for a 'simpler process'.⁶⁸ Whilst he acknowledged that the 'rules in place that govern planning overlays' are a 'good thing', Franke contended that:

I know people get very frustrated with the planning system and the length of time it takes to get a planning permit. I would like to see that changed, more so where we maybe take responsibility away from local council to issue a planning permit and give it to a private planning practitioner or planning consultant.⁶⁹

Resource limitations further constrain councils' ability to manage and enforce overlay provisions effectively. The lack of funding and staff also restricts their capacity to conduct necessary data collection and risk modelling to inform overlay boundaries.⁷⁰ Public frustration with the planning system adds to these challenges. Stakeholders recommended improving public engagement to better communicate the purpose and benefits of land overlays, potentially reducing frustration and resistance. Increased resource support for local councils was another priority, with suggestions to:

- provide additional funding for managing overlays and conducting necessary updates
- develop statewide protocols or baseline models for climate modelling or other relevant data required in planning amendments.

The Committee emphasised that land overlays are essential for managing the intersection of development and climate resilience in Victoria. While they provide critical guidance for sustainable land use and climate risk mitigation, the challenges in their implementation need to be addressed. By streamlining processes, investing in data and resources, and improving engagement, land overlays can become more effective tools in supporting a climate-resilient built environment.

RECOMMENDATION 12: That the Victorian Government develop a consistent set of engineering assumptions and modelling standards in relation to climate resilience for overlays.

RECOMMENDATION 13: That the Victorian Government work with local governments to expedite the approval process for planning scheme amendments or permits that support greater climate resilience.

RECOMMENDATION 14: That the Victorian Government ensure adequate resources are provided so that the Minister for Planning and relevant government departments can facilitate timely and responsive decision-making with respect to climate change responses, including development and/or approval of climate-related planning scheme amendments.

⁶⁸ Brett Franke, Registered Building Designer, Better Building Design, public hearing, Mount Macedon, 3 December 2024, *Transcript of evidence*, p. 34.

⁶⁹ Ibid.

⁷⁰ City of Stonnington, *Submission 42*, p. 3.

RECOMMENDATION 15: That the Victorian Government work with local governments to foster community involvement in overlay updates to improve transparency and public trust in the system. This could be achieved by actions such as targeted public education campaigns to explain the purpose, benefits, and necessity of land overlays, reducing resistance and frustration with the planning process.

5.4.1 Impact of heritage overlays on climate resilience in the built environment

Box 5.3 Heritage overlays in Victoria

Under the *Planning and Environment Act 1987* (Vic), locally significant heritage places can be listed under a 'heritage overlays' in a local planning scheme.

The Victorian Planning Provisions cl 43.01 sets out the rules and requirements for areas subject to a heritage overlay. The purpose of these overlays is to protect and conserve places of heritage significance by ensuring that development respects the cultural, architectural, historical, and archaeological importance of these places. It applies to individual properties, precincts, or structures listed for their heritage value.

A heritage overlay mandates that a planning permit is required for specific works, such as demolition, subdivision, or external alterations to heritage properties, to ensure changes are sensitive to their significance. The clause also incorporates heritage study references, statements of significance, and any conservation management plans to guide decision-making.

Source: *Planning and Environment Act 1987* (Vic); Victoria Planning Provisions cl 43.01.

Heritage overlays play a critical role in preserving the cultural and historical fabric of communities. Stakeholders identified the unique challenge of balancing heritage preservation with the urgency of climate adaptation.⁷¹ The current framework often restricts the ability of planning authorities to implement essential climate adaptation measures, particularly in residential areas covered by heritage overlays.

The retention of outdated materials and designs in heritage buildings contributes to increased emissions and energy inefficiency. As Victoria faces rising temperatures and more extreme weather (see Chapter 2), the lack of flexibility in heritage overlay requirements hinders the ability of communities to adapt. Furthermore, these restrictions disproportionately impact vulnerable residents who may already face economic and environmental challenges.

⁷¹ YIMBY Melbourne, *Submission 138*, p. 9.

Key barriers identified in balancing heritage overlays with a climate resilient built environment:

- Retrofitting restrictions: Heritage overlays often restrict modifications that are crucial for improving energy efficiency and thermal performance. Examples include limitations on installing double-glazed windows, solar panels, and efficient heating and cooling systems.⁷²
- Energy inefficient older buildings: Heritage-protected buildings, typically constructed before modern building standards, are inherently less energy-efficient. This makes them more vulnerable to extreme weather events such as heatwaves and cold spells, further exacerbating energy consumption and costs for residents.⁷³
- Complex approval processes: Navigating the planning approval process for even minor climate adaptation measures within heritage areas can be lengthy, complex, and cost-prohibitive.⁷⁴

There was a clear perception among some stakeholders that Victoria's current planning scheme favoured heritage preservation above climate adaptation. In its submission, YIMBY Melbourne argued that:

Our current planning system weighs historic preservation above the need to retrofit homes to be more energy-efficient and climate-resilient, creating significant barriers in the mission to increase our city's preparedness for climate change.⁷⁵

It recommended that the Victorian Government reform the planning system to re-establish priorities by:

- reforming heritage protections to improve ability to retrofit properties
- establishing new 'hierarchy considerations' which prioritise factors such as climate adaptation, housing quality, and supply against heritage considerations.⁷⁶

Other stakeholders also echoed concerns that climate adaptation is discouraged because of overlay requirements. The City of Port Phillip outlined that:

There are barriers in place within the planning system that discourage the adaptation of existing building stock to improve climate resilience and mitigate impacts. A stronger suite of exemptions, standards, policies and practice note guidance is required to facilitate redevelopment. This is particularly relevant in areas that are impacted by overlays, such as design and development, neighbourhood character or heritage overlays.⁷⁷

⁷² YIMBY Melbourne, *Submission 138*.

⁷³ Yarra City Council, *Submission 25*, p. 2.

⁷⁴ YIMBY Melbourne, *Submission 138*, p. 9.

⁷⁵ YIMBY Melbourne, *Submission 138*, p. 9.

⁷⁶ *Ibid.*, p. 1.

⁷⁷ City of Port Phillip, *Submission 155*, p. 6.

Natalie Egleton, Chief Executive Officer of the Foundation for Rural and Regional Renewal, explained how planning requirements impede development:

There is no way that Maldon can meet future population demand with its current heritage overlays, population and size, but safety came first. So there is just that question: 'What are we building for?' And in our local case it was, 'Well, we're building to keep people safe, and we just can't build in those places anymore.' That has consequences for compensation for the people who own land there and thought that they could be subdividing and selling for housing developments et cetera. I guess my challenge to the question is: sometimes it is not about building back, and sometimes it is about thinking entirely differently about what we need in the future.⁷⁸

At a public hearing, Ian Laging, President of the Aireys Inlet District Association, discussed the need to balance heritage with climate risks:

So I guess overarching these concerns is a recognition of the need to protect what we see as a unique and valued environment – landscapes and built heritage – in this area. As I say, we greatly enjoy living here but are aware of the risks.⁷⁹

To address the challenges between heritage protection and climate adaptation, several recommendations were put forward by stakeholders. Some of these recommendations are also broadly relevant to the planning system. Recommendations raised included:

- Streamlined processes: develop clear and standardised exemptions for minor climate adaptation measures in heritage overlays, such as the installation of solar panels, energy-efficient windows, and insulation.
- Policy reform: amend planning regulations to prioritise climate resilience and energy efficiency alongside heritage preservation. This could include the introduction of a hierarchy of considerations that places climate adaptation measures on equal or greater footing with heritage concerns.
- Guidance and support: provide detailed guidelines to property owners on integrating sustainable retrofitting solutions within heritage buildings while maintaining historical integrity. Additionally, financial incentives or grants could be offered to support retrofitting projects in heritage-protected areas.
- Data-driven decision-making: commission research to assess the environmental impact of maintaining heritage overlays under current standards and explore innovative solutions to make heritage properties more sustainable.

⁷⁸ Natalie Egleton, Chief Executive Officer, Foundation for Rural and Regional Renewal, public hearing, Mount Macedon, 3 December 2024, *Transcript of evidence*, pp. 51–52.

⁷⁹ Ian Laging, President, Aireys Inlet District Association, public hearing, Aireys Inlet, 23 October 2024, *Transcript of evidence*, p. 44.

FINDING 20: A balanced approach is required to ensure that heritage overlays evolve to support both cultural preservation and climate resilience. By modernising heritage planning requirements, Victoria can protect its historical legacy while empowering communities to adapt to the challenges of a changing climate.

Challenges with retrofitting buildings and infrastructure are discussed in Chapter 6.

5.4.2 Updating flood overlays across Victoria

Box 5.4 Overview of flood overlays in Victoria

Flood overlays indicate areas where land use or development may require a planning permit as part of the development approval process. These overlays are categorised into three main types:

- Floodway Overlays
- Special Building Overlays
- Land Subject to Inundation Overlays (LSIOs).

Floodway Overlays specifically apply to sections of a floodplain critical for water discharge or storage during significant flood events.

Source: Department of Environment, Land, Water and Planning, *Guidelines to Development in Flood Affected Areas*, 2019.

Updating flood overlay modelling is a complex and urgent challenge, as highlighted by stakeholders. Ian Laging, President of the Aireys Inlet and District Association, expressed support for overlays that consider flood risk.⁸⁰ Similarly, Amber Clarke, Chief Executive Officer of the Corangamite Catchment Management Authority, stressed the importance of a consistent statewide approach to riverine flood and coastal inundation mapping in planning schemes.⁸¹ She noted that inconsistencies in the data available to communities and those reflected in planning schemes create frustration and confusion, calling for updated and uniform information to ensure communities have access to the best possible data.⁸² Clarke agreed that a statewide overlay could be a model applied to flood risk:

Amber CLARKE: I think if there is a consistent statewide approach to having the best available and up-to-date information on riverine flood and coastal inundation in planning schemes, that would go a long way.

⁸⁰ Ibid.

⁸¹ Amber Clarke, Chief Executive Officer, Corangamite Catchment Management Authority, public hearing, Aireys Inlet, 23 October 2024, *Transcript of evidence*, p. 40.

⁸² Ibid.

Melina BATH: Thank you. I guess since the disaster of recent bushfires we have got bushfire overlays that are statewide, benchmarks et cetera. Could that be similar but differently applied in terms of riverine and coastal flooding? Is that kind of where you are thinking?

Amber CLARKE: Yes. I think the statewide bushfire hazard overlay could be a model that could be applied.⁸³

This was echoed by Stephen Swart, Director of Sustainability and Culture at the Rural City of Wangaratta, who also reinforced the need for consistency in planning schemes.⁸⁴ He noted that while the State Government has taken responsibility for the bushfire management overlay, flood overlays remain the responsibility of local governments and catchment management authorities, leading to delays and inefficiencies.⁸⁵ He recommended they be applied in line with the bushfire management overlay:

So flood overlays are still basically the responsibility of local government and the catchment management authorities. They take an extreme amount of time to complete and then introduce into the planning scheme. I personally think they could be applied consistently with the bushfire management overlay.⁸⁶

Dr Jonathan Spear, Chief Executive Officer of Infrastructure Victoria, recommended Victoria establish an 'agreed set' of baseline projections for climate modelling such as flood modelling.⁸⁷ At a public hearing, he told the Committee that Infrastructure Victoria believes there should be:

an agreed set of projections that we all work from, not necessarily a singular one because some of them change over time, their sensitivities. We think that testing decisions against different sensitivities of change is really useful, but setting a number of them would be useful. We do this in other areas of government planning. We do it in population, we do it in land use, we do it in transport network planning. We can also do it in climate assessment, where DEECA or one of the central agencies can issue some guidance around 'These are the central projections and assumptions we are going to use and plan for.'⁸⁸

Improving climate risk modelling, including consideration of establishing shared baseline projections, is discussed further on in the Report.

A pressing challenge for updating land overlays is delays in the planning scheme amendment process. This has been particularly fraught for updating flood modelling to reflect new and heightened risks in flood-prone areas. Findings for the *Inquiry into the 2022 flood event in Victoria* are below.

⁸³ Ibid.

⁸⁴ Stephen Swart, Director, Sustainability and Culture, Rural City of Wangaratta, public hearing, Wangaratta, 4 December 2024, *Transcript of evidence*, p. 7.

⁸⁵ Ibid.

⁸⁶ Ibid.

⁸⁷ Dr Jonathan Spear, *Transcript of evidence*, p. 33.

⁸⁸ Ibid.

Box 5.5 Findings from the *Inquiry into the 2022 flood event in Victoria*

FINDING 6: Flood studies are an effective tool for assessing flood risk. However:

- they must use up-to-date methodologies, technology, and data
- there needs to be statewide coordination of the frequency they are conducted
- there should be statewide funding to ensure they are kept up to date.

FINDING 9: Limiting inappropriate new development in flood-prone areas is an effective first step in minimising future flood risk.

FINDING 10: Due to the interconnectedness of the two systems, any flood-related changes to Victoria's planning system should require changes to building standards and regulation to ensure changes are compatible and effective between the two systems.

FINDING 11: Urban planning changes need to be rapid, statewide, consistent and systemic. Asking local councils and communities to manage land use planning and hazard management alone is unsustainable given the issues regarding climate disasters impact much bigger geographic areas than a single local government area.

FINDING 17: The use of strategic land use planning to mitigate flood risk requires the Victorian Government and planning authorities to consider the effects of climate change as well as projected changes to land use over time.

Source: Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into the 2022 flood event in Victoria*, July 2024.

To address these findings the Committee made several recommendations, which the Government has since responded to:

Table 5.1 Recommendations from the *Inquiry into the 2022 flood event in Victoria*

No.	Recommendation	Government's response
4	That the new Victorian Floodplain Management Strategy detail the coordination responsibility of the Victorian Government to ensure all flood studies for all local government areas are fully funded and completed.	Support in principle
7	That the Victorian Government ensure regional catchment management authorities, with local councils, are funded and resourced to conduct and implement up to date flood studies on a regular basis.	Support in principle
8	That the Victorian Government require peer review of publicly funded flood modelling as part of the next Victorian Floodplain Management Strategy.	Support in principle

No.	Recommendation	Government’s response
9	That Melbourne Water and other floodplain management authorities review flood models every five years and update the models at least every 10 years and after the occurrence of a major flood.	Support in principle
17	That the Victorian Government fast-track the implementation of flood studies into planning schemes. This should be done cooperatively with local councils and relevant stakeholders, group together flood studies into regional amendments, and use the Minister of Planning’s powers as required, within two years of completion.	Support in principle
19	That the Victorian Government work with floodplain management authorities and climate scientists to understand how flood modelling can be used to better predict the impact of climate change on flooding and update its flood management policies in line with this understanding.	Support in full

Source: Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into the 2022 flood event in Victoria*, July 2024.

In response to a question on notice for the Inquiry into climate resilience, the Department of Transport and Planning outlined how it is seeking to speed up the incorporation of updated flood modelling into planning schemes:

The Department of Transport and Planning (DTP) is responsible for the planning processes and programs funded by the Victorian Government to ‘fast track’ the implementation of flood studies into planning schemes. This includes the Flood-related amendments Standing Advisory Committee established by the Minister for Planning in May 2023 to provide Victorian councils with a targeted and streamlined alternative to a Planning Panel process for the review of community submissions about flood amendments.⁸⁹

Melissa Burrage, Manager of Climate Change and City Resilience at Mornington Peninsula Shire Council, pointed out that flood mapping data often becomes outdated even before it is fully incorporated into planning schemes due to the evolving nature of climate science. This underscores the need for streamlined and timely updates to ensure communities are adequately prepared for the impacts of flooding.⁹⁰

we know that once our flood mapping data is indeed working through the planning scheme amendment process it will already be out of date. The science is already changing before we have even completed each of the flood maps.

Melissa Burrage, Manager, Climate Change and City Resilience, Mornington Peninsula Shire Council, public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 8.

Other stakeholders also expressed concerns about delays in updating flood modelling. Without updated risk projections, developments in flood-prone areas may fail to

⁸⁹ Department of Transport and Planning, Inquiry into climate resilience hearing, response to questions on notice received 6 January 2025, p. 2.

⁹⁰ Melissa Burrage, Manager, Climate Change and City Resilience, Mornington Peninsula Shire Council, public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 8.

account for future risks and could even be based on outdated assessments of current threats. Dr Kimberley Reid representing the ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century told the Committee that:

A lot of the flood modelling will be based on the present climate, so the rules that are 20 years old are based on what was done 20 years ago, but if we are already incorporating the future climate information into the current policies, then we are at least already planning for the future flood risks today.⁹¹

Councillor Tom Crook, Mayor of East Gippsland Shire Council, highlighted the difficulties local councils face when tasked with updating flood inundation overlays. He advocated for a minister-led statewide planning scheme amendment to ensure consistency and fairness, particularly given the technical complexities of flood risk assessment:

We feel very strongly that the Victorian government needs to implement updated flood overlays and controls through a minister-led statewide planning scheme amendment rather than requiring councils to do this work in their own right and on an individual basis. This would ensure consistency in the approach and fairness, particularly given the technical nature of the issue ... With ever-increasing pressure on our council to approve developments on land vulnerable to coastal inundation and flooding risk, this work by the state we feel simply cannot happen fast enough.⁹²

Kim O'Connor, Acting Director, Built Environment and Infrastructure from Yarra Ranges Council, advocated that:

Local councils need targeted flood modelling to identify areas of greatest vulnerability, prioritise infrastructure investments and reduce flood risks in those locations. With limited resources and many areas to address, it is essential that we focus on places of most risk and where there are hazards. We cannot do it alone.⁹³

Some stakeholders emphasised the need for graduated levels of flood planning controls based on risk categories and advocated for robust legislation to support these measures. They also called for preventing development in areas with excessive flood risks, arguing that overlays should aim not only to influence building standards but also to restrict inappropriate land use.⁹⁴

In its submission, the Gippsland Community Foundation stated that:

More support needs to be given to local governments to implement bushfire and flood controls to ensure that land exposed to excessive risks is not rezoned or allowed to be developed at greater than present densities. There should not be an implicit assumption

⁹¹ Dr Kimberley Reid, Research Fellow, School of Earth Atmosphere and Environment, Faculty of Science, Monash University, public hearing, Melbourne, 9 October 2024, *Transcript of evidence*, p. 18.

⁹² Cr Tom Crook, *Transcript of evidence*, p. 3.

⁹³ Kim O'Connor, Acting Director, Built Environment and Infrastructure, Yarra Ranges Council, public hearing, Emerald, 10 October 2024, *Transcript of evidence*, p. 3.

⁹⁴ Insurance Council of Australia, *Submission 46*, p. 4.

that the purpose of flood and bushfire overlays is just to influence the standard of building rather than prevent development in inappropriate locations.⁹⁵

The Committee notes that updated flood modelling is currently underway across metropolitan Melbourne catchments. In 2024, Melbourne Water released updated modelling for the Port Phillip and Western Port catchment areas. The release of this modelling was expedited following the 2022 major flood event. Melbourne Water has indicated its intentions to progressively undertake new modelling for the entire metropolitan area. However, the Committee emphasises the need to address the gaps in rural and regional Victoria, where many communities remain vulnerable to flood events. It calls on the Victorian Government to ensure the timely completion of flood modelling for regional areas, ensuring equitable access to updated data and enabling informed decision-making to mitigate flood risks and enhance community resilience statewide.

In Victoria, flood modelling is commissioned by local councils alongside regional catchment management authorities and the Victoria State Emergency Service (VICSES). In the *Victorian Floodplain Management Strategy*, the Government described flood modelling studies as:

A comprehensive technical assessment of flood behaviour. It defines the nature of flood hazard across the floodplain by providing information on the extent, depth and velocity of floodwaters, and on the distribution of flood flows. The flood study forms the basis for subsequent management studies and needs to take into account a full range of flood events up to and including the largest probable flood. Flood studies should provide new flood mapping for Planning Scheme inclusion, data and mapping for MEMPs, and a preliminary assessment into possible structural and non-structural flood mitigation measures.⁹⁶

Local councils expressed significant concern about the burden commissioning these studies has on their resources, which they believe to already be limited. To provide perspective, Amber Clarke from Corangamite Catchment Management Authority provided an estimate of the costs and technical capacity of flood modelling:

I could give an approximate range, because each flood study is a little different depending on the catchment, parameters and inputs, but to give you a very broad figure, something in the order of, say, \$100,000 to \$250,000 would probably cover most flood studies. We rely on funding from the state government for those particular flood studies, which is usually decided and allocated on a case-by-case basis. Capacity is a real issue. For example, we could not do 10 at one time. That is why we do try and space them out as well, because it takes a lot of technical input. It also requires extensive input from modelling experts and also the time for councils to participate too, so we cannot take on too many at one single time.⁹⁷

⁹⁵ Gippsland Community Foundation, *Submission 230*, p. 4.

⁹⁶ Land Department of Environment, Water and Planning, *Victorian Floodplain Management Strategy: Part 1 to 5*, Victorian Government, 2016, p. 105.

⁹⁷ Amber Clarke, *Transcript of evidence*, p. 36.

Several councils and other stakeholders expressed their concerns about local governments continued responsibility for flood modelling. It was noted that there is a pressing need to ensure updated modelling so that authorities are preparing for current and future risks, but this is a costly and time consuming exercise. Box 5.6 highlights some of the evidence received from stakeholders.

Box 5.6 Local councils' perspectives on flood modelling

When we think about a contribution the Victorian government can increasingly make, it is to support councils to get the flood modelling and climate modelling done and to get it into the planning scheme. A lot has been done, and it does not get in the planning scheme.

Bernie O'Sullivan, Chief Executive Officer, Macedon Ranges Shire Council, public hearing, Mount Macedon, 3 December 2024, *Transcript of evidence*, p. 8.

While Melbourne Water completes the bulk of flood studies in metropolitan Melbourne, this responsibility sits with local government or catchment management authorities in rural and regional areas who are often subject to significant resource constraints. Centralising flood studies and the associated planning scheme amendments (as occurred when Bushfire Management Overlays were updated) may be a more efficient way to ensuring planning provisions across the state reflect current climate change informed flood modelling.

City of Greater Bendigo, *Submission 158*.

Flood modelling is resource intensive and dynamic. Given the need to work across local council borders, state government is perhaps better placed to effectively implement flood modelling, as they do with bushfire hazard updates.

HIP v HYPE, *Submission 224*.

The Committee acknowledges that not all stakeholders believed a centralised approach to flood modelling was necessary. For example, Camille White, Floodplain Manager at the North Central Catchment Management Authority, contended that:

There is definitely benefit to councils running flood studies rather than it being centralised. We have done it both ways – we have had the catchment management authority run a flood study, and we have had council run a flood study. There is definite benefit in the councils running it because quite often communities are looking towards mitigation as well, which is best placed to sit with the local council. I think the support that we provide in the technical support for councils to undertake these flood studies is working well.⁹⁸

⁹⁸ Camille White, Floodplain Manager, North Central Catchment Management Authority, public hearing, Mount Macedon, 3 December 2024, *Transcript of evidence*, p. 60.

Instead, she argued that it is better to support local councils to implement new modelling into planning schemes which can sometimes take 'years' through the current process.⁹⁹

Given council concerns about the resource-intensiveness of conducting flood modelling, the Committee questioned government representatives on whether the Victorian Government should take over this function. At a public hearing, Andrew McKeegan from the Department of Transport and Planning reflected on the suitability of local councils and catchment authorities to undertake modelling:

The position at the moment has been around the value of the local catchment authorities and the councils and us as a state government providing greater support. That is sort of the position we have taken at the moment, but we do acknowledge sometimes the fact that these natural hazards do not sit within a council boundary and therefore the ability for either a regional or state approach to looking at how these things are moved within the system quicker.¹⁰⁰

He indicated that a regional or state-led approach to modelling is 'under active consideration'.¹⁰¹

In response to a question on notice on the same matter, the Department of Transport and Planning advised that:

[It] will be responsible for implementing any planning system related actions arising from the Victorian Government's future response to the Final Report of the Parliamentary Inquiry into the 2022 flood event in Victoria.¹⁰²

The Committee notes that the Victorian Government tabled its response to the Final Report for the *Inquiry into the 2022 flood event in Victoria* on 6 February 2025. Table 5.1 above summarises the Committee's recommendations and the Government's response in relation to flood modelling.

Several recurring issues have been identified by the Committee, namely the:

- need for a coordinated statewide approach
- challenges of keeping flood data current
- importance of state support in both funding and developing updates to planning schemes.¹⁰³

⁹⁹ Ibid.

¹⁰⁰ Andrew McKeegan, Deputy Secretary, Planning and Land Services, Department of Transport and Planning, public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 80.

¹⁰¹ Ibid.

¹⁰² Department of Transport and Planning, response to questions on notice, p. 2.

¹⁰³ Municipal Association of Victoria, *Submission 232*, p. 3.

In relation to areas prone to flood risk, it is clear to the Committee these issues are further exacerbated by delays in applying up-to-date flood modelling. Ensuring the most current flood modelling is applied to a planning scheme is critical to managing the increasing risks associated with climate change as well as continued development.

FINDING 21: Accurate and up-to-date flood studies are essential for informed land use planning, risk mitigation, and enhancing community preparedness for the increasing impacts of flooding and climate change.

RECOMMENDATION 16: That the Victorian Government engage local government stakeholders and investigate the feasibility of establishing a centralised approach to updating flood modelling across the state, with a particular focus on ensuring the timely integration of modelling outcomes into planning schemes to reflect current and future flood risks driven by climate change.

RECOMMENDATION 17: That the Victorian Government provide an update on the outcome of its review of Recommendations 13, 15, 16, 35, 48 and 51 in the Final Report on the *Inquiry into the 2022 flood event in Victoria* and the current status of implementing the remaining recommendations, and the funding allocated in the state budget to implement recommendations.

5.5 Recent efforts to improve Victoria's planning system

In recent years, Victoria has introduced several reforms which seek to modernise its planning system and address the complex challenges posed by climate change. These efforts aim to embed sustainability and climate resilience into planning frameworks, reflecting the growing recognition of the need for long-term, coordinated responses to risks.

This Section examines some of the key recent developments, focusing on pivotal reforms such as the introduction of climate change considerations into the Planning and Environment Act and the advancement of the Environmentally Sustainable Development (ESD) Roadmap.

5.5.1 Embedding climate change considerations into the *Planning and Environment Act 1987* (Vic)

The *Climate Change and Energy Legislation Amendment (Renewable Energy and Storage Targets) Act 2024* introduces significant reforms to the Planning and Environment Act, embedding climate change considerations into Victoria's planning framework. A key amendment is the inclusion of an explicit climate change objective within the planning framework, mandating that planning authorities consider climate change impacts when preparing or amending planning schemes.

The amendment requires planning authorities to consider the impacts of climate change on land use and development at all stages of planning. Specifically, the key provisions of the Act are:

1. **Incorporation of climate objectives:** Climate change mitigation and adaptation are now formalised as critical considerations under the planning framework (see Box 5.7 below).
2. **Evaluation of climate risks:** Planning authorities must assess significant risks such as extreme weather events, flooding, and other climate-related hazards when making planning decisions.
3. **Facilitating renewable energy:** The Act explicitly encourages the development of renewable energy and storage infrastructure, with streamlined processes to support projects critical to Victoria's energy transition.

As outlined in Box 5.7 and Box 5.8, the changes to the Planning and Environment Act included a new section 12A which provides for ministerial directions for having regard to climate change. As yet, there have been no ministerial directions issued under Section 12A. The lack of Ministerial directions means there is a lack of clarity for planning authorities in how they satisfy their planning obligations under 12 (2A).

Box 5.7 Changes to the Planning and Environment Act: section 12 (2A)

Amendments to the *Planning and Environment Act 1987* (Vic): new duties on planning authorities

17 What are the duties and powers of planning authorities?

...

(2A) Without limiting subsection (2), in preparing a planning scheme or amendment, a planning authority, in accordance with and subject to any directions issued under section 12A, must have regard to—

- (a) emissions reductions targets; and
- (b) any significant risk to any use or development envisaged by the scheme or amendment that arises from, or is likely to arise from, the impacts of climate change.

Source: *Climate Change and Energy Legislation Amendment (Renewable Energy and Storage Targets) Act 2024* s 17.

Box 5.8 Changes to the Planning and Environment Act: section 12A**12A Ministerial directions for having regard to climate change**

- (1) The Minister may issue written directions to planning authorities in relation to matters relating to climate change to which planning authorities must have regard in preparing a planning scheme or amendment.
- (2) Without limiting subsection (1), the Minister's directions may set out—
 - (a) circumstances in which planning authorities must have regard to a matter relating to climate change; and
 - (b) matters to which planning authorities are not required to have regard under section 12(2A); and
 - (c) how the requirement under section 12(2A) is to be met in relation to a particular matter.
- (3) The Minister's directions may apply, adopt or incorporate, with or without modification, any matter contained in any document, code, standard, rule, specification or method published by any authority or body whether as published at the time that the direction is made or as published from time to time.

Source: *Climate Change and Energy Legislation Amendment (Renewable Energy and Storage Targets) Act 2024*.

The Committee received submissions well before the commencement of the provisions of the *Climate Change and Energy Legislation Amendment (Renewable Energy and Storage Targets) Act 2024* but completed its report after the date of passage of the Legislation.

It is unclear how recent amendments to the Victorian planning scheme, including GC252, which rezoned land for the first 10 Activity Centres identified in *Plan for Victoria*, have regard to emissions reduction targets and climate change impacts as required under 12 (2A).

It is not clear how many more very significant amendments will be approved without the Ministerial directions being in place. The Committee assumes that it was the intention of the legislature that the Ministerial directions would be in place by now.

Whilst the Act received royal assent on 26 March 2024, its provisions relating to climate change considerations did not come into effect until 26 March 2025.

Box 5.9 Amendments to the *Planning and Environment Act 1987* (Vic): inserting a new objective

4 Objectives

- (2) The objectives of the planning framework established by this Act are
- (a) to ensure sound, strategic planning and co-ordinated action at State, regional and municipal levels;
 - ...
 - (d) to ensure that the effects on the environment are considered and provide for explicit consideration of social and economic effects when decisions are made about the use and development of land;
 - (da) to provide for explicit consideration of the policies and obligations of the State relating to climate change, including but not limited to greenhouse gas emissions reduction 20 targets and the need to increase resilience to climate change, when decisions are made about the use and development of land;
 - ...

Source: *Climate Change and Energy Legislation Amendment (Renewable Energy and Storage Targets) Act 2024* s 16.

Throughout the evidence to the Inquiry into climate resilience, it was clear that many stakeholders felt it was important that the planning system embed climate change considerations into its operations. Many argued for changes to the Planning and Environment Act. Box 5.10 summarises some of the evidence received discussing the need for Victoria's planning system to explicitly embed climate change.

Box 5.10 Stakeholders' views on embedding climate risk into Victoria's planning system

In responding to climate change, planning needs to look to the longer-term impacts and requires greater consideration of the impacts on future generations. This is sometimes incompatible with other objectives of planning and with the interests and obligations of some decision-makers. Climate change considerations must be made explicit, or they will continue to be overlooked in favour of policy considerations that are more explicitly spelled out within Planning Schemes

Council Alliance for a Sustainable Built Environment, *Submission 111*, p. 18.

(Continued)

Box 5.10 Continued

disconnect between high-level policy positions on climate change, both by state and local government, and the day-to-day decisions that are being made in Victoria's planning system

Victorian Greenhouse Alliances, *Submission 129*, p. 6.

it is essential to enhance coordination and guidance among key legislative and regulatory frameworks, including the Climate Change Act, Planning and Environment Act (PE Act), Building Code, and Marine & Coastal Act. Greater alignment between these acts will ensure that climate change considerations are embedded into all aspects of planning and development.

Bass Coast Shire Council, *Submission 181*, p. 3.

we are currently in the midst of a once-in-a-generation shift in how planning operates in this state. The scope of the reform that is happening at the moment is almost unprecedented, and we are very concerned that if we do not properly embed climate change considerations into these reforms, they will be guiding land use and development outcomes over the coming decades and potentially locking in outcomes which decrease the resilience of our communities at a time when we need to be dramatically ramping that up.

Jane Keddle, Vice President, Planning Institute of Australia (Victoria), public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 64.

We really need climate change to be elevated within the planning scheme in a way that is commensurate with the level of risk that it proposes.

Annika Kearton, Chief Executive Officer, Central Victorian Greenhouse Alliance, public hearing, Mount Macedon, 3 December 2024, *Transcript of evidence*, p. 8.

Several stakeholders acknowledged the new legislation, particularly its inclusion of climate objectives into the Planning and Environment Act. At a public hearing, Jane Keddle, Vice President of the Planning Institute of Australia (Victorian branch), discussed the changes:

One of the things we were very pleased to see is that recent change to the Planning and Environment Act in terms of there being a new objective that talks to explicit consideration of mitigation and adaptation through planning scheme review. When a planning scheme is changed, that is a really critical moment in time to make sure that you are checking in and you are aligning with those outcomes. That has been extremely positive.¹⁰⁴

¹⁰⁴ Jane Keddle, Vice President, Planning Institute of Australia (Victoria), public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 70.

The Victorian Greenhouse Alliances also supported the changes to the Planning and Environment Act. However, the Alliances contended that 'further measures will be required to operationalise [the] legislation', such as:

- approving the Elevating Environmentally Sustainable Design (ESD) Targets Planning Policy Amendment (see Section 5.5.2 below)
- implementing an ESD roadmap
- consulting with councils on potential further changes, including 'minimum energy and climate resilience standards for rental properties and existing homes at point of sale'.¹⁰⁵

The Committee acknowledges that the changes to the Planning and Environment Act represent progress towards ensuring climate considerations are built into Victoria's planning system. However, given the delay in the commencement of these provisions it is difficult for the Committee to assess their effectiveness. It notes that some stakeholders expressed concern that the changes will have a limited impact on strengthening Victoria's climate risk mitigation. Discussing the Renewable Energy and Storage Targets Act, the Federation of Community Legal Centres explained that:

The amendments will exist within a framework of central control through greenhouse gas reduction targets and ultimately the potential for directions to be made by the Minister. The amendments refer to impacts of climate change on envisaged land use or development and not likely contributions by the new land use or development to climate change. The amendments allow this narrow vector of climate change to be taken into account with respect to a planning authority making or amending a planning scheme but not a responsible authority making decisions about planning permits, including conditions on permits. Ultimately, the narrow vector of climate change considerations provided for has no express connection to considerations of climate or disaster justice.¹⁰⁶

The Committee is also concerned about the potential limitations of the new legislation. While these changes introduce climate considerations at a broader level—incorporated as overarching objectives or decision-making requirements—they may fall short of meeting the pressing challenges posed by current climate risks. Broadly framed objectives and requirements often lack the precision necessary to ensure meaningful action, especially in the absence of clear guidance or implementation frameworks. High-level statements of intent, such as policy objectives, cannot substitute for actionable regulatory measures.

Vague and loosely defined objectives or requirements are ineffective if unaccompanied by adequate guidance and details. Decision-makers need to know how those objectives or requirements are to be achieved or complied with. Statements of intent (such as high-level policy) cannot be equated with the actual regulatory response.

¹⁰⁵ Victorian Greenhouse Alliances, *Submission 129*, p. 7.

¹⁰⁶ Federation of Community Legal Centres, *Submission 259*, p. 24.

Decision-makers require practical guidance to assess decisions effectively in line with climate change objectives and requirements. Without such guidance, there is a risk that decisions may be incorrectly or insufficiently assessed, or that other, better-defined objectives with clearer implementation strategies may be prioritised. For example, cl 13.01 of the Victorian Planning Provisions highlights the challenges of broad policy approaches. While the clause aims to 'minimise the impacts of natural hazards and adapt to the impacts of climate change through risk-based planning',¹⁰⁷ it lacks specific guidance on how to achieve this objective. Strategies such as directing development to low-risk locations or developing adaptation responses for vulnerable settlements are broadly stated and provide little actionable direction.¹⁰⁸ This lack of clarity leaves decision-makers without the tools to translate high-level objectives into effective, on-the-ground actions.

The absence of prescriptive measures and performance indicators in the Victorian Planning Provisions underscores the broader issue of vague legislative frameworks for climate change. This is particularly problematic given the complexity of climate-related planning, which often extends beyond the jurisdiction of individual municipalities. While local councils can amend their planning schemes to address localised issues, climate change requires a coordinated response that transcends local boundaries.

Given the scale of climate change, the onus largely falls on the Victorian Government to:

- develop substantive climate resilience strategies
- implement those strategies by amending the Victorian Planning Provisions to provide content to climate change objectives and requirements.

A potential starting point for consideration is the Environmentally Sustainable Design requirements, which is discussed in the subsequent section. Additionally, ministerial directions are another avenue to provide more prescriptive guidance. The new legislative changes provide the Minister the power to issue ministerial directions in relation to climate change matters by which a planning scheme must be assessed.

FINDING 22: The inclusion of climate change considerations as explicit objectives in the *Planning and Environment Act 1987* (Vic) represents a significant step forward in embedding climate risk management into Victoria's planning framework, although concerns remain about its operationalisation and scope.

RECOMMENDATION 18: That the Victorian Government ensure that Ministerial directions under the new Section 12A of the *Planning and Environment Act 1987* are urgently issued so that planning decisions are clear on how they account for emissions reductions and climate impacts, including for planning scheme amendments to rezone for the next 50 activity centres identified in *Plan for Victoria*.

¹⁰⁷ Victorian Planning Provisions cl 13.01.

¹⁰⁸ Victorian Planning Provisions cl 13.01-15.

The Committee notes that the Housing Industry Association's concerns regarding the cumulative burden of planning and building regulations—particularly those introduced without coordination or alignment with the National Construction Code—is impeding the delivery of new housing and inflating costs for homebuyers. Discretionary Environmentally Sustainable Design standards applied through planning schemes often duplicate existing National Construction Code requirements, creating inefficiencies and confusion.

The Housing Industry Association argues for a temporary pause on the regulatory burdens that allow for a review to streamline existing frameworks, reduce duplication, and ensure that climate resilience measures are practical, cost-effective, and do not compromise housing affordability.

RECOMMENDATION 19: That the Victorian Government work with other jurisdictions to support a nationally consistent approach to climate resilience in the housing sector that supports both climate resilience and housing affordability.

5.5.2 Environmentally Sustainable Development Roadmap

Released in 2021, the *Environmentally Sustainable Development of buildings and subdivisions: A roadmap for Victoria's planning system* (ESD Roadmap) outlines the Victorian Government's framework to improve the environmental performance of buildings and subdivisions. It aligns with Victoria's climate goals, aiming to:

- reduce emissions
- enhance energy and water efficiency
- support biodiversity
- promote sustainable development.¹⁰⁹

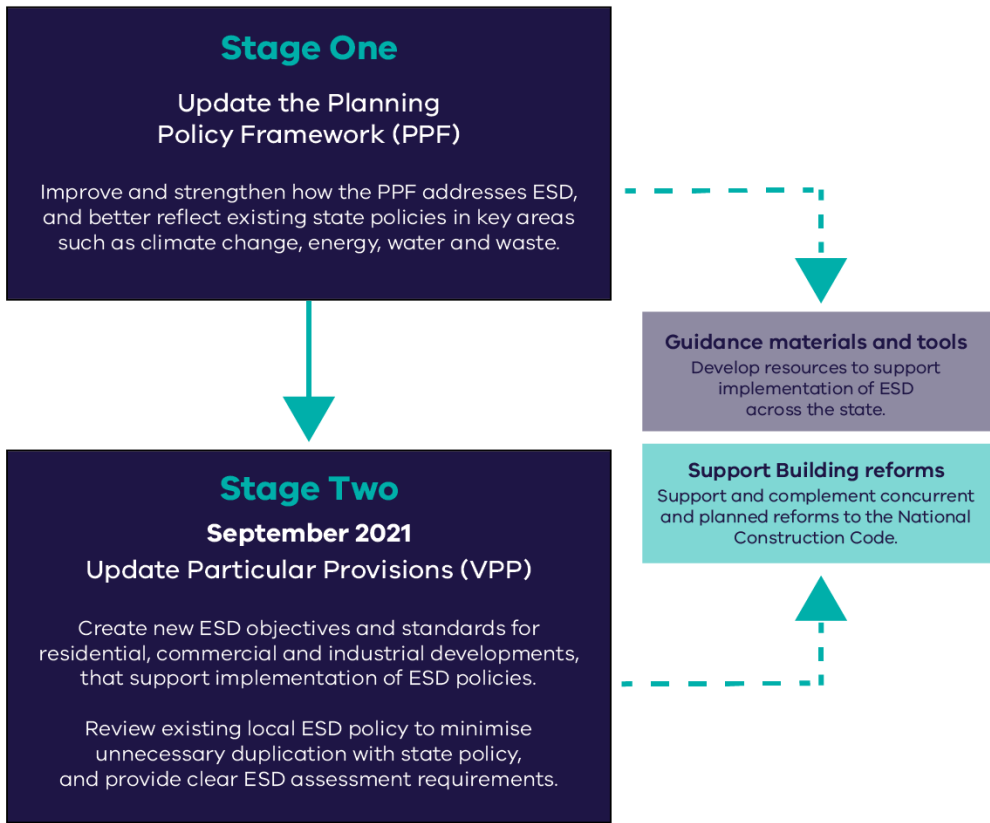
The ESD Roadmap focuses on key actions, including updates to planning policies to prioritise sustainability, setting measurable Environmentally Sustainable Design standards, and building capacity among planners and developers through training and resources. Stakeholder engagement and collaboration with government, industry, and communities are central to its implementation.¹¹⁰

Implementation is phased, beginning with short-term actions like policy updates and pilot programs, followed by broader rollouts in the medium term. Long-term goals focus on adapting to emerging needs and achieving sustainability benchmarks by 2050. Figure 5.4 summarises the goals of each stage of the ESD Roadmap.

¹⁰⁹ Land Department of Environment, Water and Planning, *Environmentally sustainable development of buildings and subdivisions: A roadmap for Victoria's planning system* Victorian Government, 2020.

¹¹⁰ Ibid.

Figure 5.4 Stages of the ESD Roadmap



Source: Department of Environment, Land, Water and Planning, *Environmentally sustainable development of buildings and subdivisions: A roadmap for Victoria's planning system* Victorian Government, 2020, p. 13.

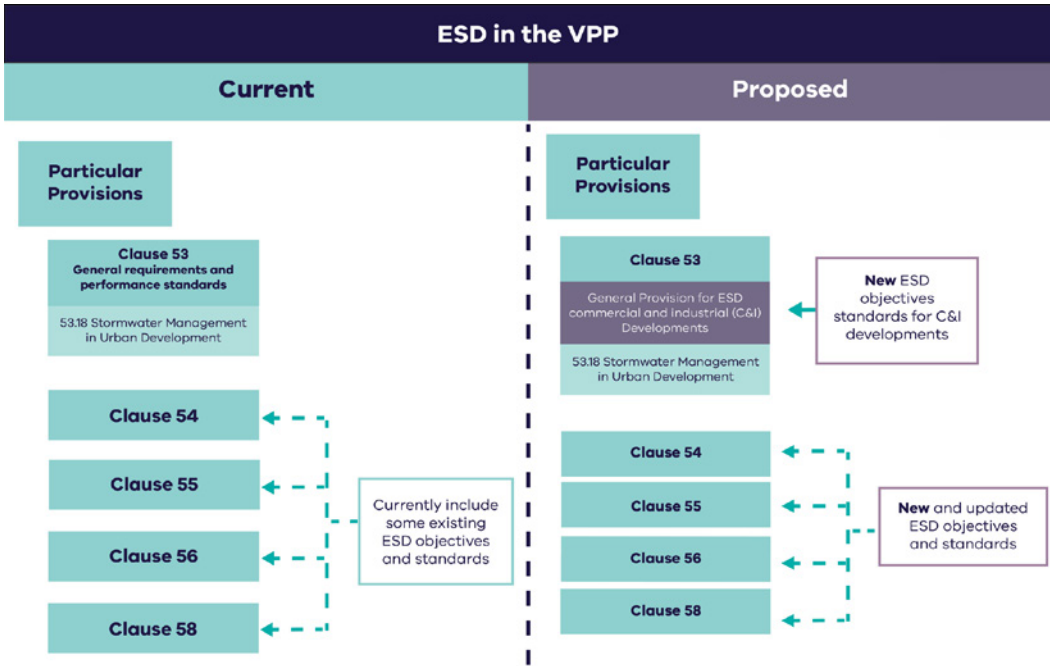
Despite initial intentions of the ESD Roadmap to be completed by September 2021, it is still incomplete. Stage One of the ESD Roadmap was implemented in June 2022 via planning scheme Amendment VC216. In its submission, the Municipal Association of Victoria explained Amendment VC216:

Amendment VC216 added consideration of climate change into the purpose of the Victoria Planning Provisions for the first time. This inclusion was a significant and exciting milestone, and culmination of much advocacy from local government and other advocates.¹¹¹

Stage Two of the Roadmap has not been completed. However, the Victorian Government has outlined the intentions of Stage Two as shown in Figure 5.5 below.

¹¹¹ Municipal Association of Victoria, *Submission 232*, p. 14.

Figure 5.5 Proposed update of particular planning provisions, Stage Two ESD Roadmap



Source: Department of Environment, Land, Water and Planning, *Environmentally sustainable development of buildings and subdivisions: A roadmap for Victoria’s planning system* Victorian Government, 2020, p. 15.

The Committee was informed that the ESD Roadmap, announced in 2021, has faced significant delays, leaving stakeholders frustrated with the lack of progress. Donna Taylor from Bass Coast Shire Council highlighted that despite the announcement of the Roadmap, little advancement has been observed, calling for renewed efforts to drive this important initiative forward.¹¹² Similarly, Natasha Palich from the Council Alliance for a Sustainable Built Environment pointed out that while the first phase of the roadmap introduced higher-level objectives, the second phase—detailing comprehensive standards—has not yet been issued. She noted that this phase might be integrated into broader planning reforms rather than presented as a cohesive Environmentally Sustainable Design package, suggesting uncertainty about its implementation.¹¹³

The Municipal Association of Victoria emphasised that Stage Two of the ESD remains incomplete three years after its launch, despite significant stakeholder consultation and the drafting of provisions. It noted that Stage Two contains ‘important planning provisions’, such as ‘urban cooling and greening as well as consideration of water management, air and noise pollution, apartment siting and recycling and resource recovery’.¹¹⁴ In response to these delays, the Municipal Association noted collective

¹¹² Donna Taylor, Acting General Manager, Place Making, Bass Coast Shire Council, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, p. 11.

¹¹³ Natasha Palich, Executive Officer, Council Alliance for a Sustainable Built Environment, public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 58.

¹¹⁴ Municipal Association of Victoria, *Submission 232*, p. 14.

efforts from local councils to implement Environmentally Sustainable Design initiatives through local planning scheme amendments:

Concerned over the slow progress of the roadmap and lack of ambition, 24 Victorian CASBE member councils lodged a planning scheme amendment to introduce planning policy that elevates sustainability requirements for new buildings and encourages a move towards net zero carbon development. The elevating targets amendment builds on the current ESD requirements for new developments and in doing so, aims to better protect the natural environment, reduce resource and energy consumption, and support the health and wellbeing of future dwelling occupants.

These councils are still waiting for a response from the Victorian Minister for Planning on the amendment.¹¹⁵

The Elevating ESD Targets Policy Amendment is discussed further in the Section below.

Bayside City Council expressed similar concerns about the stagnation of Stage Two of the ESD Roadmap, noting the lack of updates since mid-2023.¹¹⁶ The Council called on the Victorian Government to provide 'clarity regarding the prioritisation of the ESD Roadmap program in the current climate'.¹¹⁷

Baw Baw Shire Council stressed the importance of strong state government leadership to ensure Environmentally Sustainable Design policies are consistently applied across all Victorian municipalities:

Building on the 'ESD Roadmap' introduced through VC 216, more detailed and measurable targets are a vital next step to utilising Planning Policy levers to build climate change resilience. With State Government taking the lead on ESD Policy, in consultation with local government, standards for sustainability would become more uniform across municipalities rather than being a potential reflection of available Council resources.¹¹⁸

While the introduction of new Environmentally Sustainable Design standards was broadly supported (particularly among local councils), others expressed caution about the planning and building systems being subject to conflicting or overly cumbersome bureaucratic requirements. The Housing Industry Association contended that a common response to climate risk mitigation has been to introduce regulations which meet 'community expectations around improved environmental outcomes from urban development'.¹¹⁹ However, the Association noted that:

Sometimes without due cause, policy makers use planning systems to mandate new environmentally sustainable design (ESD) standards for development (e.g. 'green' tape).

¹¹⁵ Ibid.

¹¹⁶ Bayside City Council, *Submission 200*, p. 4.

¹¹⁷ Ibid.

¹¹⁸ Baw Baw Shire Council, *Submission 198*, p. 2.

¹¹⁹ Housing Industry Association, *Submission 26*, p. 3.

These reforms often duplicate or hold to a different standard than the NCC, a dwelling's environmental performance. HIA believes the National Construction Code (NCC) adequately manages this and needs to do so as it is not the domain of the planning system. The NCC provides the minimum necessary requirements for safety, health, amenity and sustainability in the design and construction of new buildings throughout Australia. There is a tendency for authorities to apply different discretionary ESD standards across the planning system for residential development, that are not consistent with the NCC.¹²⁰

Some stakeholders called for the reduction of 'green tape' to progress climate resilience projects.¹²¹ It is important to note that 'green tape' does not refer to environmental regulation in general. Rather, it refers to:

excessive regulation or rigid conformity to rules, which delays decision-making or results in unnecessary administrative or other burdens on businesses and communities, with no associated improvement to the protection of the environment.¹²²

It is important to ensure that ESD standards are not delayed unnecessarily due to regulatory burdens. The Committee notes that ESD standards are not inherently examples of 'green tape', rather these standards serve an essential role in advancing climate adaptation and mitigation by embedding sustainability into the planning system. However, governments should be mindful to ensure that such regulations are applied consistently, do not cause regulatory conflicts and are not overly burdensome to stakeholders. Striking a balance between effective regulation and streamlined processes is critical to achieving the dual goals of environmental protection and efficient project delivery.

FINDING 23: Stage Two of the Environmentally Sustainable Development Roadmap was to be completed in September 2021 and is now well behind schedule.

RECOMMENDATION 20: That the Victorian Government expedite the implementation of Stage Two of the Environmentally Sustainable Development Roadmap.

Evidence from the Wimmera and North Central CMAs also highlighted that many rural councils rely on outdated design standards that do not account for future climate scenarios. This limits the resilience of critical infrastructure such as roads, culverts, and drainage systems. Updating these standards will ensure that new and upgraded infrastructure is climate-fit and cost-effective over its lifecycle.

¹²⁰ Ibid.

¹²¹ See, for example: Luke Austin, Operational Delivery Manager, Wimmera Catchment Management Authority, public hearing, Mount Macedon, 3 December 2024, *Transcript of evidence*, p. 58.

¹²² Parliament of Australia, Standing Committee on the Environment, *Inquiry into Streamlining environmental legislation: Inquiry into streamlining environmental regulation, 'green tape', and one stop shops*, February 2015, p. 3.

RECOMMENDATION 21: That the Victorian Government review and update the Infrastructure Design Manual (IDM) and related engineering standards to reflect projected climate conditions, including increased rainfall intensity, prolonged droughts, and more frequent extreme weather events.

Elevating ESD Targets Planning Policy Amendment

On 21 July 2022, 24 local councils¹²³ lodged their respective Elevating Environmentally Sustainable Design (ESD) Targets amendment to the Minister for Planning. These amendments, which are coordinated in content, seek to 'introduce planning policy that elevates sustainability requirements for new buildings and encourages a move towards net zero carbon development'.¹²⁴

Key objectives include achieving net zero carbon emissions from operational energy use, supporting renewable energy integration, enhancing energy efficiency, and promoting sustainable transport and water management. Proposed standards encompass:

- achieving an average 7-star NatHERS rating for residential developments and specifying minimum requirements for onsite renewable energy generation
- encouraging the reuse of existing buildings, use of materials with recycled content, and design for future adaptability
- providing adequate bicycle parking, electric vehicle charging infrastructure, and designing car parking facilities to support sustainable transport modes
- reducing potable water use by at least 30%, managing stormwater runoff, and improving stormwater quality
- achieving a Green Factor score of 0.55 (0.25 for industrial uses) or ensuring a minimum percentage of site coverage comprises external landscaping
- reducing the urban heat island effect and designing for future climate impacts
- ensuring appropriate thermal comfort, natural ventilation, daylight access, and use of low-toxicity materials
- providing adequate waste and recycling infrastructure and facilitating separation and storage of various waste streams.¹²⁵

¹²³ The following councils are project partners of the Elevating ESD Targets initiative and have lodged amendments: Ballarat, Banyule, Bayside, Boroondara, Darebin, Frankston, Glen Eira, Greater Bendigo, Greater Dandenong, Greater Geelong, Hobsons Bay, Knox, Maribyrnong, Mitchell Shire, Moonee Valley, Mornington Peninsula Shire, Port Phillip, Stonnington, Strathbogie, Warrnambool, Whitehorse, Whittlesea and Yarra.

¹²⁴ Council Alliance for a Sustainable Built Environment (CASBE), *Elevating ESD Targets Planning Policy Amendment*, 2023, <<https://www.casbe.org.au/elevating-esd-targets>> accessed 7 January 2025.

¹²⁵ Built Environment Sustainability Scorecard (BESS), *Elevating ESD Targets*, 2024, <<https://factsheets.bess.net.au/elevating-esd-targets.html>> accessed 7 January 2025.

The Committee was made aware that little progress has been made to advance any of the 24 amendments lodged by local councils. Amendments were still pending authorisation from the Minister for exhibition. As such, councils involved in the initiative emphasised the need for their urgent advancement. Annika Kearton, Chief Executive Officer of the Central Victorian Greenhouse Alliance, explained that:

Victorian councils have been working together along with the Victorian Greenhouse Alliances to advance how ESD is addressed in the planning system, and in 2022, 24 Victorian councils, led by CASBE, lodged an elevating ESD targets amendment articulating minimum standards in key areas such as energy efficiency and green infrastructure. Two years on we continue to call for this amendment to be approved by the minister for exhibition.¹²⁶

Some councils provided insight into the progress of their amendments to demonstrate that they have stalled in the preliminary stages of the planning amendment process. In its submission, Bayside City Council detailed that following their July 2022 lodgement they 'received a letter from the Victorian Government on 3 August 2022 informing that the Amendment had been held for further review, with no further communication as to the progression of this review since this date'.¹²⁷

In March 2023, the Council Alliance for a Sustainable Built Environment wrote to the Minister for Planning requesting timelines for advancing the amendments.¹²⁸ In its submission, the Alliance said the Victorian Government advised that 'a decision on the authorisation request was pending completion of Stage 2 of the ESD Roadmap, flagged for the end of 2023'.¹²⁹ Amendments are still pending authorisation.

At a public hearing, Andrew McKeegan, Deputy Secretary of Planning and Land Services (Department of Transport and Planning), advised that:

There has been some really good work done within local governments in relation to those standards. The approach we have taken within the state is to look at all of those from the local government perspective and approach that from a statewide perspective, rather than sort of accept each of those standards within a particular planning scheme for one or a group of councils.¹³⁰

The Elevating ESD Targets amendments represents a significant effort from local councils to embed sustainability into their planning systems. The amendments outline ambitious, yet essential measures aimed at achieving net zero carbon emissions, improving energy efficiency, promoting sustainable transport, and enhancing water and waste management practices.

¹²⁶ Annika Kearton, Chief Executive Officer, Central Victorian Greenhouse Alliance, public hearing, Mount Macedon, 3 December 2024, *Transcript of evidence*, p. 6.

¹²⁷ Bayside City Council, *Submission 200*, p. 4.

¹²⁸ Ibid.

¹²⁹ Council Alliance for a Sustainable Built Environment (CASBE), *Submission 111*, p. 14.

¹³⁰ Andrew McKeegan, *Transcript of evidence*, p. 83.

Despite the comprehensive preparation and collaboration involved, progress on the amendments has stalled, with councils receiving little feedback or clarity regarding their advancement. The Committee notes that these delays are impeding the ability of local governments to take decisive action on sustainability. It is evident that there is a pressing need for the Victorian Government to expedite the authorisation process and establish clear timelines to support councils in their efforts to lead the transition towards environmentally sustainable development.

By advancing these amendments, Victoria has an opportunity to demonstrate leadership in sustainable urban planning, ensuring that new developments contribute meaningfully to mitigating climate change and enhancing community resilience.

The Select Committee's *Inquiry into Victoria Planning Provisions amendments VC257, VC267 and VC274* considered the impact of the new VC267 – known as the townhouse and low-rise code – on the application of Environmentally Sustainable Design standards to residential buildings.

In public hearings before the Select Committee, officials from the Department of Transport and Planning discussed the impact of the new Townhouse code on the application of the ESD standards. Andrew McKeegan stated:

Yes. Our aim is to try and lift that baseline and ensure that those elements are put within this. We appreciate that there are a couple of councils that are leaders and have done a lot of great work, and we continue to work with them and make sure that we can take onboard that. But I think it is critically important that we also make sure that we can lift the bar and bring some of the other councils along to a standard and a statewide position on that so we do not have a different approach in every individual area that is slightly different. I think that is the approach about bringing that up. I think that is a really important starting point, and then if there are any other additional things you can respond to, Colleen.¹³¹

Colleen Peterson added:

The approach has been, as Andrew has indicated, to raise the baseline. So for all 78 councils in Victoria there is now a minimum best practice for achieving sustainability in buildings, including energy systems, and that work is in concert also with the building regulations, which then require a 7-star energy rating for dwellings.¹³²

In response to whether there will be more environmental standards in this code than there were before, Colleen Peterson stated that 'Yes, there are.'¹³³

The Select Committee's final Report stated:

The townhouse code applies ESD standards to all homes in all local government areas. In many areas, these standards now exist where no standards existed previously. The

¹³¹ Andrew McKeegan, *Transcript of evidence*, p. 96.

¹³² Colleen Peterson, *Transcript of evidence*, p. 96.

¹³³ Ibid.

concern from many witnesses was about the lowering of ESD standards in those local government areas that have a local planning policy on ESD that is stronger than the ESD standards set out in clause 55. The 28 CASBE councils account for the majority of the State in terms of population and planning activity

The Committee heard evidence from the Department that, while it would consider improvements to the townhouse code necessary to address insufficient ESD standards, many ESD matters could be left to the Building Code to address. Dr Rowley, the Planning Institute of Australia (Victoria), the MAV and the CASBE councils disputed this argument and argued that ESD, especially in relation to 'passive design', is better addressed in the planning system.

FINDING 16: New environmentally sustainable development standards now consistently apply to residential developments under clause 55 of the Victoria Planning Provisions for all parts of the state, where they did not apply before. However, the effect of clause 55 of the Victoria Planning Provisions and the exemptions from clause 65 and the ability to consider local planning policies has had the effect of lowering some environmentally sustainable development standards in 28 local government areas. Whether the lifting of environmentally sustainable development standards across the state, and the lowering of some environmentally sustainable development standards in 28 local government areas, creates a net benefit overall, has not been proven.

RECOMMENDATION 11: That the Victorian Government promptly review and improve the environmentally sustainable development standards in clause 55 of the Victoria Planning Provisions with a view to ensuring the statewide standards meet the higher standards found in 28 local government areas.¹³⁴

The Committee notes that the provisions relating to climate change in the *Climate Change and Energy Legislation Amendment (Renewable Energy and Storage Targets) Act 2024* did not come into effect until 26 March 2025. Therefore, these considerations did not apply to the three planning scheme amendments that were the subject of the Select Committee Inquiry, including VC257. The Committee supports Recommendation 11 of the *Select Committee Inquiry into Victoria Planning Provisions amendments VC257, VC267 and VC274*.

RECOMMENDATION 22: That the Victorian Government monitor the impact of the new townhouse and low-rise code (VC267) on the application of Environmentally Sustainable Design (ESD) standards, and revise and improve any deficiencies that are identified with the application of the new code.

¹³⁴ Parliament of Victoria, Select Committee on Victoria Planning Provisions Amendments VC257, VC267 and VC274, *Inquiry into Victoria Planning Provisions amendments VC257, VC267 and VC274*, May 2025, pp. xi-xv.

5.6 Balancing fast-tracked approvals and community rights in renewable energy projects

Under the Development Facilitation Project, some state projects are eligible to utilise a fast-tracked approval process, including select renewable energy projects. Planning scheme VC242—approved in 2023—allows projects which are a ‘significant economic development’ to be exempt from the review rights contained in s 82(1) of the Planning and Environment Act.¹³⁵ Section 82(1) typically allows an objector to a proposed planning permit to apply to the Victorian Civil and Administrative Tribunal for ‘review of a decision of the responsible authority to grant a permit’.¹³⁶ Renewable energy projects under the Development Facilitation Project fall within this classification and are eligible to be exempt from the standard approval process and rights of review.¹³⁷

A media article published in March 2024 noted that under the changes, ‘from the time a complete application is lodged for one of the new state significant projects, decisions can be made within four months’.¹³⁸

Some stakeholders expressed concern about the challenges to review rights for these projects. These stakeholders felt that it would impede the social licence for such projects and unduly remove rights from the community and landholders. At a public hearing, Mayor Tom Crook from East Gippsland Shire Council reflected on the Government’s decision to reform the right for communities to appeal certain planning projects:

think any planning reform that takes the decision-making away from local communities or removes local communities’ capacity to influence decisions which impact their lives is not going to be received well by local communities, and we have seen some of that in recent times with solar farm developments around Bairnsdale. That is not to say that anybody is suggesting we do not need greater levels of renewable energy in our mix; everybody I think accepts that we do. It is more around the location and the placement of those particular assets, and there is definitely concern that council has had its capacity on behalf of community curtailed to have a say in best placement of where that infrastructure is to be put.¹³⁹

The Victorian Farmers’ Federation shared its concern that the lack of regulatory and community oversight for renewable energy development is adversely risking farm property and emergency service operations:

Regional communities are concerned about where they stand in relation to damage caused by or to renewable energy infrastructure, and the associated risks. To maintain

¹³⁵ Victorian Planning Provisions cl 53.22–4.

¹³⁶ *Planning and Environment Act 1987* (Vic) s 82(1).

¹³⁷ Department of Transport and Planning, *Development Facilitation Program*, 2024, <<https://www.planning.vic.gov.au/planning-approvals/planning-enquiries-and-requests/development-facilitation-program>> accessed 9 January 2025; Jane McNaughton and Jean Bell, ‘Renewable energy projects ‘acceleration’ by the Victorian government draws the fury of farmers’, *ABC News*, 15 March 2024, <<https://www.abc.net.au/news/rural/2024-03-15/renewable-energy-projects-acceleration-draws-fire-from-farmers/103588060>> accessed 9 January 2025.

¹³⁸ Jane McNaughton and Jean Bell, ‘Renewable energy projects ‘acceleration’ by the Victorian government draws the fury of farmers’.

¹³⁹ Cr Tom Crook, *Transcript of evidence*, p. 11.

community support for renewable energy it is critical that the sustainability of these facilities and their impact on agricultural production is central to their approval and management.¹⁴⁰

In its submission, Farmers for Climate Action emphasised the importance of social licence for critical projects such as renewable energy developments:

Without community support, it will be more difficult, costly, and in some cases, impossible to build the infrastructure that we need to move away from fossil fuels and build climate resilience in Victoria's energy systems.¹⁴¹

Others also questioned the impact these reforms could have on support for future renewable energy projects, particularly in affected communities.¹⁴²

The Federation of Community Legal Centres reflected on planning exemptions more generally, noting that:

the provisions that frame planning for climate resilience against anticipated bushfire and flood and support post-emergency recovery routinely exempt planning applications and activities from the usual requirements to provide:

- Notice of application requirements of s 52(1)(a), (b) and (d) PE Act.
- Notice of decision requirements of s 64(1), (2) and (3) PE Act.
- VCAT review rights for objectors under s 82(1) PE Act.¹⁴³

The Federation called for an end to the 'blanket exclusion of third parties from notice of proposed planning scheme amendments, planning permit applications, rights of objection, notification of planning decisions and rights to seek review'.¹⁴⁴

5.7 Climate considerations in Victoria's building system

Chapter 7 of this Report closely examines opportunities to improve the capacity of the building system to respond to climate risk and how the industry can adapt its practices to increase Victoria's climate resilience. This section outlines the building system approach to climate risk and resilience. The Committee notes this is not a detailed examination, rather introduces some of the key issues raised by stakeholders to situate climate considerations within the building industry.

Stakeholders emphasised that Victoria's building system must prioritise climate resilience to ensure long-term sustainability and the safety of communities. Throughout

¹⁴⁰ VFF Submission 252

¹⁴¹ Farmers for Climate Action, Submission 175, p. 2.

¹⁴² See, for example: Daniel Miller, Chief Executive Officer, Gunnaikurnai Land and Water Aboriginal Corporation, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*; Stephen Duncan, Treasurer, Inverloch Surf Life Saving Club, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*.

¹⁴³ Federation of Community Legal Centres, Submission 259, p. 23.

¹⁴⁴ Ibid.

the Inquiry, several issues emerged about the ways the building system considers climate resilience. Andrew McKeegan from the Department of Transport and Planning outlined how the building system manages climate risk and promotes resilience, highlighting its 'critical role in ensuring construction standards are continually improved over time and are based on developments in technology and on new information about climate change and hazard exposure'.¹⁴⁵ He further noted specific practices in place:

- It defines minimum construction standards and performance measures tailored to site-specific constraints and risks.
- Regular updates to building standards aiming to enhance resilience against natural hazards like bushfire, flooding, and severe storms.
- From 1 May 2024, new Victorian houses and apartments must comply with updated National Construction Code energy efficiency standards, increasing the thermal shell insulation and glazing requirements from 6- to 7-star under the Nationwide House Energy Rating Scheme.
 - Modelling suggests that 7-star homes in Melbourne will maintain effective performance across climate scenarios until 2090, benefiting occupants with lower energy bills, increased resilience during extreme weather, and adaptation to climate change.
- Following recommendations from the Royal Commission into National Natural Disaster Arrangements, building ministers agreed to include a new climate change objective in the National Construction Code. The expanded objectives recognise the need for buildings to be more resilient to extreme weather events and enable periodic updates to address climate change impacts on housing and community facilities.¹⁴⁶

Whilst the Victorian building system recognises the importance of addressing climate change, it also faces significant challenges in embedding climate resilience into its framework. Recent updates, such as the introduction of the 7-star energy efficiency standards in the National Construction Code, reflect an effort to improve energy efficiency in homes. However, while these updates promote mitigation strategies by reducing energy consumption, some stakeholders expressed concern that they do not adequately address broader climate adaptation concerns. Jane Keddie, Vice President of the Planning Institute of Australia (Victoria), noted that:

The NCC does not deal with climate adaptation at the moment, it deals with energy efficiency. Obviously that is an important component in terms of mitigation, but it is not the same thing and it does not always align with those objectives.¹⁴⁷

The distinction between these two aspects is critical, as adaptation measures, such as designing homes to withstand extreme weather, remain largely unaddressed in

¹⁴⁵ Andrew McKeegan, *Transcript of evidence*, p. 75.

¹⁴⁶ Ibid.

¹⁴⁷ Jane Keddie, *Transcript of evidence*, p. 65.

the current standards. Jane Keddle provided an example of 'climate-safe housing' to demonstrate the distinction between a build which is 'climate resilient' versus 'energy efficient':

what is a climate-safe house? There is kind of a national standard that you might want to look at in terms of building regulations, but there are also spatial considerations in terms of what a climate-resilient home is, because there are different hazards which will affect different areas. I think that is where the planning system becomes really important, because it allows the targeting of that regulation to make sure that in particular areas where we do have climate hazards that we have either got now or that are going to increase over time, we can target those particular areas so we are not throwing a blanket everywhere, we are actually thinking about where those controls might be best targeted.¹⁴⁸

The Committee was told that one of the building system's key limitations is the lack of integration between energy efficiency and climate resilience. The current approach allows for a variety of energy-efficient design, some of which may not align with climate adaptation objectives. For example, while the National Construction Code focuses on achieving energy efficiency ratings, it does not consider whether these methods also enhance the resilience of homes to climate hazards such as flooding, extreme heat, or bushfire.

Moreover, the building system operates within a broader planning context that struggles with inconsistent application and guidance across jurisdictions. Local governments, often resource-constrained, face difficulties implementing state-level policies effectively, leading to uneven outcomes in climate resilience.

In addition, the building system's ability to support informed decision-making is hampered by a lack of accessible and transparent data on climate hazards. Both consumers and builders face uncertainty when planning construction projects, as there is insufficient clarity about future risks such as sea-level rise or flood zones. Keith Ryan, Executive Director (Victoria) at the Housing Industry Association, highlighted the industry's need for more 'information and certainty for builders and developers', particularly concerning planning for long-term climate risk.¹⁴⁹

While recent reforms, such as changes to the Planning and Environment Act that mandate consideration of mitigation and adaptation, represent positive steps forward, they remain insufficient on their own. Greater coordination across legislative frameworks, including the Building Code and the Marine and Coastal Act, is needed to align efforts and close gaps in the current system. Without such integration, the Victorian building system risks embedding vulnerabilities that will exacerbate the challenges of a changing climate. The emphasis must shift toward creating homes and communities that are not only energy-efficient but also capable of withstanding the climate challenges of the future.

¹⁴⁸ Ibid.

¹⁴⁹ Keith Ryan, Executive Director, Victoria, Housing Industry Association, public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 65.

Councils and industry stakeholders highlighted barriers to climate-resilient design such as the 'very limited guidance on such matters', making it difficult for local government to undertake effective climate risk assessments without external support.¹⁵⁰ Mayor Tom Crook of East Gippsland Shire Council advocated that 'the Victorian Government should really look to provide this critical assistance by developing standard guidance models and methodologies' to support climate-resilient design and investment decisions.¹⁵¹

Jane Keddie from the Planning Institute of Australia (Victoria) emphasised the risk Victoria faces if changes are not made to the building system to improve its uptake of climate-resilient design. She told the Committee:

what is happening now is we are currently in the midst of a once-in-a-generation shift in how planning operates in this state. The scope of the reform that is happening at the moment is almost unprecedented, and we are very concerned that if we do not properly embed climate change considerations into these reforms, they will be guiding land use and development outcomes over the coming decades and potentially locking in outcomes which decrease the resilience of our communities at a time when we need to be dramatically ramping that up.¹⁵²

Stakeholders also pointed out the financial barriers to implementing climate-resilient infrastructure. For instance, the Bass Coast Shire Council representatives reported that 'within the last five years the cost of reconstruction of [their] assets has doubled, and that is without factoring in the requirements of climate change'.¹⁵³ Similarly, Yarra City Council emphasised that 'adaptation investment, particularly in new or upgraded public infrastructure, is far outside the financial capacity of local government'. It requires coordinated state and federal government action to bridge the adaptation financing gap.¹⁵⁴

While the Victorian building system has made progress with energy efficiency standards and climate resilience initiatives, significant challenges remain. Stakeholders emphasise the need for better integration of resilience into building codes, clearer guidance for local government, and coordinated state action to address financial and data barriers. Current reforms present a critical opportunity to embed climate adaptation alongside mitigation, ensuring homes and communities are prepared for future climate risks. Without these changes, the system risks entrenching vulnerabilities rather than enhancing resilience.

FINDING 24: The Victorian building system acknowledges climate risk but requires stronger integration of adaptation measures, clearer guidance, and coordinated support to ensure resilient and sustainable communities.

¹⁵⁰ Cr Tom Crook, *Transcript of evidence*, p. 2.

¹⁵¹ Ibid.

¹⁵² Jane Keddie, *Transcript of evidence*, p. 64.

¹⁵³ Donna Taylor, *Transcript of evidence*, p. 4.

¹⁵⁴ Yarra City Council, *Submission 25*, p. 1.

5.8 How does Victoria's planning system consider: Adaptation, preparation and mitigation

There is no one silver bullet to fix the planning system or in the planning system to fix mitigation or adaptation or resilience – it relies on many, many changes.

Natasha Palich, Executive Officer, Council Alliance for a Sustainable Built Environment, public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 55.

The current planning system has resulted in the creation of a range of locked-in climate risks.

City of Yarra, *Submission 25*.

5.8.1 Adaptation

Box 5.11 What is climate adaptation?

Climate 'adaptation' means making changes to processes, practices, and structures to respond to the impacts of climate change. It involves governments and communities coming up with solutions and taking action to deal with the current and future effects of climate change.

Source: Legislative Council Environment and Planning Committee.

The Committee heard that the Victorian planning system faces significant challenges in integrating climate resilience into its framework, creating barriers to adaptation. Stakeholders contended that the Victorian planning system lacks provisions to mandate climate adaptation in new developments. As a result, some considered it insufficient to deal with issues such as urban flash flooding, heat islands, and thermally unsafe housing.

One of the core issues raised by stakeholders was a perceived lack of agility in the planning system. It was contended that an agile planning system is essential for climate adaptation because it allows for flexibility in responding to uncertain and evolving climate impacts.¹⁵⁵ An agile planning system can ensure:

- efficient resource use
- incorporation of new data and technologies
- changes address localised needs.

¹⁵⁵ Stephen Angus, *Transcript of evidence*, p. 59.

An agile planning system strengthens resilience by enabling quick adjustments, learning from setbacks, and tackling interconnected risks effectively. In its submission, the City of Port Phillip contended that:

There are barriers in place within the planning system that discourage the adaptation of existing building stock to improve climate resilience and mitigate impacts. A stronger suite of exemptions, standards, policies and practice note guidance is required to facilitate redevelopment. This is particularly relevant in areas that are impacted by overlays, such as design and development, neighbourhood character or heritage overlays.¹⁵⁶

To increase the agility of the planning system so that it can improve its adaptability to climate-related risks, stakeholders suggested a variety of measures:

- streamline approval pathways for planning amendments to reduce delays
- empower councils to implement locally relevant climate adaptation measures
- adopt flexible and iterative planning frameworks that can be updated based on new climate data, evolving risks, and emerging technologies
- fast-track high-priority climate resilience projects
- improve coordination between jurisdictions to align objectives, share resources, and enhance collaboration
- regularly review and reform planning regulations to eliminate outdated provisions
- establish dedicated funding streams and staged grants
- enhance the planning system's responsiveness by enabling climate-focused amendments, even for large state-led projects, and integrating local expertise and data.¹⁵⁷

Natasha Palich, Executive Officer of the Council Alliance for a Sustainable Built Environment, emphasised that while building and planning regulations must continue to support greenhouse gas mitigation and climate-safe buildings, land-use planning is critical for community adaptation and resilience.¹⁵⁸ She criticised Victoria's planning system for prioritising growth over climate resilience, arguing that the climate crisis must be integral to future planning.¹⁵⁹ Palich highlighted:

Our planning system determines where and what we will build. It also has the potential to deliver a state-led approach to hazard mapping and meaningful urban greening, which is a key global cooling strategy – I think that we are going to start to talk more about global cooling efforts in the future. Our planning system also has the potential to provide a science-informed approach to managing risk.¹⁶⁰

¹⁵⁶ City of Port Phillip, *Submission 155*, p. 5.

¹⁵⁷ Council Alliance for a Sustainable Built Environment, *Submission 111*.

¹⁵⁸ Natasha Palich, *Transcript of evidence*, p. 55.

¹⁵⁹ Ibid.

¹⁶⁰ Ibid.

Delays in approving planning scheme amendments have further hindered Victoria's adaptation progress. These delays are discussed in detail in Section 5.2 above. As shown in that section, planning scheme amendments have been stalled, leaving councils unable to implement necessary adaptation measures. These delays undermine the ability of local government to address emerging climate risk effectively.¹⁶¹

Alongside amendment delays, councils also expressed concern that the current planning system limits local governments' ability to implement locally specific climate actions, reducing their capacity to address unique risks within their jurisdictions.

Jane Keddie of the Planning Institute of Australia emphasised the importance of tailoring regulations to specific climate hazards, noting:

I think that is where the planning system becomes really important, because it allows the targeting of that regulation to make sure that in particular areas where we do have climate hazards that we have either got now or that are going to increase over time, we can target those particular areas so we are not throwing a blanket everywhere, we are actually thinking about where those controls might be best targeted.¹⁶²

The complexity of ensuring adaptation is appropriately embedded in the planning system was made clear to the Committee. Throughout the evidence, stakeholders raised a number of concerns with the current operation of the system which they believed hindered its capacity to be adaptable. Issues raised included:

- Exemptions for large state projects result in missed opportunities to incorporate Environmental Sustainable Development (ESD) measures.
- Retrofitting older buildings to meet current or projected climate conditions is challenging due to outdated regulations and funding gaps.
- Inadequate housing policies have left vulnerable populations in thermally unsafe rental and public housing, increasing their climate exposure.
- The planning system limits local councils' ability to implement climate-specific actions tailored to their unique risks.
- A perceived tendency that the system prioritises heritage preservation over retrofitting.

Whilst these issues are concerning, the Committee has focused on two key concerns that were raised by a significant number of stakeholders: retrofitting and the capacity for a locally specific response. These are discussed in greater detail in Chapters 6 to 8.

FINDING 25: Stakeholders expressed concern that Victoria's planning system lacks agility and sufficient provisions for climate resilience and delays adaptations, limiting its ability to address evolving climate risk.

¹⁶¹ See, for example: Tiffany Crawford, *Transcript of evidence*.

¹⁶² Jane Keddie, *Transcript of evidence*, p. 65.

5.8.2 Preparation

Box 5.12 What is climate preparation?

Climate 'preparation' means taking steps to prepare for the impacts of climate change, like assessing risks, planning for vulnerabilities, and protecting people, infrastructure, and ecosystems. The aim is to reduce harm, build resilience, and adapt to changes.

Source: Legislative Council Environment and Planning Committee.

Victoria's planning system plays a crucial role in managing risk associated with climate change while supporting sustainable growth. Stakeholders acknowledged progress in incorporating climate resilience measures, such as construction standards and hazard overlays, yet significant challenges remain. Key concerns include the integration of climate adaptation into planning frameworks, inequities in resource distribution, and the need for greater agility to address emerging threats effectively.

Pete Mercouriou, Senior Sustainability Officer at the City of Greater Geelong, viewed the current planning system as 'suitable for today' but expressed concerns about its long term adequacy, particularly in addressing climate resilience.¹⁶³ He highlighted a critical issue with integrating street trees into new estates, as these compete with existing infrastructure like telecommunications and utilities. While progress has been made, such as adopting a seven-star construction code and moving away from gas in new developments, challenges persist. Further, inequities in tree coverage, especially in areas like North Geelong, exacerbate climate resilience issues:

For lot of homes in the northern parts of Geelong, which are very hot parts of the area, those street trees which the new estates might be getting do not exist in those areas, so that is inequitable. So delivering that across the board is going to be a challenge. From the planning scheme, pulling trees into the foreground at the beginning and having those conversations with infrastructure is highly important, particularly when we are talking about climate resilience.¹⁶⁴

Martin Gill, Chief Executive Officer of the Borough of Queenscliffe, acknowledged that the Victorian planning system has made progress in mitigating risks by implementing tools like the bushfire management overlay and the significant inundation overlay. However, he noted that these tools, while effective, can become diluted over time due to competing interests, such as the pressures of housing affordability and the influence of developers adept at navigating and exploiting gaps in planning regulations. Gill highlighted the challenge of balancing growth and safety, using Torquay as an example of rapid development in areas vulnerable to bushfire and coastal risks. He

¹⁶³ Pete Mercouriou, Senior Sustainability Officer, City of Greater Geelong, public hearing, Aireys Inlet, 23 October 2024, *Transcript of evidence*, p. 7.

¹⁶⁴ Ibid.

emphasised that while the planning system has effective tools, their application could be more robust and consistent to address these challenges effectively.¹⁶⁵

Regulatory burden was identified by other stakeholders as a key driving factor in weakening the capacity of the planning and building sectors to prepare for climate challenges. The following issues were highlighted by stakeholders as affecting Victoria's preparedness:

- Current planning schemes lack adequate provisions for addressing climate risk, leading to developments that exacerbate issues like urban heat islands, flash flooding, and unsafe housing.
- Key climate resilience amendments face lengthy delays in approval and implementation. However, some cautioned that additional regulations can also create compliance challenges and increase housing costs.
- Planning frameworks are too broad and lack the granularity needed for localised and context-specific climate adaptation measures.
- Historical developments have locked in climate risks, with older housing and infrastructure being particularly vulnerable to current and future climate conditions.
- Local councils face financial barriers in upgrading infrastructure due to limited funding and restrictions on using disaster recovery funds for improvements beyond simple replacement.

Luke Austin, Operational Delivery Manager of the Wimmera Catchment Management Authority, provided an example of how regulatory burden can impact the advancement of a resilience project:

in the township of Warracknabeal there, they have got an area there which has significant build-up in the Yarriambiack Creek, with significant sediment from stormwater. It needs to be cleaned out. It took us 12 months to get through the environmental approvals to get that project underway, and it is still not underway. That was originally planned to go back in January, and we are still planning to get that done shortly. They need to look at the net overall benefit.¹⁶⁶

An example of the impact of delayed resilience projects is discussed in Section 5.5.2 above in relation to the Elevating Environmentally Sustainable Design Target Policy Planning amendments.

As previously discussed, another key component of ensuring that the planning system is prepared for future climate challenges is its capacity for agility. An agile planning system has processes and controls in place to respond more rapidly to emerging challenges. Stakeholders expressed concern that Victoria's system lacks agility meaning its capacity to prepare for challenges is hindered.

¹⁶⁵ Martin Gill, *Transcript of evidence*, p. 7.

¹⁶⁶ Luke Austin, *Transcript of evidence*, p. 65.

In the context of flood risk preparation, Jane Keddie from the Planning Institute of Australia (Victorian branch) told the Committee that:

if we talk about the agility of the planning system, again remaining with flooding, we are also on record as saying that we need to get more dynamic in terms of our actual responses as well. At the moment the way we approach planning for flood hazard is we go, 'Right, there is this type of flood event at this one point in time and the flood level is this, and then we raise our floor level above that.' In a context where what that level is is going to be changing quite a lot over the coming decades, we do not think that is potentially the right approach in terms of delivering climate-resilient housing.¹⁶⁷

She noted that Queensland takes a different approach which is more agile and prepared to manage flood risks:

In other states, like Queensland, they have a slightly different approach where flood resilience is much more than just raising the floor level. It goes to the materials and it goes to the construction techniques et cetera when you are in one of those flood-prone areas. Certainly we think there is a fundamental rethink needed in terms of how we deal with flood hazard as we move into these new times.¹⁶⁸

Similarly, the City of Stonnington argued that the 'current planning and building approvals systems are not adequate or sufficiently responsive for climate change mitigation or adaptation'.¹⁶⁹ The Victorian Greenhouse Alliances raised concerns that there is:

a disconnect between high-level policy positions on climate change, both by state and local government, and the day-to-day decisions that are being made in Victoria's planning system.¹⁷⁰

Many submissions identified the current failure to adequately consider adaptation in planning not just in terms of individual buildings, but at the whole precinct level. For example, with respect to the significant investment and renewal that is envisioned by the Victorian Government for metropolitan Melbourne at precinct scale, the Planning Institute of Australia (Victoria) noted:

there is no requirement that these precincts undertake an assessment and deliver a meaningful response to adaption – a 'climate change response plan' remains an 'optional extra' under Victoria's recently updated Precinct Structure Planning Guidelines.¹⁷¹

While Victoria's planning system has made strides in addressing climate risk through initiatives such as hazard overlays and updated construction standards, substantial gaps remain in its capacity to effectively adapt to future challenges. Stakeholders have identified critical issues, including regulatory delays, inequities in resource distribution,

¹⁶⁷ Jane Keddie, *Transcript of evidence*, p. 70.

¹⁶⁸ Ibid.

¹⁶⁹ City of Stonnington, *Submission 42*, p. 4.

¹⁷⁰ Victorian Greenhouse Alliances, *Submission 129*, p. 6.

¹⁷¹ *Submission 258*, p. 8.

and insufficient integration of climate adaptation into planning processes. The need for a more agile and dynamic system, capable of responding to emerging threats such as flooding and urban heat islands, is evident. By prioritising resilience, fostering collaboration, and bridging the disconnect between policy and implementation, Victoria's planning framework can better prepare communities for the long-term impacts of climate change while maintaining a balance between growth, equity, and safety.

FINDING 26: A best practice planning system is agile, equitable, and effectively integrates climate adaptation measures to address the long-term impacts of climate change.

RECOMMENDATION 23: That the Victorian Government review the Victoria Planning Provisions and *Planning and Environment Act 1987* to ensure that climate adaptation considerations are embedded in the planning stage at a precinct level, as well as individual buildings.

5

5.8.3 Mitigation

Box 5.13 What is climate mitigation?

Climate mitigation means taking action to reduce greenhouse gas emissions or remove them from the atmosphere. This helps slow down climate change and its effects.

Source: Legislative Council Environment and Planning Committee.

The Victorian planning system has foundational elements that recognise the importance of climate mitigation. As noted in Chapter 2, Victoria has established greenhouse emissions reduction targets. Established in 2023, Victoria's current targets seek to reduce emissions to 75–80% below 2005 levels by 2035, and achieve net-zero emissions by 2045.¹⁷² However, stakeholders widely agree that the planning system requires significant enhancements to meet these targets. There were calls for the Victorian Government to provide 'detailed, consistent, and actionable guidance'.¹⁷³

In its submission, Bass Coast Shire Council advocated for:

Clearer integration of climate adaptation plans, consistent application of scientific data, enhanced stakeholder collaboration, and targeted provisions for resilient built forms and infrastructure are crucial to strengthening the system's adequacy in addressing climate change impacts.¹⁷⁴

¹⁷² Environment and Climate Action Department of Energy, *Victoria's 2035 Emissions Reduction Target*, Victorian Government, 2023, p. 5.

¹⁷³ Bass Coast Shire Council, *Submission 181*, p. 6.

¹⁷⁴ Ibid.

Concerns were raised that the current focus on housing supply and affordability has unfortunately been sidelined due consideration of long-term climate mitigation. However, these issues can, and should, be considered together. Bayside City Council emphasised this, stating:

long term housing affordability and cost of living go hand in hand with climate resilience. This is supported by the Victorian Government's own research into all electric homes, which showed saving to energy bills of \$1000 per annum in new homes, whilst reducing household emissions.

Although the Victorian Government has a target of achieving net zero emissions by 2045, there has been little change to the planning schemes, with no clarity or certainty as to how this goal will be able to be achieved. The inclusion of any climate change mitigation in the planning scheme is critical in allowing the matter to be considered by decision makers.¹⁷⁵

Similarly, Urban Futures (RMIT University) discussed the significant role of urban planning in achieving climate mitigation goals. The research institute reflected on the government's housing targets to raise concerns about potential impacts on mitigation if climate considerations are not acknowledged:

Planning for new urban environments can greatly contribute to climate mitigation and emissions targets. The recently announced local government housing targets place a significant role on new residential development and supporting infrastructure in many locations but without appropriate targets for transport options, local work and services and targets for energy efficiency in buildings these developments risk embedding long-term emissions impacts and limiting future adaptation. New urban precincts should be aiming for net-zero outcomes through building design and neighbourhood design.¹⁷⁶

Many stakeholders reflected on the role of the planning system to enable climate mitigation. Jane Keddie from the Planning Institute of Australia (Victoria) told the Committee that:

Planning and the decisions made through the planning system really have either a foundational or an enabling role in almost all of the changes that we know we need in order to respond to climate change, and that is both the delivery of state-endorsed mitigation targets but also obviously climate-resilient communities.¹⁷⁷

The importance of ensuring mitigation is considered not only at the individual building stage, but at the precinct and subdivision planning stage was emphasised in multiple submissions. However, as highlighted by the Council Alliance for a Sustainable Built Environment, currently the planning system is failing to do so:

Current planning practices at precinct scale, including huge areas of greenfield development, as well as more standard subdivisions, are failing to take into consideration the scale of change needed to standard practice. This is a key barrier, as

¹⁷⁵ Bayside City Council, *Submission 200*, p. 3.

¹⁷⁶ Urban Futures (RMIT University), *Submission 222*, p. 14.

¹⁷⁷ Jane Keddie, *Transcript of evidence*, p. 63.

once these foundations are set through the subdivision and precinct planning stages, they are very difficult to change or to retrofit. Many of these areas will still be developing when a net zero target is envisaged to be met.¹⁷⁸

Missed opportunities in expanding green infrastructure can exacerbate climate risks and undermine mitigation. A significant missed opportunity related to the limited uptake, removal and lack of replacement of canopy trees was highlighted in the evidence.¹⁷⁹ Development practices, along with utility-related pruning, have resulted in substantial losses in urban tree canopy cover.¹⁸⁰ Despite the critical role tree canopies play in climate resilience—mitigating urban heat islands and enhancing biodiversity—existing policies are fragmented across councils, leading to inconsistent protection and expansion efforts.¹⁸¹ Tree and canopy retention as an important climate resilience measure is discussed further in Chapter 8.

Furthermore, several State-funded major projects, such as the Big Housing Build, are not subject to some planning scheme requirements, including Environmentally Sustainable Design requirements. This potentially further undermines mitigation goals. The City of Stonnington expressed concerns over this exemption:

Whilst minimum targets against sustainability tools such as Green Star and ISCA are typically stated by State Government in their tendering of such projects, there appears to be limited oversight or scrutiny by suitably qualified professionals in State Government to ensure that selected targets in the tools are appropriate to the project area, that sustainability issues of most concern are addressed, or that if a sustainability treatment is applied (e.g. WSUD features), that these are appropriate, fit for purpose and operate correctly once constructed. Whilst Council holds significant information about local climatic issues, desired sustainability outcomes, and expertise in installation and application of sustainability interventions, local government authorities are excluded from the Big Build planning process and are unable to share this knowledge to the detriment of an appropriate climate response and sustainability outcome for such projects.¹⁸²

The Committee notes that the Victorian Government has indicated that all new homes constructed under the Big Housing Build will meet:

- minimum 7-star Nationwide House Energy Rating Scheme energy efficiency standard
- minimum 5-star Green Star certification
- housing designed in accordance with the Liveable Housing Design Guidelines – Silver Level
- new shared green and open spaces to promote community building.¹⁸³

¹⁷⁸ Submission 111, p. 18.

¹⁷⁹ See, for example: Urban Futures (RMIT University), *Submission 222*; Labor Environment Action Network, *Submission 61*; Youth Affairs Council Victoria, *Submission 142*; Climate Action Merri-bek, *Submission 197*.

¹⁸⁰ Urban Futures (RMIT University), *Submission 222*, p. 10.

¹⁸¹ Ibid.

¹⁸² City of Stonnington, *Submission 42*, p. 5.

¹⁸³ Homes Victoria, *Lowering our environmental impact*, 2024, <<https://www.homes.vic.gov.au/lowering-our-environmental-impact>> accessed 21 January 2025.

As this Chapter has highlighted, mitigation efforts in the planning system can face systemic challenges, including gaps in the planning framework, insufficient funding, and limited integration of climate-resilient practices into major infrastructure projects. While progress has been made with some Environmentally Sustainable Design reforms, broader adoption of higher sustainability standards is needed to address climate risks effectively. The Council Alliance for a Sustainable Built Environment noted:

The ESD local policies lay a solid foundation for climate responsive building designs, but they do not go far enough to support zero carbon emissions and climate resilient buildings.¹⁸⁴

Enhanced Environmentally Sustainable Design standards, particularly at the design stage, are critical to delivering long-term climate benefits.

Stakeholders also expressed that the current building regulations, such as the National Construction Code, could be improved to better address climate risk, including urban heat and material resilience. The City of Stonnington believed that 'state planning provisions should also enable councils to introduce planning scheme amendments that seek to manage identified local climate risks through locally relevant planning requirements'.¹⁸⁵ Chapter 7 considers opportunities to improve building practices and standards to better achieve climate resilience and mitigation goals.

The planning system is foundational in enabling the State to meet its climate mitigation goals, yet significant gaps and challenges hinder its effectiveness. The Committee acknowledges that the Victorian Government has established greenhouse gas reduction targets. It echoes stakeholders concerns that the current planning framework requires greater clarity, consistency, and actionable guidance to achieve these objectives. The integration of climate adaptation plans, reliance on scientific data, and strengthened collaboration between stakeholders are all essential to ensuring the planning system supports climate mitigation comprehensively.

Evidence presented to the Committee highlights several missed opportunities to enhance mitigation efforts, including the limited application of green infrastructure and the insufficient incorporation of sustainability standards in state-funded projects. These oversights could mean exacerbating climate vulnerabilities and embedding long-term emissions impacts. Furthermore, the focus on housing affordability, while critical, should not be at the expense of climate resilience. Addressing these issues together, as advocated by stakeholders, can provide holistic and sustainable solutions that benefit communities and the environment alike.

FINDING 27: Effective climate mitigation is essential to reducing greenhouse gas emissions, slowing the impacts of climate change, and safeguarding both communities and ecosystems for future generations.

¹⁸⁴ Council Alliance for a Sustainable Built Environment (CASBE), *Submission 111*, p. 2.

¹⁸⁵ City of Stonnington, *Submission 42*, p. 5.

FINDING 28: Addressing gaps in Victoria's planning framework, such as the inconsistent application of climate-resilient measures and missed opportunities in green infrastructure, is vital to effectively mitigating climate risks and meeting Victoria's net-zero emissions targets.

RECOMMENDATION 24: That the Victorian Government provide clear guidance within the planning system regarding tree canopy coverage and vegetation, with a view to retaining existing canopy trees and vegetation where possible, and achieving at least 30% tree canopy coverage as outlined in Plan for Victoria.

RECOMMENDATION 25: That the Victorian Government review the Victoria Planning Provisions and Planning and Environment Act to ensure that climate mitigation is embedded in the planning stage at a precinct and subdivision level, as well as for individual buildings.

5

5.9 Committee comment: Importance of state-led reform

legislative triggers to address climate resilience in state-led and local planning development proposals are absent

Trevor Budge, Chair, Planning, Tourism and Environment sub-committee, Emerald Village Association, public hearing, Emerald, 10 October 2024, *Transcript of evidence*, p. 16.

Through this Inquiry, the Committee has determined the need for state-led reform of Victoria's planning system to address the growing challenges posed by climate change, urbanisation, and evolving community needs. Evidence presented to this Committee highlighted the essential role of the Victorian Government in leading reforms that promote consistency, efficiency, and alignment across all municipalities. A stronger State role is fundamental to embedding resilience and sustainability into the planning framework, ensuring it is equipped to meet both current demands and future uncertainties.

One of the key advantages of state-led reform is its capacity to enhance consistency and fairness across the planning system. By providing statewide guidance and implementing updates to planning schemes, governments can ensure uniform application of climate resilience measures and standards. Minister-led amendments and statewide overlays, such as those for flooding or bushfire risk, reduce administrative and financial burdens on local councils while fostering equitable outcomes, particularly for resource-constrained rural and regional areas.

A more centralised approach can also enable timely responses to emerging risks. Climate change presents urgent and complex challenges, yet delays in implementing planning scheme amendments and updating overlays have left many communities vulnerable. A state-coordinated process can expedite these updates, ensuring the

planning system evolves in step with contemporary risks and incorporates best practice approaches. This is especially critical in areas exposed to extreme weather events or long-term climate impacts, where outdated provisions can exacerbate vulnerabilities.

As noted previously, these delays currently occur at many stages in the planning process, including at the State government level. Therefore, it cannot be assumed that centralisation will automatically improve efficiency, and appropriate structures and resourcing will be critical.

The alignment and integration of legislative frameworks, such as the Climate Change Act and the Planning and Environment Act, are critical to embedding climate considerations throughout the planning process. High-level objectives must translate into enforceable actions at the local level. As Stephen Swart, Director of Sustainability and Culture at the Rural City of Wangaratta, noted:

There is also maybe some policy direction within the planning scheme that could be strengthened at a state government level. You may be aware that within the planning system right now there is state-level policy, there is regional-level policy and then local. So mechanisms already exist, but there is probably in my mind not very strong policy when it comes to these matters, resilience specifically.¹⁸⁶

Strengthening state-level policy direction is essential to ensuring that resilience is consistently prioritised and integrated across all levels of the planning framework.

State-led reform also has a vital role in building the capacity and resources of local councils. Many councils, particularly those in regional areas, lack the technical expertise and funding to manage complex tasks such as climate risk modelling or comprehensive planning scheme amendments. The Victorian Government can address this gap by providing targeted support, clear guidelines, and resources to empower councils to deliver effective local outcomes within a consistent statewide framework.

Finally, the Government is uniquely positioned to balance the competing priorities inherent in the planning process. Economic, social, and environmental objectives often intersect and conflict, and a robust state-led framework can ensure that long-term climate resilience and sustainability goals are not deprioritised. Ministerial directions and updates to the planning framework can elevate the importance of these objectives, ensuring they are consistently considered in planning decisions.

Victoria stands at a critical moment where decisive state-led reforms can transform its planning system to better meet current and future challenges. By fostering collaboration across all levels of government, streamlining processes, and embedding resilience into planning frameworks, the Victorian Government can create a system that is not only fit for purpose today but also protects communities, the environment, and future generations.

¹⁸⁶ Stephen Swart, *Transcript of evidence*, pp. 9–10.

The committee notes that while centralisation of some aspects of the planning system with respect to climate change considerations could improve consistency and efficiency, it does not replace the role of councils and local communities in climate adaptation and mitigation. The importance of local knowledge in ensuring climate resilience measures are contextually appropriate and gain social licence are discussed in Chapters 6 to 9.

5.10 Inquiry into Victoria Planning Provisions amendments VC257, VC267 and VC274

As discussed in Chapter 3, the Final Report of the Select Committee into Victoria Planning Provisions Amendments VC257, VC267 and VC274 noted that the purpose of the three amendments was 'to increase housing, and to implement Victoria's Housing Statement.'¹⁸⁷ These amendments introduce new zones with streamlined planning pathways and assessments.¹⁸⁸ The three amendments will produce distinct built environments, as areas where they apply reflect unique planning requirements. Consequently, the Findings and Recommendations from the *Inquiry into Victoria Planning Provisions amendments VC257, VC267 and VC274* hold significant relevance to this Inquiry, given their direct connection to built environment planning and construction.

The Final Report of the Select Committee into Victoria Planning Provisions Amendments VC257, VC267 and VC274 identified significant concerns regarding consultation, environmental safeguards, and third-party rights. The amendments aim to streamline housing development, yet the Findings indicate that environmental protections are at risk of being undermined.¹⁸⁹ Key Recommendations call for better safeguards, transparency, and adherence to past reform advice to ensure balanced and sustainable planning outcomes.¹⁹⁰ The Committee believes that implementing these recommendations would lead to better climate resilience outcomes for the built environment.

The Committee wishes to note that these amendments represent a small part of the picture in relation to the legislative and regulatory environment for building and planning, and climate related activity in Victoria. For example, in relation to tree canopy, a concern of the Select Committee inquiry, a proposal in *Plan for Victoria* is to introduce new controls to prevent the unnecessary removal of mature trees.

Box 5.14 presents the key findings and recommendations relevant to this Inquiry's Terms of Reference, particularly regarding the Victorian planning system's adequacy in adapting to, preparing for, and mitigating climate change impacts.

¹⁸⁷ Parliament of Victoria, Select Committee on Victoria Planning Provisions Amendments VC257, VC267 and VC274, *Inquiry into Victoria Planning Provisions amendments VC257, VC267 and VC274*, May 2025, p. 13.

¹⁸⁸ Parliament of Victoria, Select Committee on Victoria Planning Provisions Amendments VC257, VC267 and VC274, *Inquiry into Victoria Planning Provisions amendments VC257, VC267 and VC274*, May 2025, pp. 7–11.

¹⁸⁹ Parliament of Victoria, Select Committee on Victoria Planning Provisions Amendments VC257, VC267 and VC274, *Inquiry into Victoria Planning Provisions amendments VC257, VC267 and VC274*, May 2025, pp. xi–xv.

¹⁹⁰ Parliament of Victoria, Select Committee on Victoria Planning Provisions Amendments VC257, VC267 and VC274, *Inquiry into Victoria Planning Provisions amendments VC257, VC267 and VC274*, May 2025, pp. xi–xv.

Box 5.14 Key Findings and Recommendations from the Report for the Inquiry into Victoria Planning Provisions amendments VC257, VC267 and VC274 that concern the planning system's ability to deliver climate-resilient built environments

RECOMMENDATION 4: At a minimum, modification of planning scheme amendments should be undertaken after a round of genuine consultation with councils and communities.

FINDING 8: The Committee makes no conclusions about whether amendment VC257 gives proper effect to the objectives of planning in Victoria, but finds that the controls introduced by VC257 have the potential to give proper effect to the objectives depending on how their local schedules are drafted and where they apply.

FINDING 13: Victoria Planning Provisions amendment VC267's exemption in clause 55 of the Victoria Planning Provisions from the requirements of the decision guidelines at clause 65 represents a substantial change to how residential development assessments are conducted where planning permits are required.

FINDING 14: The clause 65 decision guidelines of the Victoria Planning Provisions assist in guiding sound planning decisions. The most important are the guidelines that require consideration of risks to human life and health, and to the environment. These include:

- any significant effects the environment, including the contamination of land, may have on the use or development
- the effect on the environment, human health and amenity of the area
- factors likely to cause or contribute to land degradation, salinity or reduce water quality
- the extent and character of native vegetation and the likelihood of its destruction
- the degree of flood, erosion or fire hazard associated with the location of the land and the use, development or management of the land so as to minimise any such hazard.

FINDING 15: Without being presented with any evidence to the contrary, the Committee is concerned that clause 55 of the Victoria Planning Provisions may lead to the excessive removal of existing trees and reduce tree canopy.

RECOMMENDATION 7: The decision guidelines of clause 65 of the Victoria Planning Provisions should apply to all decisions made under clause 55. This is most important where risks to human life and health, and to the environment, should be identified and managed.

RECOMMENDATION 8: The Victorian Government work with councils to manage flood, bushfire and climate hazard risks and improve identification of risks to human life and health, and to the environment, in the Victoria Planning Provisions, including the planning scheme amendment process for overlays with up to date modelling.

(Continued)

Box 5.14 Continued

RECOMMENDATION 9: That the Victorian Government publish and release modelling regarding the expected impact of the planning scheme amendments on tree canopy and vegetation in areas affected by the changes.

RECOMMENDATION 10: That the Victorian Government make improvements to clause 55 of the Victoria Planning Provisions including the addition of a separate landscaping objective and standards, and changes to the tree canopy cover objective and standards. The introduction of any improvements should be undertaken as early as possible.

FINDING 16: New environmentally sustainable development standards now consistently apply to residential developments under clause 55 of the Victoria Planning Provisions for all parts of the state, where they did not apply before. However, the effect of clause 55 of the Victoria Planning Provisions and the exemptions from clause 65 and the ability to consider local planning policies has had the effect of lowering some environmentally sustainable development standards in 28 local government areas. Whether the lifting of environmentally sustainable development standards across the state, and the lowering of some environmentally sustainable development standards in 28 local government areas, creates a net benefit overall, has not been proven.

RECOMMENDATION 11: That the Victorian Government promptly review and improve the environmentally sustainable development standards in clause 55 of the Victoria Planning Provisions with a view to ensuring the statewide standards meet the higher standards found in 28 local government areas.

FINDING 18: The planning amendments mark a reduction in long standing third party appeal rights in the planning system.

FINDING 19: The Committee makes no conclusions about whether amendment VC274 gives proper effect to the objectives of planning in Victoria, but finds that the controls introduced by VC274 have the potential to give proper effect to the objectives depending on how their local schedules are drafted and where they apply.

FINDING 20: The Victorian Government failed to implement the recommendations of the Victorian Auditor-General in 2008 and 2017 to create a performance and continuous improvement mechanism for the Victoria Planning Provisions. This has contributed, in part, to the problems with the planning system that the amendments are trying to solve

RECOMMENDATION 12: That, after consultation with relevant stakeholders, the Victorian Government act on the recommendations of the Victorian Auditor-General from 2008 and 2017 in relation to the performance and continuous improvement of the Victoria Planning Provisions.

Source: Parliament of Victoria, Select Committee on Victoria Planning Provisions Amendments VC257, VC267 and VC274, *Inquiry into Victoria Planning Provisions amendments VC257, VC267 and VC274*, May 2025, pp. xi–xv.

FINDING 29: The Final Report of the Select Committee into Victoria Planning Provisions Amendments VC257, VC267 and VC274 demonstrates that the Amendments make significant changes to the existing 'res code' and the new townhouse code has raised Environmentally Sustainable Design standards in some areas, and lowered standards in others.

RECOMMENDATION 26: That the Victorian Government continue to monitor the impact of recent amendments to the Victorian Planning Provisions, especially VC267, in relation to Environmentally Sustainable Design, and revise as required to ensure the reforms are working as intended.

Chapter 6

Challenges to ensuring a resilient built environment

Victoria's built environment, such as infrastructure, housing, and essential services, is facing increasing risk from climate change. Ensuring a climate-resilient built environment requires proactive investment, adaptive planning, and strong collaboration between all levels of government, industry, and communities.

This Chapter explores the key barriers to building resilience in Victoria's built environment, including funding constraints, planning system limitations, gaps in climate risk data, and challenges in securing community support. It particularly highlights the structural and financial obstacles that hinder the ability of local councils to adapt critical infrastructure and examines the broader systemic issues affecting resilience efforts across the state. Addressing these challenges will require coordinated action, long-term investment, and policies that prioritise future climate risk.

Many of these concerns were raised in the Committee's *Inquiry into the 2022 flood event in Victoria*, which highlighted significant gaps in flood preparedness, land-use planning, and emergency response capabilities. The Victorian Government's response to the Inquiry acknowledged the scale of these challenges and outlined commitments to improve flood governance, enhance community awareness of flooding risk, and invest in critical infrastructure.

6.1 Barriers for local government

Local governments play a critical role in ensuring a climate-resilient built environment. The Committee heard that they face a range of barriers that limit their ability to effectively plan for and respond to climate risks. Councils manage essential infrastructure, including roads, drainage, public buildings, and energy networks, which are increasingly vulnerable to climate change impacts. However, their ability to adapt these assets and implement resilience measures is constrained by financial, regulatory, and structural challenges.

This Section examines the key barriers local governments encounter, including funding constraints, limitations in the planning system, gaps in climate risk data, and challenges in securing community support for resilience initiatives. While some councils have taken steps to improve infrastructure resilience, many struggle with insufficient resources, inconsistent policy frameworks, and difficulty engaging communities in long-term adaptation efforts. Addressing these barriers requires a coordinated, statewide approach that empowers local governments. Funding, data, planning tools, and community engagement strategies are critical to building climate-ready infrastructure and protecting communities from emerging risks.

6.1.1 Funding constraints

Local governments are on the frontline of responding to climate change impacts on infrastructure and the built environment. However, councils across Victoria face significant funding constraints that limit their ability to undertake necessary resilience-building projects. These constraints stem from rate capping, limited access to long-term funding, and the financial burden of maintaining aging infrastructure in the face of increasing climate risk.

Improving climate resilience has become more complex and expensive due to the increasing frequency and intensity of climate risks. It is a growing problem for Victorian communities, with the financial burden growing for local councils. Mayor Tom Crook from East Gippsland Shire Council reiterated this challenge for councils:

So we are seeing more of our infrastructure damaged more often and that is increasingly challenging for council to manage, as was mentioned, not just under the rate cap but with limited capacity to raise those additional funds for betterment when we are building back.¹

Bernie O'Sullivan from Macedon Ranges Shire Council echoed these concerns, arguing that the 'ability for Victorian councils to keep up with regular asset maintenance and renewal to invest in upgrades for climate resilience is severely hampered by resource and funding constraints'.² He highlighted that these pressures are exacerbated by rate capping, rising inflation, labour shortages, and increasing construction and maintenance costs, as well as the ongoing need to respond to successive climate-related disaster events.³ Uncertainty around future climate impacts further complicates planning for essential infrastructure, including power, water supply, stormwater, and sewage systems. The Committee heard that at present, infrastructure is designed for current climate conditions, rather than future projections. Bernie O'Sullivan warned:

The sector is generally not modelling future climate scenarios, and there is a risk that infrastructure that is being delivered today is not being designed to adequately accommodate future climate conditions. This puts communities at risk. Including future climate projections and flood modelling into infrastructure design will in turn increase the cost of construction and ongoing maintenance.⁴

Local councils maintain a vast and diverse network of infrastructure and essential assets, including roads, drainage systems, public buildings, and energy and transport infrastructure. For areas at high risk of climate hazards, the financial burden can be twofold: restoration of damaged infrastructure and assets, and upgrading to withstand future climate impacts. Ensuring a climate resilient built environment must therefore go

¹ Cr Tom Crook, Mayor, East Gippsland Shire Council, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, p. 6.

² Bernie O'Sullivan, Chief Executive Officer, Macedon Ranges Shire Council, public hearing, Mount Macedon, 3 December 2024, *Transcript of evidence*, p. 3.

³ Ibid.

⁴ Ibid.

beyond sole reliance on disaster recovery funding. While post-disaster funding helps rebuild affected areas, many regions that have not yet experienced major climate disasters still require investment to strengthen resilience, mitigate future risks, and prepare for increasing climate variability. Without proactive funding, councils remain stuck in a reactive cycle, unable to implement long-term climate adaptation measures, or to aim for betterment when rebuilding.

As an example, East Gippsland Shire Council raised concerns about stormwater drainage infrastructure, noting that:

For some other infrastructure types, such as critical drainage infrastructure, there really currently is very little support available, so we would suggest that the Victorian government needs to support local government to plan for climate resilience through non-competitive funding rounds that support councils to design and upgrade non-road infrastructure – you know, drainage, community halls and footpaths – because these things too are most vulnerable to the impacts of a changing climate.⁵

Similarly, the City of Stonnington stated that local drainage infrastructure is ‘substantially under capacity’ and requires a dedicated State or Federal funding stream, similar to the Roads to Recovery model.⁶ Without this investment, councils will continue to struggle with urban flooding, which is worsening due to increased rainfall intensity and urbanisation.

It is forecast that by the year 2100, there will be an 18.5% increase in rainfall intensity in Australia. Current preliminary predictive flood modelling indicates this will markedly increase flooding in Stonnington. As a result of this and increases in development within Stonnington over the last 50–100 years, we consider that Council drains are substantially under capacity.

City of Stonnington, *Submission 42*, p. 3.

The City of Melbourne emphasised that public transport, electricity networks, and emergency services infrastructure are at heightened risk, warning that without state investment, the resilience of these essential services will continue to decline. To effectively prepare communities for climate change, funding must extend beyond disaster recovery efforts and ensure councils can proactively strengthen their infrastructure before extreme events occur.⁷

The Victorian Greenhouse Alliances discussed the ‘significant barriers’ to accessing betterment funding, with councils often needing to provide upfront investment themselves:

Local governments in Victoria experience significant barriers to accessing funds for betterment of damaged assets and infrastructure following disaster events. Under current Disaster Recovery and Funding Arrangements (DRFA) in Victoria, councils

⁵ Cr Tom Crook, *Transcript of evidence*, p. 3.

⁶ City of Stonnington, *Submission 42*, p. 3.

⁷ City of Melbourne, *Submission 75*.

are funded to return assets and infrastructure to their pre-disaster state. Resilience improvements are often not funded, or only partially funded through the DRFA, with councils generally required to pay for these upgrades themselves.⁸

Whilst Mayor Tom Crook acknowledged that betterment can result in long-term financial benefits for local councils, he emphasised the immediate financial constraints can make it difficult. He stated that there are upgrades councils can take which increase resilience even where betterment is not funded:

Assets obviously have a lifespan, so is it better to build back better when that lifespan expires or when the asset is destroyed? Of course it is. But there is a lot that we can do in terms of adapting our existing assets to make them more resilient to the impacts of climate change, whether that is making them more resilient to floods or fire – even extreme heat is a great example. There is a huge opportunity in in our region to look at the energy efficiency of individual buildings, and it is simple stuff like door seals and in-ceiling insulation so people are less exposed to that extreme heat during summer days, which we know actually kills more people than all other disasters combined. There are some real opportunities in that space, I think.⁹

Yarra City Council highlighted that councils are best placed to manage localised climate risks but lack the necessary resources.¹⁰ The Council acknowledged that adaptation investment can have long-term financial benefits—such as lower restoration or repair costs—but local councils often cannot afford the upfront investment. However, its submission emphasised that the ‘return on this investment is significant’.¹¹ It referenced analysis from the Insurance Council of Australia which suggested that resilience funding could provide returns of \$8.10 for every \$1 invested by 2050.¹² Similarly, the City of Melbourne noted that the costs of adapting cities and infrastructure are escalating, with the average annual damages to its assets from climate hazards projected to increase by 1,200% in the next 75 years. The submission called for long-term secure funding to enable councils to undertake necessary resilience upgrades.¹³

Where government funding is in place, councils report that most climate resilient funding programs are short-term, highly competitive, and do not allow for long-term planning. The City of Stonnington criticised the structure of existing grant programs:

Current disaster recovery funding initiatives often only allow the replacement of infrastructure like for like, which precludes councils from upgrading drainage infrastructure to prevent or better respond to future floods. Restructuring grants to allow for ‘betterment’—as in Category D funding under the [Disaster Recovery Funding Arrangements]—would be enormously beneficial for councils and communities.¹⁴

⁸ Victorian Greenhouse Alliances, *Submission 129*, p. 3.

⁹ Cr Tom Crook, *Transcript of evidence*, p. 11.

¹⁰ Yarra City Council, *Submission 25*, p. 1.

¹¹ Yarra City Council, *Submission 25*, p. 1.

¹² Ibid.

¹³ City of Melbourne, *Submission 75*, p. 1.

¹⁴ City of Stonnington, *Submission 42*, p. 6.

This issue was also raised by Gippsland Alliance for Climate Action in public hearings, where representatives noted that in contrast Queensland's betterment model¹⁵ has proven successful, with 79% of upgraded projects avoiding subsequent damage.¹⁶ Stakeholders' perspective of the Disaster Recovery Funding Arrangements is discussed further in the Section below; and the need for a betterment approach is discussed in Section 6.3.

In addition, councils face barriers to accessing private finance for climate adaptation. Yarra City Council called on the Victorian and Federal Governments to 'both directly fund local government adaptation investments, and to establish frameworks that mobilise public and private capital into the adaptation financing gap'.¹⁷

The lack of availability of private, or alternative, funding streams means councils rely almost wholly on disaster relief funding to maintain essential assets. This is despite access to disaster funding being seen as complex and restrictive, adding to the financial and administrative burden on councils already struggling to respond to climate impacts. Bernie O'Sullivan from Macedon Ranges Council discussed this issue, explaining that while insurance and Commonwealth disaster recovery funding are the two primary funding sources available to councils, strict qualification criteria and exclusions mean they do not fully cover the financial costs of extreme weather events. This leaves councils shouldering significant unbudgeted expenses, particularly for smaller disasters that do not meet funding thresholds but still require costly local response efforts.¹⁸

In the context of Macedon Ranges which 'has been impacted by 22 severe weather events that have qualified for disaster recovery funding arrangements in the past 10 years',¹⁹ Bernie O'Sullivan raised several concerns:

- Even in areas at high-risk of frequent extreme weather events, many smaller events do not qualify, despite requiring substantial council expenditure.
- For events that fall outside disaster funding arrangements, councils must cover infrastructure repairs, debris clearing, waste disposal, pothole patching, and road grading, leading to substantial financial strain.
- Extreme weather events are the largest financial strain on councils. For example, a 2021 major windstorm cost Macedon Ranges Shire Council \$21 million, with \$5.6 million in costs not reimbursed despite government assistance.
- The financial impact of disasters extends beyond direct expenses, creating additional burdens through staff overtime and burnout, higher administrative costs, internal investigations into asset failures, contractor shortages, and delays in routine services.

¹⁵ Betterment funding typically provides upfront investment for infrastructure projects. Infrastructure betterment is repairing or rebuilding damaged assets so that they can withstand future disasters.

¹⁶ Tiffany Crawford, Co-Director, Climate Change and City Resilience, City of Melbourne, public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 5.

¹⁷ Yarra City Council, *Submission 25*, p. 1.

¹⁸ Bernie O'Sullivan, *Transcript of evidence*, p. 2.

¹⁹ Ibid.

- Even when funding is available, claims processing is slow and resource intensive. Claims made following the 2021 windstorm event took nearly three years to finalise, delaying financial recovery and adding further stress on council resources.²⁰

The increasing frequency and severity of climate-related disasters are placing unprecedented financial strain on local councils, which are responsible for maintaining essential public infrastructure. Current funding mechanisms, including disaster recovery grants and insurance, are insufficient and often inaccessible, leaving councils to absorb substantial unbudgeted costs. This reactive approach not only limits councils' ability to recover but also prevents them from proactively strengthening infrastructure to withstand future climate risk.

In the Committee's view, to ensure councils can adequately prepare, adapt, and build long-term resilience, a more diversified and sustainable funding model is required. This should include dedicated funding for climate adaptation projects, as well as mechanisms to attract private sector investment in resilience infrastructure. Expanding financial options will allow councils to future-proof public assets, reducing reliance on post-disaster funding and minimising long-term costs to both local communities and the State.

FINDING 30: For many local councils, climate adaptation and resilience investment, particularly for upgrading public infrastructure, stretches their financial capacity.

FINDING 31: The increasing frequency and intensity of extreme weather events means that a more flexible and proactive funding approach is needed to support councils in both emergency response and long-term climate resilience efforts.

RECOMMENDATION 27: That the Victorian Government explore options for diversifying funding streams for local councils to adapt important public infrastructure to be more climate resilient, including considering providing financial incentives for private investment in resilient infrastructure.

Disaster Recovery Funding Arrangements

The Disaster Recovery Funding Arrangements (DRFA) are a collaborative cost-sharing initiative between the Commonwealth and state governments, designed to support relief and recovery activities following eligible disasters.²¹ These arrangements encompass various categories of assistance:

- Category A addressing 'early relief and recovery activities'

²⁰ Ibid.

²¹ Victorian Government, *Disaster Recovery Funding Arrangements*, 2024, <<https://www.vic.gov.au/disaster-recovery-funding-arrangements>> accessed 2024.

- Category B specifically addressing the restoration of essential public assets, such as roads, bridges, and public buildings
- Category C and D are activated in extraordinary circumstances for additional support.²²

Under the DRFA, the standard approach mandates like-for-like ‘restoration’, meaning that damaged assets are to be rebuilt to their original form and function. This approach means that infrastructure is restored to its pre-disaster state without enhancements or improvements, even in circumstances where the asset has been damaged in multiple disasters. However, many stakeholders expressed concern about this approach because of the limitations it places on building resilience, particularly in not allowing for the upgrading or strengthening of assets to better withstand future disasters (betterment).

The Municipal Association of Victoria noted that climate change is already causing significant infrastructure damage, with councils facing mounting costs. It provided estimates from the Australian Local Government Association on repair costs following the 2022 major flood event:

The Australian Local Government Association (ALGA) estimated that repairs to roads in Victoria, NSW, South Australia and Queensland following the 2022 floods would cost \$3.8 billion – more than the annual spending on local road maintenance in each of these states. This repair is still being completed in Victoria.²³

The Municipal Association of Victoria reflected on the existing DRFA model, particularly its emphasis on like-for-like restoration and the burden on councils to fund betterment. It contended that:

Unless a dedicated betterment stream is established through Category D of the DRFA, councils that wish to improve the infrastructure by designing and developing to more modern or disaster-resilient solutions must fund the improvement component in full.²⁴

The City of Greater Bendigo echoed these concerns, reporting that some councils may need to cover up to 75% of reconstruction costs due to the interpretation of the DRFA guidelines, placing significant strain on council budgets. For example, it noted that while DRFA funding covers gravel road re-sheets at a depth of 50-75mm, councils typically re-sheet to 100mm, leaving them to fund the additional cost:

The cost of gravel re-sheeting for one flood impacted council in our Northern Victorian Emergency Management Cluster will be more than \$10 million. Full funding for restoration costs to contemporary design and service levels standards is therefore imperative to ensure that assets are returned to a fully functional and serviceable state without imposing unreasonable or impractical financial and delivery burdens of councils.²⁵

²² Ibid.

²³ Municipal Association of Victoria, *Submission 232*, p. 10.

²⁴ Ibid.

²⁵ City of Greater Bendigo, *Submission 158*, p. 11.

A local example of incurred betterment costs for Council is Spillway Road, Eppalock which was impacted by the 2011 floods and again by the October 2022 floods. Approximately 150 metres of the road was severely compromised/undermined requiring closure of the road to through traffic. Council applied through DRFA to renew the road, however experience demonstrated that the road was susceptible to future flood damage if reconstructed to the same standard as applied after 2011 (like for like). As a result, Council is electing to cover the additional \$340,000 cost above and beyond like for like reinstatement, to upgrade the road to a higher standard to reduce the risk of flood damage in the future. Such investment will in effect reduce the likelihood or extent of future DRFA claims, however is having to be funded by Council.

City of Greater Bendigo, *Submission 158*, p. 11.

It was suggested that the current DRFA model applies a narrow interpretation of allowable works for funding. Stakeholders emphasised the current model is predicated on 'restoration'—often understood as like-for-like repair—rather than betterment and improvement. The City of Greater Bendigo provided an example of inefficiencies in the funding arrangements:

current funding would cover rectification of isolated defects such as scours on gravel roads due to flooding but would not cover grading of the rest of the road as it would be considered betterment. This results in the inefficient use of both state and local government resources or excessive delays in completing flood restoration works, i.e. delaying works to when peripheral renewal works may be scheduled which may prove challenging in the context of community expectations as well as complying with the 2 year timeframe to lodge eligible DRFA claims.²⁶

The narrow application of allowable works under the DRFA has resulted in increased complexity and administrative burdens, often resulting in delays in funding being procured for much needed works. Several local councils expressed frustration with protracted administrative processes under the DRFA. Ian Ellett, Director of Infrastructure Services at Indigo Shire Council, argued that councils often feel they are in a 'constant recovery phase' and that the time taken to secure funding is the most significant factor. He told the Committee:

So here we are two, two and a half years on from significant events in the region, and we, like a lot of councils, are still awarding contracts and putting tenders out. It is the time taken to get there. I think tidying up, reviewing, revising and streamlining our disaster recovery funding process would certainly speed that up.²⁷

Similarly, delays in triggering disaster recovery funding can be a significant burden for councils who may need to incur costs if immediate and urgent work is needed.

²⁶ City of Greater Bendigo, *Submission 158*, p. 11.

²⁷ Ian Ellett, Director Infrastructure Services, Indigo Shire Council, public hearing, Wangaratta, 4 December 2024, *Transcript of evidence*, p. 10.

Kim O'Connor argued that the event declaration process is another barrier to funding access. Both state and federal governments must formally declare a disaster event, with a financial impact threshold before councils can apply for funding. Kim O'Connor told the Committee that:

I think the trigger is about a few hundred thousand dollars, so councils are then carrying that as part of the operation. So to actually have more flexibility or available funds around how we can acknowledge that and access that would be significant. Tree events – council just in its operating budget last year was \$1 million overspent on tree events, but they are not claimable in certain scenarios, so that becomes an impost.²⁸

The current framework is based on isolated, single-incident funding, yet local governments frequently deal with multiple concurrent disasters. Frances Ford pointed out that each disaster triggers a separate reporting process, making it difficult for councils to manage resources efficiently.²⁹ A more integrated approach that links disaster recovery funding with resilience funding would better support local governments in adapting to climate risk.

The DRFA was also considered by the Committee in its *Inquiry into the 2022 flood event in Victoria*. Box 6.1 and Box 6.2 show the Finding and Recommendations made by the Committee in its Final Report.

Box 6.1 Finding from the Final Report into the Inquiry into the 2022 flood event in Victoria

FINDING 30: The application process for funding under the Commonwealth-State Disaster Recovery Funding Arrangements poses a significant administrative challenge for local governments who bare the evidentiary burden. This is compounded by the broader difficulties of councils to sustain recovery efforts, rebuild mitigation infrastructure, and resume business-as-usual activities following a disaster.

Source: Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into the 2022 flood event in Victoria*, July 2024.

²⁸ Kim O'Connor, Acting Director Built Environment and Infrastructure, Yarra Ranges Council, public hearing, Emerald, 10 October 2024, *Transcript of evidence*, p. 8.

²⁹ Frances Ford, Coordinator Emergency Management and Resilience, City of Greater Bendigo, public hearing, Mount Macedon, 3 December 2024, *Transcript of evidence*, pp. 4–5.

Box 6.2 Recommendations from the Final Report into the Inquiry into the 2022 flood event in Victoria

RECOMMENDATION 38: That the Victorian Government work with the Commonwealth Government to ensure the Disaster Recovery Funding Arrangements are not unduly burdensome.

RECOMMENDATION 61: That the Victorian Government simplify the application process for disaster recovery funding. This could include reducing paperwork, providing hands-on assistance and investigating technology to streamline processes.

Source: Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into the 2022 flood event in Victoria*, July 2024; Victorian Government, *Response to the Parliament of Victoria Inquiry into the 2022 flood event in Victoria*, 6 February 2025.

Given the varying concerns raised about the DRFA, stakeholders called for a review of funding arrangements.³⁰ In particular, shifting arrangements from prioritising like-for-like to betterment to reduce future costs of repair. The Committee notes that two significant national level reviews into disaster funding arrangement have recently been completed:

- *Independent Review of the Commonwealth Disaster Funding* (Colvin Review)
- *Independent Review of National Disaster Governance Arrangements* (Glasser Review).

These reviews followed the *Royal Commission into National Natural Disaster Arrangements*, whose final report was released in October 2020. The National Emergency Management Agency's website on the progress of the Royal Commission indicated that a report outlining how governments have implemented the Commission's recommendations will be released:

Anticipated to be published in Early 2025, this report will inform the Australian public about the steps taken by Australian, state, and territory governments to implement the Royal Commission recommendations. It will showcase various projects arising from these recommendations, emphasising community preparedness. The finalisation of these recommendations will leave communities better prepared for disasters than ever before.³¹

The Committee notes that the Colvin Review and the Royal Commission both acknowledged the benefits of betterment, and called on the DRFA to better reflect the principle of 'build back better'.

³⁰ Bryan Sword, Director, Sustainable Development, Moira Shire Council, public hearing, Wangaratta, 4 December 2024, *Transcript of evidence*, p. 3.

³¹ National Emergency Management Agency, *Royal Commission into National Natural Disaster Arrangements*, 2024, <<https://www.nema.gov.au/about-us/governance-and-reporting/reviews/royal-commission-into-natural-disaster>> accessed 2024.

FINDING 32: The Disaster Recovery Funding Arrangements (DRFA) create administrative challenges for local governments and limit betterment funding, making recovery efforts less efficient and increasing financial strain on councils.

FINDING 33: Current disaster recovery funding arrangements focus on like-for-like restoration rather than sustainable, resilient solutions. Expanding funding eligibility to include betterment expenses and proactively investing in resilience are essential steps for reducing asset vulnerabilities.

6.1.2 Planning system limitations

Beyond funding shortfalls, councils identified inadequacies in the Victorian planning system as a key structural barrier to ensuring a climate-resilient built environment. Issues related to planning and regulatory frameworks are discussed in greater detail elsewhere in this Report but are important to highlight here in the context of barriers faced by local councils in building climate resilience.

Yarra City Council noted that state planning laws have historically ‘created and transferred climate risk to local government’, leading to a system where councils are forced to manage the consequences of poorly regulated private development.³² The Council further outlined that the Victorian planning scheme does not include:

adequate provisions to allow statutory planners to require climate adaptation in new developments, especially at the precinct scale. This resulted in developments which create significant local climate risks (e.g., urban flash flooding and urban heat islands) which are managed by local governments, and expose residents to climate impacts (e.g., through the construction of thermally unsafe housing).³³

Several councils raised concerns about the exemptions granted to certain projects which bypasses local planning scheme requirements. This limits councils’ ability to apply Environmentally Sustainable Development standards and climate adaptation measures at a precinct level. The City of Stonnington highlighted the consequences of these exemptions, stating:

It is notable that the Victorian Government has exempted its current Big Housing and Infrastructure Build projects from meeting the requirements of local planning schemes and thus Councils’ local climate concerns and ESD requirements.³⁴

Additionally, councils have been waiting years for planning reforms that would allow them to enforce stronger resilience measures. The Council Alliance for a Sustainable Built Environment, representing 24 councils, lodged the Elevating Environmental

³² Yarra City Council, *Submission 25*, p. 2.

³³ Ibid.

³⁴ City of Stonnington, *Submission 42*, p. 5.

Sustainable Design Targets Planning Scheme Amendment in July 2022. This amendment, which aims to require zero-carbon, climate-resilient development, is still awaiting authorisation from the Minister for Planning.

Some local councils highlighted inadequacies in the regulatory frameworks that support climate resilience in the built environment, raising issues such as:

- lack of coordination among key legislative instruments
- absence of mandated state-wide Environmental Sustainable Design standards within planning schemes
- no requirement for retrofitting existing infrastructure and housing to meet changing climate conditions.³⁵

A recurring theme in the evidence submitted by local councils was the need for a state-led approach to climate resilience that aligns planning frameworks, regulations, and funding mechanisms. Warren Smith, Coordinator of Climate Change and Heritage at Cardinia Shire Council, emphasised that individual councils lack the capacity to implement large-scale resilience strategies on their own and called for a coordinated Victorian Government response.³⁶

Similarly, the City of Melbourne reinforced the importance of strong intergovernmental collaboration, stating:

All levels of government, agencies and private developers have a role to play in ensuring a climate-resilient future for Victoria. Strong collaborative structures and programs that are supported by long term funding are needed.³⁷

Without a statewide adaptation strategy, councils are left to navigate climate risks in isolation, leading to inefficiencies and inequities in local adaptation efforts. Councils advocated for:

- clearer statutory guidelines,
- stronger minimum climate resilience requirements in the planning scheme, and
- statewide flood and climate risk overlays that ensure development decisions align with projected climate impacts.³⁸

FINDING 34: Limitations in the Victorian planning system, including inadequate climate adaptation provisions and delays in planning reforms, create significant barriers for local councils in ensuring a climate-resilient built environment.

³⁵ Bass Coast Shire Council, *Submission 181*, p. 3; Merri-bek City Council, *Submission 186*, p. 4; Bayside City Council, *Submission 200*, p. 3.

³⁶ Warren Smith, Coordinator Climate Change and Heritage, Cardinia Shire Council, public hearing, Emerald, 10 October 2024, *Transcript of evidence*, p. 2.

³⁷ City of Melbourne, *Submission 75*, p. 8.

³⁸ City of Greater Bendigo, *Submission 158*, pp. 13–14; Bass Coast Shire Council, *Submission 181*, p. 6; Natasha Palich, *Transcript of evidence*, p. 55.

6.1.3 Availability of consistent and accurate climate risk data

A key barrier raised by councils in ensuring a climate-resilient built environment is the lack of access to consistent, accurate, and locally relevant climate risk data. While issues related to climate risk assessments and methodology are examined in detail in Chapter 8 (and other parts of the Report), it is important to acknowledge here that councils identified data limitations as a significant constraint in developing and implementing effective climate adaptation measures.

Several councils highlighted gaps in granular climate data, particularly at the mesh-block level (the smallest geographic areas defined by the Australian Bureau of Statistics), which affects their ability to conduct localised vulnerability assessments and prioritise resilience investments. The City of Stonnington explained:

The provision of high level (5km) climate risks data via the Victorian Climate Futures Tool is not granular enough for councils to appropriately prioritise or invest in locally relevant actions at the neighbourhood or street scale. Support for councils to collect more granular data will enable better planning for locally relevant climate adaptation.³⁹

Box 6.3 About Victoria's Future Climate Tool

Victoria's Future Climate Tool, launched in 2021, provides public access to local-scale climate projections for Victoria up to the 2090s. Developed by the Victorian Government in collaboration with CSIRO, the interactive tool allows users to explore future climate data, such as temperature, rainfall, and heatwaves, through maps and charts, with options to export data for further analysis.

The Department of Energy, Environment and Climate Action is updating the tool with the latest climate projections and sought user feedback to enhance its usability, ensuring it remains fit for purpose and meets user needs. Chapter 8 discusses the Tool in more detail.

Source: Engage Victoria, *Victoria's Future Climate Tool update*, 2024, <<https://engage.vic.gov.au/victorias-future-climate-tool-update>> accessed 31 January 2025.

Beyond data granularity, councils reported inconsistent methodologies for conducting climate risk assessments, leading to fragmented and uncoordinated adaptation responses across the State. Tiffany Harrison, Coordinator of the Gippsland Alliance for Climate Action, described how councils are at different stages of risk assessment. There are no uniform guidelines on the climate scenarios, timeframes, or risk assessment frameworks that should be used.⁴⁰ The Alliance emphasised that:

a lot of councils are looking at climate risk assessments ... Some of the barriers are things like funding – even doing a risk assessment is quite costly. There are also

³⁹ City of Stonnington, *Submission 42*, p. 6.

⁴⁰ Tiffany Harrison, *Transcript of evidence*, p. 5.

guidelines and methodology and how to do that consistently across the councils. They are looking for more guidelines on how to do that, so things like what sort of scenario do they use, what sort of RCP, what timelines.⁴¹

Another major issue is outdated flood and climate mapping, which does not adequately reflect current or projected climate risks. Councils such as East Gippsland Shire and Bass Coast Shire reported challenges in updating flood inundation overlays, with significant delays in obtaining approvals from state authorities.⁴²

Councils consistently called for state-led coordination in data collection, risk assessment methodologies, and flood mapping updates to ensure greater consistency and accuracy across Victoria. Representatives from the City of Melbourne advised the Committee that:

We would encourage the state government to develop a standardised, government-endorsed methodology for assessing risk, vulnerability and economic and financial impacts that councils can use and also community and other entities can use to inform their decision-making.⁴³

Without consistent and accurate data, councils remain constrained in their ability to implement targeted, evidence-based climate adaptation measures. Addressing these data challenges is essential to ensuring that climate resilience efforts are proactive, equitable, and aligned with the best available science.

FINDING 35: A lack of consistent, locally relevant, and granular climate risk data, along with outdated flood mapping and inconsistent risk assessment methodologies, significantly hinders councils' ability to plan and implement effective climate adaptation measures.

6.1.4 Community support

Effective community support is essential for building climate resilience, yet local councils have identified significant barriers in engaging and educating their communities on climate risk. The importance of education and community-led resilience initiatives is explored further in later Chapters. This section addresses the broader challenges councils face in mobilising community support for climate adaptation.

Communicating complex climate risks to the public remains a persistent challenge for local government. Bass Coast Shire Council illustrated the difficulties faced when engaging with residents in coastal regions susceptible to erosion and sea-level rise. Donna Taylor acknowledged that there is a 'general acceptance that climate change

⁴¹ Ibid.

⁴² Cr Tom Crook, *Transcript of evidence*, p. 3; Donna Taylor, *Transcript of evidence*, p. 4.

⁴³ Tiffany Harrison, *Transcript of evidence*, p. 2.

is real', however gaps and delays in important climate data can impede community support for resilience projects.⁴⁴ She explained to the Committee that:

I think there is always a challenge when you knock on an individual landowner's door and say, 'We have got some updated science, and this is what it looks like for you.' We have seen councils in Gippsland in very recent history abandon flood amendments because it has been too hard and too complex to work with communities to get them over the line. And even on local projects, we have got a proposed path along Surf Parade in Inverloch and we have got half of our community saying, 'Don't build the path. Leave Mother Nature alone,' and then another half who really wants this great piece of community infrastructure. So the work that we do is, via consulting on things like our climate change action plan, on those individual projects as they come through, but it is a lot of work for local government.⁴⁵

Similarly, Mayor Tom Crook from East Gippsland Shire Council emphasised that 'social licence is critical' to building climate resilience. He contended that community support can only be achieved by:

having good information upon which to be basing the decisions. It is about having as settled a science as you can get, the best available modelling and stepping communities through that information so they understand.⁴⁶

The need for social licence for important climate resilience projects was highlighted by several local councils. To achieve this, effective communication strategies are needed to bridge the knowledge gap, enabling communities to make informed decisions about their properties and future investments. These strategies require funding and investment, potentially adding to the financial burden on local councils to lead efforts to build goodwill in communities for projects and regulatory changes. Community support being another resource challenge for local councils was acknowledged by stakeholders.

Farmers for Climate Action stated that:

building and maintaining social licence in the long term will require an ongoing effort by states, territories and the federal government, working together with coordination and additional funding. It is imperative that Victoria invests in better land use and project planning, alongside alleviating regulatory issues to ensure farms are able to incorporate renewable energy projects and build resilience into their operation and the grid.⁴⁷

Community education and engagement as a critical component of a community-led response to climate resilience is discussed in Chapter 9.

As discussed in Chapter 5, stakeholders expressed concern that fast-tracked approval processes for renewable energy and climate resilience projects limit community

⁴⁴ Donna Taylor, *Transcript of evidence*, p. 10.

⁴⁵ Ibid.

⁴⁶ Cr Tom Crook, *Transcript of evidence*, p. 10.

⁴⁷ Farmers for Climate Action, *Submission 175*, p. 2.

consultation and review rights, potentially undermining social licence. Planning scheme VC242 allows certain projects to bypass VCAT review, which some councils and advocacy groups argued reduces local input on project locations and diminishes transparency. Farmers for Climate Action and the Federation of Community Legal Centres cautioned that removing community engagement and objection rights may create resistance to future developments, making projects more costly and difficult to implement. Calls were made for greater public consultation and accountability to maintain trust and ensure effective project placement.

Local councils who engaged with the Inquiry proposed several recommendations to alleviate barriers to achieving community support. The following proposals were submitted in evidence:

- **Develop a statewide climate resilience engagement strategy:** Establish a coordinated, statewide strategy to support local councils in engaging and educating communities about climate risk and adaptation measures.
- **Enhance communication tools and resources:** Provide councils with tailored communication tools and resources to effectively convey climate risk to residents, focusing on practical actions they can take to protect their properties and communities.
- **Support vulnerable communities:** Implement targeted programs to assist vulnerable populations, including financial incentives for housing upgrades, community-based resilience projects, and increased access to support services during climate events.
- **Facilitate community-led adaptation initiatives:** Encourage and fund community-led adaptation projects that empower residents to take an active role in building local resilience, fostering a sense of ownership and shared responsibility.

The Committee acknowledges that effective community engagement is critical to building climate resilience, yet local councils face significant challenges in communicating risk, securing public trust, and ensuring communities are actively involved in adaptation efforts. Without clear communication strategies, access to reliable data, and meaningful consultation, there is a risk that climate resilience measures—particularly in high-risk areas—will face resistance, delaying necessary action.

The Committee also notes concerns that fast-tracked approval processes for major projects may limit community input, further undermining social licence. To ensure communities are not left behind, the Committee finds that a coordinated, statewide approach to engagement and support is needed, providing councils with the tools, resources, and funding required to build public understanding and participation in climate adaptation initiatives.

The Committee will be examining public consultation and engagement as part of its forthcoming *Inquiry into Community Consultation Practices*.

FINDING 36: Where engagement strategies are lacking, local councils face significant challenges in securing community support for climate resilience initiatives due to difficulties in communicating climate risk.

RECOMMENDATION 28: That the Victorian Government, in collaboration with local councils, ensure consistent community engagement across all projects, including fast-tracked developments, to prevent communities from being left behind. This should include clear communication strategies, targeted support, and funding for local councils to lead adaptation initiatives.

6.1.5 Accountability for action on coastal erosion

Some erosion-prone coastal communities expressed concern that they have been left without clarity on government financial support, despite mounting economic losses and asset destruction. Multiple stakeholders and overlapping responsibilities have made it difficult to determine who is accountable for action to address the adaptation required to deal with coastal erosion. This has contributed to delays and community frustration.

FINDING 37: Delays in implementing erosion control measures at Inverloch and Loch Sport are increasing risks to infrastructure, community safety, and local economies. Interim works such as sandbagging have had limited success.

RECOMMENDATION 29: That the Victoria Government initiate temporary protection works at high-risk locations while longer-term adaptation strategies are developed in partnership with local communities.

6.2 Barriers to upgrading infrastructure

Upgrading infrastructure to withstand climate change is critical, yet the Committee heard that several barriers hinder progress. Restrictive funding models, regulatory constraints, financial pressures, and land use limitations often prevent councils from enhancing resilience. The ‘like-for-like’ approach to asset restoration, in particular, limits improvements, leading to repeated damage and rising costs.

This Section explores these challenges, including vulnerabilities in essential infrastructure, housing, and planning. Addressing these barriers will require policy reform, investment, and a coordinated approach to future-proof Victoria’s built environment.

6.2.1 Focus on a ‘like-for-like’ approach to restoration of public assets

As raised in section 6.1.1 the like-for-like approach to asset restoration is a funding model that limits disaster recovery efforts. It reinstates public infrastructure to its pre-disaster condition rather than allowing for upgrades that enhance resilience. This approach creates significant challenges, as it does not account for evolving risks or contemporary design standards that could prevent repeated damage. Several stakeholders highlighted the inefficiencies of this model, noting that councils must cover the cost difference if they wish to improve infrastructure beyond the like-for-like standard.

The City of Port Phillip highlighted that Victoria’s like-for-like approach is a key barrier to upgrading infrastructure to be more resilient:

The barriers to upgrading infrastructure to be more resilient are many and include initial financial investment as well as whole of lifecycle costs, political commitment, land constraints and the need for a collaborative approach. Under insurance and constraints in some instances to rebuild like-for-like post disaster, does not enable residents to increase investment to build differently and with climate resilience in mind.⁴⁸

This was echoed by other councils who expressed significant concerns about how funding arrangements constrain their capacity to build more resilient infrastructure.⁴⁹ At a public hearing, Bernie O’Sullivan, Chief Executive Officer of Macedon Ranges Shire Council, explained that:

Under current disaster recovery funding arrangements in Victoria, councils are only funded to return assets and infrastructure to their pre-disaster state, with councils generally required to pay for additional upgrades themselves should they wish to build back better. The urgency with which essential infrastructure needs to be reinstated, such as getting a road open, further limits opportunities to budget for and allocate funding to build back better. In a sense, the road may get washed out with the next disaster event because we are not futureproofing it.⁵⁰

The barriers to upgrading infrastructure include financial constraints, land use limitations, and political considerations. The City of Port Phillip noted that these barriers are compounded by underinsurance and the restrictions of rebuilding like-for-like, which prevent residents and councils from incorporating climate-resilient design.⁵¹

There was broad consensus among stakeholders that a like-for-like approach, especially for infrastructure important to Victoria’s climate resilience, is insufficient. It was emphasised to the Committee that a like-for-like approach to rebuilding

⁴⁸ City of Port Phillip, *Submission 155*, p. 4.

⁴⁹ See, for example: City of Greater Bendigo, *Submission 158*, p. 1; Frances Ford, *Transcript of evidence*, pp. 4–5; Bernie O’Sullivan, *Transcript of evidence*, p. 7; Cr Tom Crook, *Transcript of evidence*, p. 3.

⁵⁰ Bernie O’Sullivan, *Transcript of evidence*, pp. 2–3.

⁵¹ City of Port Phillip, *Submission 155*, p. 4.

infrastructure has significant drawbacks, many of which undermine efforts to enhance climate resilience. Key concerns raised in evidence included:

- Rebuilding assets to their pre-disaster state leaves them vulnerable to the same hazards, leading to repeated failures during future climate events.
- While initially cheaper, frequent repairs and reconstructions ultimately result in higher cumulative costs compared to investing in upgrades.
- This approach prevents the adoption of modern, climate resilient design, perpetuating outdated infrastructure systems that fail to meet future challenges.
- Communities remain exposed to repeated disruptions and safety risks as infrastructure fails to adapt to evolving climate conditions.
- Damage to essential infrastructure, such as roads, bridges, and utilities, disrupts economic activities, reducing productivity and growth.
- Frequent rebuilding consumes resources and can exacerbate environmental impacts, particularly when materials are not sustainably sourced.
- Repeated infrastructure failures can undermine public confidence in government decision-making and long-term planning.
- The urgency to restore infrastructure quickly often sacrifices resilience for speed, missing opportunities to build back stronger and more effectively.

Recent extreme weather events have clearly demonstrated the short-comings of a like-for-like approach to upgrading infrastructure, especially infrastructure which supports climate mitigation and adaptation. The Committee's recent *Inquiry into the 2022 flood event in Victoria* made several findings and recommendations on the issue of betterment (see Box 6.4 below for a relevant Finding). Evidence to the *Inquiry into the 2022 flood event in Victoria* provided examples where flood mitigation or other infrastructure was rebuilt like-for-like following prior climate-related damage, only to be further damaged (in some cases more extensively) during the 2022 event.

Box 6.4 Finding from the Final Report into the Inquiry into the 2022 flood event in Victoria: on betterment

FINDING 31: A like-for-like approach to rebuilding mitigation infrastructure following a flood event is inadequate. There is a clear pattern of infrastructure failing to withstand successive flood events, resulting in repeated damage and economic losses.

Source: Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into the 2022 flood event in Victoria*, July 2024.

Through assessing stakeholder concerns the Committee has determined that Victoria's like-for-like approach presents a critical resiliency gap as infrastructure is reinstated to its pre-disaster condition rather than upgraded to withstand future climate risk. This restriction prevents councils from incorporating improved design standards or

materials that could enhance durability and reduce vulnerability to repeated damage. As a result, essential infrastructure remains exposed to the same hazards that caused its initial failure, leading to a cycle of recurrent damage, costly repairs, and increased financial pressure on local governments. Without a mechanism to fund betterment, councils are often forced to bear the additional costs of upgrading infrastructure themselves or accept ongoing risk, which ultimately undermines long-term community resilience.

FINDING 38: The like-for-like approach to asset restoration creates a resiliency gap by reinstating infrastructure to its pre-disaster condition without allowing for necessary upgrades, leaving assets vulnerable to repeated damage and increasing long-term costs for councils.

6.2.2 Housing

Our built environment, both the public realm and our building stock, is currently built in a way that exacerbates vulnerabilities. Our buildings are not designed to handle extreme heat, our utilities are easily knocked out by storms, and our streets and public spaces are so heavily sealed and asphalted that they are high-risk areas for both flooding and heatwaves.

Urban Futures (RMIT University), *Submission 222*, p. 2.

Victoria's built environment was largely designed for historical climate conditions and is now facing increasing structural vulnerabilities due to climate change. Many homes and commercial buildings remain energy inefficient, leading to higher energy costs and increased exposure to extreme weather events such as heatwaves and cold conditions. The challenge of retrofitting existing infrastructure, such as roads, drainage, and buildings, is both costly and technically complex, particularly in densely populated urban areas with space constraints.

The City of Melbourne highlighted the severity of the urban heat island effect, noting that 'Melbourne can be 4–8 degrees hotter than regional areas because the built environment is not designed to mitigate heat'.⁵² This exacerbates issues such as power outages, transport disruptions, and impacts on outdoor events during heatwaves. While the City of Melbourne has implemented measures such as expanding its urban forest and integrating green infrastructure, it acknowledges that additional support is required to achieve broader adaptation goals.⁵³ Similarly, Friends of the Earth Melbourne raised concerns about the lack of adequate heat refuges in public spaces:

One of the reasons why extreme heat kills more Australians than any other climate disaster is that most of our buildings are not designed or built for extreme heat in Australia ... Public spaces the community can currently go to keep cool are not

⁵² City of Melbourne, *Submission 75*, p. 5.

⁵³ Ibid.

functional as heat refuges and are not available outside of office hours. This is a missed opportunity to utilise already in place infrastructure, such as air-conditioned facilities, for heat relief. A means for people to reach these spaces safely and return home safely, day or night, is not available and needs to be provided. The homeless need consideration here as well.⁵⁴

The Energy Efficiency Council underscored the limitations of current building energy rating systems in addressing climate resilience.⁵⁵ The Council Alliance for a Sustainable Built Environment reinforced the necessity of retrofitting existing buildings to enhance their resilience against extreme weather conditions. There is a risk that some buildings will be unable to be retrofitted, or will be destroyed by extreme weather events before these retrofitting activities can occur:

It will be necessary to retrofit many existing buildings to ensure they provide the shelter, thermal comfort and durability required to withstand the scientifically predicated weather events that are likely to occur as a result of climate change. There is a risk that some buildings will be unable to be retrofitted, or will be destroyed by extreme weather events before these retrofitting activities can occur.

To avoid the need to retrofit our future buildings, all new development must be designed and constructed with consideration of applicable climate risks. Planning and building policy must be based on the latest updated science and data to allow consideration of the impact of climate change.⁵⁶

Whilst the thermal and energy efficiency of Victoria's housing stock was most commonly highlighted, a number of other vulnerabilities were also noted by stakeholders. Evidence to the Committee suggested that the following issues in housing stock are a barrier to ensuring a resilient built environment:

- Barriers to retrofitting: There is a lack of legislative requirements and guidelines for retrofitting existing buildings to meet changing climate conditions. Current frameworks inadequately address climate resilience upgrades for existing structures.⁵⁷
- Social housing vulnerabilities: A significant portion of legacy social housing stock, including the high-rise towers, lack insulation and energy efficiency, making it less resilient to extreme weather and placing its residents at higher risk.⁵⁸
- Urban planning and zoning issues: Inadequate flood mapping and overlays in planning schemes lead to approvals for development in areas at high risk of flooding or coastal inundation. This leaves new housing stock vulnerable to future climate risks.⁵⁹

⁵⁴ Friends of the Earth Melbourne, *Submission 192*, p. 5.

⁵⁵ Energy Efficiency Council, *Submission 38*, p. 2.

⁵⁶ Council Alliance for a Sustainable Built Environment, *Submission 111*, p. 5.

⁵⁷ See, for example: YIMBY Melbourne, *Submission 138*; City of Port Phillip, *Submission 155*.

⁵⁸ See, for example: Yarra City Council, *Submission 25*; City of Melbourne, *Submission 75*; Sarah Powers, *Submission 92*; Doctors for the Environment Australia, *Submission 122*.

⁵⁹ See, for example: Architects Declare Australia, *Submission 228*; YIMBY Melbourne, *Submission 138*; Una Causevic, *Submission 208*.

- Renter vulnerabilities: Renters, especially those in substandard housing, often lack the means to make necessary energy efficiency or safety upgrades, exposing them to higher risks from extreme heat and other climate impacts.⁶⁰
- Cost of upgrading infrastructure: The cost of retrofitting existing homes or rebuilding damaged infrastructure with climate-resilient designs is significant, posing a financial challenge to councils and homeowners.⁶¹

Many stakeholders underscored the importance of energy efficiency housing for the most vulnerable in our community, especially those in ageing public and community housing. Action is underway to improve the energy efficiency of social housing in Victoria with all Big Housing Build homes required to meet a minimum 7-star Nationwide House Energy Rating Scheme (NatHERS) energy efficiency standard. The redevelopment of the ageing properties in Victoria's public housing stock, including through the High-Rise Redevelopment Program, should see an improvement to meet a range of modern standards and codes including energy efficiency standards.

Stakeholders broadly stated that significant investments in retrofitting, regulatory reform, and community infrastructure are necessary to enhance the resilience of Victoria's built environment. Addressing these vulnerabilities will require coordinated efforts between government, industry, and community stakeholders to ensure that homes, commercial buildings, and public spaces can withstand the increasing impacts of climate change.

Commenced in 2020, the Victorian Government's Energy Efficiency in Social Housing Program has provided around 19,000 upgrades to social homes. A continuation of the program to 2027 is expected to deliver around 45,000 upgrades to make social housing more energy efficient.⁶²

Chapter 8 considers options for the Victorian Government to improve housing so that it is more climate resilient. Chapter 9 considers options for individuals, including homeowners, on managing the resilience of their assets.

FINDING 39: Victoria's housing stock is increasingly vulnerable to climate-related risks due to poor thermal design, inadequate retrofitting policies, and outdated urban planning. This leaves many homes and communities exposed to extreme heat, flooding, and energy inefficiency.

⁶⁰ See, for example: City of Melbourne, *Submission 75*; YIMBY Melbourne, *Submission 138*; Enya Venn, *Submission 123*; Mathew Nelson, *Submission 132*.

⁶¹ See, for example: Merri-bek City Council, *Submission 186*.

⁶² Homes Victoria, *Energy Efficiency in Social Housing Program*, <<https://www.homes.vic.gov.au/energy-efficiency-social-housing-program>> accessed 2024.

6.2.3 Vulnerability of essential infrastructure

Essential infrastructure—including telecommunications, electricity, roads, and water systems—is increasingly vulnerable to climate change risks. Stakeholders across local government, industry, and emergency management sectors have raised significant concerns about the resilience of Victoria’s critical infrastructure.

The vulnerability of essential services is discussed in greater detail in Chapter 8. This Section highlights stakeholders’ perspectives on key vulnerabilities across certain types of critical infrastructure.

Core stakeholders, especially local councils, have expressed concern about how funding constraints have made essential infrastructure increasingly vulnerable. Local governments told the Committee that they bear the financial burden of climate adaptation, and that this extends to maintenance of some critical infrastructure. The Committee reiterates its calls for increased state government support to ease the financial burden on local councils and provide better funding pathways for ensuring resilient infrastructure, particularly the need for betterment funding.

Local governments and industry stakeholders overwhelmingly supported a build back better approach that prioritises resilient design over reactive repairs. However, achieving this will require coordinated action across all levels of government to ensure that essential infrastructure can withstand future climate impacts. The Committee calls on the Victorian Government to take urgent action to address these vulnerabilities through strategic planning, funding mechanisms, and legislative reforms to secure the long-term sustainability of the State’s infrastructure.

Telecommunications

Those communities better prepared, from our experience, recover quicker and are ultimately more resilient to the impacts of a changing climate. This includes investment in community capacity and connectedness, ensuring that they have the information they need during an event, training communities to set up their own relief centres, improving communication facilities, including satellite communications, and advocating for more resilient telecommunications more generally.

Cr Tom Crook, Mayor, East Gippsland Shire Council, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, p. 2.

Resilient telecommunications infrastructure is essential for emergency management, community resilience, and disaster response. However, evidence highlighted the vulnerability of telecommunications networks during extreme weather events, which can leave communities isolated and unable to access vital emergency services. Many stakeholders, particularly local councils and residents from areas affected by extreme weather events, expressed concern about the impact of climate events on telecommunications. Box 6.5 below highlights some of the concerns expressed by stakeholders.

Box 6.5 Stakeholders' perspectives on the vulnerability of telecommunications during climate events

We heard quite dramatic experiences, where the power outage event and the failure of telecommunications and other forms of critical infrastructure really very negatively impacted people's personal, social and financial wellbeing. It was not only on the individuals themselves but the sense in those communities of their responsibility for their communities was an added element to this impact.

Rosemary Sinclair AM, Chair, The Network Outage Review Panel, public hearing, Melbourne, 9 October 2024, *Transcript of evidence*, p. 2.

We lost power – that is not an unusual occurrence – but this time we also lost communication. Now, communication is the only way for us in an isolated community – and this is applicable to multiple communities, not just Monbulk. If we lose communication, we lose the VicEmergency app, we lose CFA. We are sitting ducks. We do not know what is around the corner. We do not know, say, exit routes. We do not have any ability to call for emergency. And we actually tried to call 000 – this was our experience – and there was actually no reception. We were not able to get through. We could not get an ambulance for over 50 minutes.

Dr Dan Jeyaseelan, Member, Monbulk and District Community Working Group, public hearing, Emerald, 10 October 2024, *Transcript of evidence*, p. 34.

We lost the internet. Now, the fire brigade have got pagers, and when we get a fire call the pagers go off and off we go. But we work on WhatsApp. So when they ask the strike team members 'Who's around tomorrow so we can do this?', if we have got no WhatsApp, we cannot communicate. We can only communicate for an emergency, but we cannot communicate in planning. Our community group – when we had that last storm, I was going to activate it, but I had to actually go around to houses individually and knock on their doors.

Peter Edyvane, Member, Monbulk Emergency Management Group, public hearing, Emerald, 10 October 2024, *Transcript of evidence*, p. 36.

whenever there is a power outage the telecommunication also goes down – so how they can ensure that messages get to their local community members if they cannot use their phones or the internet.

Andrew Joseph, Team Leader, Community Resilience and Emergency Management, Mornington Peninsula Shire, public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 9.

Last year we had a big storm which cut off our power for 7 days and 7 hours, due to trees down and lines down. We also lost all phone communication for several days – no NBN due to loss of power, and the mobile cell here was also isolated – we could ring people within the cell, but not outside. Emergency calls (000) I believe were affected as well.

Rose Ovenden, *Submission 81*, p. 1.

As noted in Chapter 2, it was made clear to the Committee that the increasing frequency and severity of extreme weather events, driven by climate change, pose a significant threat to telecommunications infrastructure. Reliable communication systems are essential for emergency response, coordination, and public safety. However, recent disasters have exposed critical weaknesses in telecommunication networks, particularly in regional and disaster-prone areas. The following vulnerabilities highlighted by stakeholders demonstrate the urgent need for improved resilience in telecommunication services:

- Telecommunications failures during extreme weather events: Power outages often lead to the complete loss of mobile and internet services, isolating communities.⁶³
- Lack of backup power for telecommunications infrastructure: Many telecommunications towers rely on battery backups that last only a few hours. Generators, when available, frequently run out of fuel or fail due to lack of maintenance.⁶⁴
- Inadequate resilience standards for telecommunications providers: Unlike legacy landlines, modern mobile and broadband networks have no mandated emergency backup power. Telecommunications providers are not legally required to invest in climate-resilient infrastructure.⁶⁵
- Telecommunications companies not integrated into emergency response planning: Telecommunications providers are not obligated to coordinate with emergency management authorities. No requirement exists for them to have representatives in state control centres or Incident Control Centres.⁶⁶
- Barriers and complexity in bureaucratic processes hindering backup solutions: Complex insurance, funding, and legal hurdles prevent communities from implementing independent backup communication solutions.⁶⁷
- Poor maintenance and accountability for backup systems: Many backup generators are either non-functional or inadequately maintained. When infrastructure is hosted on private land, responsibility for upkeep is unclear.⁶⁸
- Over-reliance on fragile modern communication systems: Unlike traditional landlines, mobile and broadband networks fail immediately during blackouts. Communities are left without any alternative means of communication.⁶⁹

⁶³ See, for example: Andrew Joseph, Team Leader, Community Resilience and Emergency Management, Mornington Peninsula Shire, public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, pp. 2–3; Rosemary Sinclair AM, Chair, The Network Outage Review Panel, public hearing, Melbourne, 9 October 2024, *Transcript of evidence*, p. 2; Kate Forster, Committee Member, Planning, Tourism and Environment sub-committee Emerald Village Association, public hearing, Emerald, 10 October 2024, *Transcript of evidence*, p. 16.

⁶⁴ See, for example: Rachelle Mechielsen, *Transcript of evidence*, pp. 34–45; Peter Edyvane, *Transcript of evidence*, p. 34; Kate Forster, *Transcript of evidence*, p. 16; Urban Futures - RMIT University, *Submission 222*, pp. 15–16.

⁶⁵ See, for example: Dr Dan Jeyaseelan, *Transcript of evidence*, pp. 33–34; Renae Littlejohn, *Transcript of evidence*, p. 2; Urban Futures - RMIT University, *Submission 222*, pp. 15–16.

⁶⁶ See, for example: Rachelle Mechielsen, *Transcript of evidence*, p. 39.

⁶⁷ See, for example: Dr Dan Jeyaseelan, *Transcript of evidence*, p. 40.

⁶⁸ See, for example: Peter Edyvane, *Transcript of evidence*, p. 36.

⁶⁹ See, for example: Dr Dan Jeyaseelan, *Transcript of evidence*, p. 37; Youth Affairs Council Victoria, *Submission 142*, p. 19.

Opportunities to increase the resilience of Victoria's telecommunications infrastructure, including the need to work with the Commonwealth Government to ensure ongoing services during extreme weather events, is discussed in Chapter 8.

FINDING 40: Resilient telecommunications infrastructure is critical for emergency response, community safety, and disaster recovery. However, vulnerabilities exposed during extreme weather events highlight an urgent need for enhanced backup systems and increased investment in climate-resilient networks.

Energy

we know Victorians rely on reliable electricity supply to power their lives more than ever before

Renate Vogt, General Manager, Regulation, Powercor, public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 41.

Victoria's energy grid is facing increased strain due to rising temperatures, extreme weather events, and the transition to renewable energy sources. Stakeholders emphasised that to improve the resilience of energy infrastructure, Victoria must reduce peak electricity demand and invest in more resilient energy infrastructure. As noted in previous Chapters, energy efficiency measures taken today may no longer be sufficient to protect vulnerable households in the future.

The Affiliated Insulation Industry Coalition highlighted that:

peak electricity demand in buildings will increase in all regions of the world in the coming decades. This rise is expected to be even more pronounced in countries with significant and expanding space cooling needs. This underscores the importance of improving the thermal performance of our built environment as a matter of urgency, given the extreme heat already experienced in parts of Victoria and Australia more broadly.⁷⁰

Similarly, the Energy Efficiency Council warned that greater thermal efficiency is necessary to successfully improve heat resiliency in homes. It contended that:

Victorian homes are vulnerable to the impacts of climate change, and the energy ratings we use to design them are not yet responding to the threat. Newly built, thermally efficient homes are still expected to outperform older homes in resilience to heat, however climate change will put this resilience under pressure. Recent modelling found that by 2070, a 7-Star home built in 2024 will face similar indoor temperatures during hot summer conditions as a 1.1-Star uninsulated home does today. Meanwhile, if left unrenovated, that 1.1-Star home will face even more extreme indoor temperatures.

⁷⁰ Affiliated Insulation Industry Coalition, *Submission 39*, p. 1.

This is an important consideration for Victoria when planning for the climate resilience of the built environment now and into the future.⁷¹

Thermal efficiency in homes was highlighted as an important component of residential climate resilience. Many stakeholders were concerned that poor efficiency resulted in a number of adverse outcomes for households:

- high energy bills
- risk of adverse health outcomes due to exposure to extreme heat or cold
- weather-related damage to property
- higher risk of power outages due to overloading the energy grid during days of extreme heat.⁷²

It is not only household electricity that is susceptible to climate hazards but also large-scale energy infrastructure. Box 6.6 below highlights stakeholder views on the varying risks to Victoria's electricity and energy infrastructure.

Box 6.6 Stakeholders' perspectives on the vulnerability of electricity and energy infrastructure

In my community we have seen recent flooding destroy homes, felt extreme heat exacerbated by urban heat island, and have been affected by power outages. Particularly with the floods, people were unprepared in how to respond and the local Council was under-resourced to provide the necessary support in urgent and efficient manner.

Sarah Rickard, *Submission 254*, p. 1.

One lesson that we learned was that the recurrent power outages are cumulatively eroding the resilience of customers and communities. It is not just one; it is a number of events, and that cumulative effect becomes very difficult.

Rosemary Sinclair AM, Chair, The Network Outage Review Panel, public hearing, Melbourne, 9 October 2024, *Transcript of evidence*, p. 3.

People were ringing their employers and saying, 'I can't come to work; I've had no power for a week' ...

Rachelle Mechielsen, Team Leader, Emerald and Cockatoo Emergency Support Team, public hearing, Emerald, 10 October 2024, *Transcript of evidence*, p. 41.

(Continued)

⁷¹ Energy Efficiency Council, *Submission 38*, p. 2.

⁷² Geelong Sustainability, *Submission 202*; Erne Energy, *Submission 204*; Asthma Australia, *Submission 213*; City of Port Phillip, *Submission 155*.

Box 6.6 Continued

in the aftermath of the storms where houses had no power they hook up the generators and some have candles for light and heat and things like that. One of those was a cause of a house fire. If that was not there, there would very likely have been no house fire.

Klaus Brodeck, Captain, Emerald Fire Brigade, public hearing, Emerald, 10 October 2024, *Transcript of evidence*, p. 57.

The township of Loch Sport is considered to be an area of extreme fire risk. It has only single road access and tank water that is unusable when the power goes out.

Friends of the Earth Melbourne, *Submission 192*.

Stakeholders raised several concerns regarding the vulnerability of energy infrastructure to climate change and extreme weather events. Key concerns included:

- Climate-induced disruptions (e.g., severe storms or heat waves) to power generation, distribution, and transmission, increase the risk of brownouts, blackouts, and extensive infrastructure damage.⁷³
- Overhead power lines are highly susceptible to extreme heat, high winds, and storms, leading to failures that can trigger fires and cause prolonged outages, particularly in rural and regional areas.⁷⁴
- Renewable energy infrastructure faces risks from extreme weather events, such as high wind speeds affecting wind turbines, and hail reducing the efficiency of solar panels.⁷⁵
- Rising financial and insurance costs for maintaining and repairing energy infrastructure are making resilience investments increasingly expensive.⁷⁶
- Increased climate-related risks to power lines, transformers, and substations, require urgent mitigation strategies, alongside measures to address rising electricity demand for cooling.⁷⁷

To address these challenges, stakeholders proposed a range of measures to improve resilience and sustainability, such as:

- investment in resilience measures
- strengthening emergency response plans
- enhanced government oversight and planning

⁷³ See, for example: Victorian Farmers Federation, *Submission 252*; City of Melbourne, *Submission 75*; ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*.

⁷⁴ See, for example: Emerald Village Association, *Submission 168*; Victorian Farmers Federation, *Submission 252*.

⁷⁵ See, for example: Victorian Farmers Federation, *Submission 252*; ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*.

⁷⁶ See, for example: Friends of the Earth Melbourne, *Submission 192*.

⁷⁷ See, for example: Adam Gellie, *Transcript of evidence*, p. 51; Infrastructure Victoria, *Submission 126*.

- localised energy resilience strategies
- stronger regulations and building codes
- greater government and private sector investment
- community-based energy resilience initiatives.

Chapter 8 considers options for increasing the security of Victoria's energy infrastructure during extreme weather events and climate change.

The Victorian Farmers' Federation submission highlighted the fact that severe weather events expose the fragility of the energy network. The submission also argued that current systems focus on urban areas, neglecting proactive management of risks to farms, which intensifies losses during climate events.

Transmission and distribution lines can fail in hot or windy weather. Failure can lead to fire events that impact on buildings, structures, and infrastructure. Wind turbines can be impacted by strong winds and do not generate when no wind or strong wind. Solar Panels can be impacted by hail events. Overhead distribution and transmission is vulnerable to flood, fire and storm. Farmers need reliable and affordable power.⁷⁸

The Committee heard some concern among some regional communities about the potential microclimate impacts of large-scale solar developments, particularly in areas where viticulture, orchards, and other sensitive agricultural industries are prominent. In locations such as Colbinabbin, local stakeholders have expressed fears that solar farms may alter the local thermal environment — the rural heat island effect — potentially affecting crop yields and long-term viability. However, as the committee heard, there is currently no research confirming or refuting these claims.

As Associate Professor Ailie Gallant of the ARC Centre of Excellence for Climate Extremes and Chief Investigator in the School of Earth, Atmosphere and Environment at Monash University explained during the hearing:

No. There is no evidence because there is no research on it. It is not that there is no evidence. There is simply no research on these things, as I am aware. I am happy to take it on notice and go and look for some, but I am not aware of anything at this stage.⁷⁹

Commissioning independent, peer-reviewed research would provide a sound scientific basis to either validate or allay the concerns of affected communities and guide future solar infrastructure planning in agricultural zones. As Victoria continues its rapid transition to renewable energy, large volumes of infrastructure — particularly solar panels, batteries, and eventually wind turbines — are being installed across homes, businesses, and utility-scale projects. Many of these components have finite operational lifespans, with solar panels typically lasting around 20 years, and batteries and inverters potentially failing sooner. Despite this growing deployment, there is a notable lack of preparation for managing the waste stream these technologies will generate.

⁷⁸ Victorian Farmers Federation, *Submission 252*.

⁷⁹ Associate Professor Ailie Gallant, *Transcript of evidence*, p. 20.

During the inquiry, Shamir Varma of the Bendigo Sustainability Group acknowledged that while solar infrastructure has not yet reached end-of-life in their projects, the issue remains unresolved:

We have not thought about how we are going to recycle solar panels. These are all open-ended issues for us that I think whether we like it or not, we are going to have to face in the near future.⁸⁰

Similarly, Ben McGowan, Managing Director of Indigo Power, emphasized the gap between available recycling information and practical implementation:

... you can do is write a really neat section in your report about “These are all the options that are there” – and they are there; ... we have not taken anything off and we have not sent anything down to Melbourne and had it cycled yet, so we do not know.⁸¹

Heath Shakespeare, also from Indigo Power, pointed out that recycling facilities for solar panels are currently limited in their capacity:

... there are not many that recycle [solar panels] ... so they reach their limits quite quickly ... you have got some limitations that come with that with the amount of solar panels there are ...⁸²

These testimonies reveal a significant policy and infrastructure gap.

FINDING 41: Victoria’s energy infrastructure is increasingly vulnerable to climate change and extreme weather events, susceptible to risks such as power generation disruptions and increased strain on the grid due to rising temperatures.

FINDING 42: Without a proactive plan, Victoria risks creating a new category of environmental waste just as it works to reduce emissions. A government-led investigation into end-of-life pathways and domestic recycling capacity is needed.

RECOMMENDATION 30: That the Victorian Government investigate and report to Parliament on the end of life of renewable energy products including wind turbines, solar panels and batteries and opportunities for recycling within Australia.

RECOMMENDATION 31: That the Victorian Government undertake a review of the resilience and sustainability of Victoria’s energy generation and associated transmission, distribution and storage networks, including an assessment of impacts on agriculture and manufacturing.

⁸⁰ Shamir Varma, *Transcript of evidence*, p. 21.

⁸¹ Ben McGowan, *Transcript of evidence*, p. 64.

⁸² Heath Shakespeare, *Transcript of evidence*, p. 64

Roads and transport

The urgency with which essential infrastructure needs to be reinstated, such as getting a road open, further limits opportunities to budget for and allocate funding to build back better. In a sense, the road may get washed out with the next disaster event because we are not futureproofing it.

Bernie O'Sullivan, Chief Executive Officer, Macedon Ranges Shire Council, public hearing, Mount Macedon, 3 December 2024, *Transcript of evidence*, p. 3.

Victoria's road and transport networks are highly vulnerable to climate change. Roads are increasingly vulnerable to extreme weather events such as heat, drying, intense storms, coastal inundation, and fire. For example, the Committee received evidence from different representatives in the Gippsland region who all cited the vulnerability of the Princes Highway, near Lakes Entrance. Stuart McConnell, General Manager of Assets and Environment at East Gippsland Shire Council, highlighted:

there are some really significant investments that will be required, particularly for some of the lower lying communities. Even over the last week we have had water across the Princes Highway in Lakes Entrance simply from the effects of tidal surge and sea level rise. Those things are coming, and there are very significant investments that will be required in relation to some of those low-lying communities.⁸³

Mayor Tom Crook reflected on the closure of the Princes Highway due to the Black Summer bushfires, telling the Committee:

As you would be aware, the Black Summer fires were probably our most catastrophic example in recent times. As you probably also know, the scale, the severity of that event was entirely unprecedented – well, in European history anyway. We had community infrastructure damaged at a scale we had never experienced before and an impact on communities themselves as a result of not only the physical damage to, let us say, the road network. We had communities stranded, isolated, for weeks. The Princes Highway was shut to Cann River for three weeks. Increasingly, because we have a lot of remote settlements in a heavily forested environment, the impact of those extreme weather events, whether it is storms or fires, is increasingly being felt by our communities.⁸⁴

From a metropolitan perspective, Mornington Peninsula Shire Council discussed the complexity of road reconstruction following severe weather-related events, such as a landslide. The Shire's submission stated:

The reconstruction a road impacted by a landslide required complex geotechnical assessment and design, works under difficult conditions to reinstate drainage, a closed key local road causing ongoing frustrations for local residents, threat of ongoing soil instability nearby, and considerable time delays due to the need to obtain infrastructure components in short supply.⁸⁵

⁸³ Stuart McConnell, *Transcript of evidence*, p. 6.

⁸⁴ Cr Tom Crook, *Transcript of evidence*, p. 6.

⁸⁵ Mornington Peninsula Shire, *Submission 215*, p. 1.

Other stakeholders also discussed the impact of climate hazards on Victoria's road network, some of this evidence is highlighted in Box 6.7.

Box 6.7 Stakeholders' perspectives on the vulnerability of the road network due to climate risks

The street is fairly busy in terms of trucks, for instance, so it needs to be a certain rated bridge. But to avoid having to close that road every winter for some number of days, even when there are no substantial floods, money in an ideal world would be spent on making that into a bridge. When there are more substantial floods, Great Alpine Road, which is the main road through Myrtleford, can become closed on both sides of the town.

David Coates, Myrtleford SES Unit, public hearing, Wangaratta, 4 December 2024, *Transcript of evidence*, pp. 49–50.

[Following the 2022 flood event] in the upper catchment is the Breakaway Bridge. It is still disconnected from the road. There are obviously examples of potholes and stuff all through the catchment.

Joel Leister, Manager, Flood Plain Implementation, Goulburn Broken Catchment Management Authority, public hearing, Wangaratta, 4 December 2024, *Transcript of evidence*, p. 20.

I think on a rural road we would say the drainage is fundamentally part of the road. The road has to be sort of formed up, sit above the surrounding land and have roadside drains. Water needs to be able to get away from the road pavement, so any culverts or roadside drains would be included. I think in an urban area it is probably not so straightforward. Your drainage is pipes, some sort of network of drainage infrastructure that is not necessarily critically aligned with the flow.

Ian Ellett, Director, Infrastructure Services, Indigo Shire Council, public hearing, Wangaratta, 4 December 2024, *Transcript of evidence*, p. 12.

As you drive up here or as you drive the roads, I think you will see that where we interface our unsealed roads with a department of transport road, you will see that washouts occur. You will get gravel on the road just in those simple locations where there could be a build-back opportunity in just improving the asphalt aprons on those types of roads as well and investing in that.

Kim O'Connor, Acting Director, Built Environment and Infrastructure, Yarra Ranges Council, public hearing, Emerald, 10 October 2024, *Transcript of evidence*, p. 12.

Stakeholders emphasised to the Committee that as climate change accelerates, Victoria's road and transport networks face increasing threats from extreme weather events and environmental changes. These risks not only disrupt daily travel but also compromise the safety, reliability, and long-term sustainability of critical infrastructure. Risks highlighted by stakeholders included:

- Flooding and extreme rainfall road inundation, erosion, drainage overload, and washouts, leading to closures and costly repairs.⁸⁶
- Rising sea levels and storm surges threaten coastal roads, weaken infrastructure through saltwater intrusion, and increase the likelihood of permanent damage.⁸⁷
- Prolonged heat softens asphalt, damages road surfaces, buckles rail tracks, and increases the risk of vehicle overheating and tire blowouts.⁸⁸
- Bushfires can result in road closures, infrastructure destruction, melting road surfaces, and blocked evacuation routes.⁸⁹
- High winds can cause structural damage to bridges, tunnels, and transport hubs, while fallen trees and debris block roads and pose serious hazards to vehicles.⁹⁰
- Heavy rainfall and soil erosion can cause landslides which block roads, weaken highway foundations, and disrupt rail networks.⁹¹

Extreme weather events can disrupt public transport and supply chains by delaying or suspending bus, rail, and freight services, which in turn affects passenger mobility, economic activity, and supply chain reliability. Additionally, outdated planning policies and infrastructure standards fail to incorporate climate adaptation measures, leaving roads, bridges, and public transport systems increasingly vulnerable to future climate-related events.

Upgrading roads and transport routes to be climate-resilient in Victoria faces several critical barriers, including funding constraints, outdated planning frameworks, and insufficient coordination between government levels. A significant barrier to climate-resilient transport infrastructure is the lack of coordinated planning and siloed approaches to adapting road infrastructure. Dr Jillian Carroll, Vice President of the Wellington Climate Action Network, explained planning processes see assets as separate even where in practical terms they are linked (such as bridges and roads):

They have got this silo sort of mentality to management still where they have roads as one department and bridges as another and they are actually allocating more money to bridges than they are to roads. As we said, what is the use of a good bridge if the road cannot get to the bridge? The planning manager said, 'Well, that's a good point. I think they need to be integrated.'⁹²

This is further compounded by the delayed integration of climate resilience into regulations guiding maintenance and updates of roads. Regulatory delays are discussed in Chapter 8 and other parts of this Report.

⁸⁶ See, for example: Caroline Evans, *Transcript of evidence*, p. 30; Kim O'Connor, *Transcript of evidence*, p. 3.

⁸⁷ See, for example: Youth Affairs Council Victoria, *Submission 142*; M9, *Submission 188*.

⁸⁸ See, for example: Polar Environ, *Submission 131*; Doctors for the Environment Australia, *Submission 122*.

⁸⁹ See, for example: Victorian Farmers Federation, *Submission 252*; Youth Affairs Council Victoria, *Submission 142*.

⁹⁰ See, for example: Emerald Village Association, *Submission 168*; ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*.

⁹¹ See, for example: Value Advisory Partners, *Submission 218*; Urban Futures (RMIT University), *Submission 222*.

⁹² Dr Jillian Carroll, *Transcript of evidence*, p. 65.

RECOMMENDATION 32: That the Victorian Government prepares a road, rail and port infrastructure strategy which:

- a. assesses the resilience of this infrastructure to climate change.
- b. identifies actions to improve the function and climate resilience of this infrastructure.
- c. and includes an implementation plan to undertake works to improve the function and climate resilience of this infrastructure.

Local councils, which are responsible for much of the State's road infrastructure, are struggling to finance climate adaptation efforts. Donna Taylor from Bass Coast Shire Council highlighted that the cost of road reconstruction has risen significantly:

that within the last five years the cost of reconstruction of [their] assets has doubled, and that is without factoring in the requirements of climate change. By way of example, to construct a road out of a more sustainable pavement is 20 per cent more expensive than the 50 per cent additional cost we have seen over the last five years.⁹³

Councils also stressed that existing disaster recovery funding is focused on rebuilding damaged infrastructure as is, rather than improving it to withstand future climate impacts. This results in a cycle of recurrent damage and costly repairs instead of long-term resilience. Shifting to a betterment approach to asset reconstruction is discussed further below.

Local governments are limited in their ability to undertake climate adaptation on road networks due to rate capping and insufficient long-term funding commitments.⁹⁴ Funding pathways are available to support the construction and maintenance of local road infrastructure, such as the Roads to Recovery program. The program is an Australian Government initiative that provides funding to local governments for the construction and maintenance of local road infrastructure. Operating on a five-year cycle, the current period from 2024–25 to 2028–29 allocates \$4.4 billion, with annual funding reaching \$1 billion by 2027–28. This structure offers councils the flexibility to prioritise projects that address their specific local needs.⁹⁵

However, stakeholders questioned how adequate existing funding pathways are, given the scale of adaptation required across Victoria. East Gippsland Shire Council representatives called for non-competitive funding to support resilience projects not eligible under existing pathways. The Council stated that this would strengthen capacity of roads, such as drainage and footpaths.⁹⁶ Similarly, Bass Coast Shire Council noted that climate adaptation costs far exceed the financial capacity of local councils, particularly when major transport upgrades require rapid capital investment. Without

⁹³ Donna Taylor, *Transcript of evidence*, p. 4.

⁹⁴ City of Stonnington, *Submission 42*, p. 3.

⁹⁵ Department of Infrastructure, *Roads to Recovery Program* 2024, 2024, < <https://investment.infrastructure.gov.au/about/local-initiatives/roads-recovery-program> > accessed 2024.

⁹⁶ Cr Tom Crook, *Transcript of evidence*, p. 3.

significant and sustained financial support from state and federal governments, councils remain unable to retrofit and upgrade roads and adjacent infrastructure to handle the increasing threats posed by climate change.

FINDING 43: Victoria's road and transport networks are highly vulnerable to climate change, with extreme weather events such as flooding, storms, heatwaves, and bushfires causing significant damage. This is compounded by issues such as funding constraints and outdated planning frameworks which limit the ability to build resilient infrastructure, leaving communities at risk of recurrent disruptions and costly repairs.

The Committee heard consistent evidence from councils that disaster recovery funding often limits reconstruction to pre-existing standards, even when these are no longer fit for purpose in a changing climate. Witnesses highlighted that this approach risks repeated damage and rising repair costs. Greater flexibility in funding arrangements—particularly for roads and bridges—would allow councils to upgrade assets and avoid recurrent failures.

Sarah Matthee, Lead, Climate Solutions, Foundation for Rural and Regional Renewal stated:

I think I have seen examples of roads where they are only funded to build back to the status quo of what was originally there, and so many people say 'There's a missed opportunity here' or 'The same thing is going to happen exactly again'. I think the opportunity around building back better is to make sure that we are not facing the same impacts again and again.⁹⁷

Donna Taylor, Bass Coast Shire Council said:

To construct a road out of a more sustainable pavement is 20 per cent more expensive ... We need the support of government ... to ensure that when we are replacing assets we are doing it with a climate lens.⁹⁸

FINDING 44: Retrofitting existing infrastructure is essential to withstand future climate impacts but remains cost-prohibitive for many councils.

RECOMMENDATION 33: That the Victorian Government work with local councils and the Commonwealth to identify pathways for integrating 'build back better' principles into post-disaster infrastructure funding, to reduce repeated damage and improve long-term resilience.

⁹⁷ Sarah Matthee, *Transcript of evidence*, p. 51.

⁹⁸ Donna Taylor, *Transcript of evidence*, p. 4.

6.2.4 Climate mitigation infrastructure

Infrastructure designed to mitigate the impacts of climate change, such as seawalls, drainage systems, and flood barriers, is crucial in protecting communities and ensuring the resilience of the built environment. However, when these systems are improperly maintained, inadequately designed, or lack sufficient investment, they can paradoxically become obstacles to resilience. The broader resilience of the built environment depends on effective climate mitigation, particularly in high-risk areas prone to flooding, coastal erosion, and extreme weather events. Where mitigation measures are inadequate or poorly maintained, homes, public assets, and critical infrastructure face heightened vulnerability, leading to increased damage, economic losses, and prolonged recovery periods.

Chapter 8 focuses on ensuring there is sufficient climate mitigation infrastructure across Victoria. However, the intensity and frequency of extreme weather events has shown that mitigation infrastructure is also vulnerable to recurring damage. This issue was canvassed in detail in the Committee's Final Report for its *Inquiry into the 2022 flood event in Victoria*. Box 6.8 below outlines Findings made in relation to mitigation infrastructure.

Box 6.8 Findings from the Final Report for the Inquiry into the 2022 flood event in Victoria: mitigation infrastructure

FINDING 19: The existing policy framework under the Victorian Floodplain Management Strategy places a significant responsibility on rural councils and landowners to manage their own levee systems. This has resulted in inadequately maintained levees, contributing to extensive breaches in October 2022 and greater financial pressure on councils and landowners for repair.

FINDING 27: There is notable community concern that the current maintenance of culverts is inadequate and eroding their capacity to provide flood mitigation during an event. In October 2022, there were several instances of blockages or other maintenance issues causing culverts to operate ineffectively.

FINDING 28: Improving the maintenance and implementation of culverts is a potential avenue for embedding a betterment approach to flood mitigation infrastructure updates.

FINDING 29: Confusion about the ownership and maintenance of flood mitigation infrastructure has led to ineffective management and upkeep of these assets. The lack of formal or unclear management led some sites to deteriorate, making them ineffective in providing mitigation during the October 2022 flood event.

Source: Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into the 2022 flood event in Victoria*, July 2024.

The 2022 flood Inquiry considered the vulnerabilities of important climate mitigation infrastructure but also the consequences of gaps in this infrastructure, such as a lack of levees. Table 6.1 lists the recommendations made by the Committee and the Government's response.

Table 6.1 Mitigation infrastructure, Recommendations, *Inquiry into the 2022 flood event in Victoria*

No.	Recommendation	Government's response
26	That the Victorian Government's review of the last Victorian Floodplain Management Strategy (and development of the new Strategy) examine levee funding and management arrangements to determine if they are still fit for purpose based on new information and insights from the October 2022 flood event.	Support in principle
27	That the Victorian Government fund floodplain managers to develop flood maps modelling scenarios demonstrating the impact on landholders of specified levee breaches.	Support in principle
28	That the Victorian Government review the Victoria Floodplain Management Strategy to examine issues around rural levee management. This should include the roles and responsibilities of local councils and private landowners and consider the adequacy of taxpayer support for maintaining these systems.	Support in principle
29	That the Victorian Government fund the pilot of a ring levee development program in Northern Victoria to protect houses and curtilage in flood-prone areas.	Support in part
31	That the Victorian Government ensure that major flood mitigation measures be assessed and reviewed to ensure they perform as intended.	Support in full
35	That the Victorian Government ensure that the state's existing culvert infrastructure in high-risk flood areas is fit for purpose, and that the Government also consult with local councils and other relevant stakeholders and prioritise betterment in any upgrade works deemed necessary.	Under review
36	That the Victorian Government audit transport links in and out of disaster-prone areas.	Support in part
37	That the Victorian Government clarify responsibility for flood mitigation infrastructure, with clear accountability and transparency for who is responsible for each asset.	Support in part
39	That the Victorian Government prioritise investment in betterment projects to improve the resilience of mitigation infrastructure, and in doing so work with the Commonwealth Government to achieve this goal.	Support in principle

Source: Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into the 2022 flood event in Victoria*, July 2024; Victorian Government, Response to the Parliament of Victoria, *Inquiry into the 2022 flood event in Victoria*, 6 February 2025.

Mitigation infrastructure—including levees, seawalls, drainage systems, and flood management assets—plays a foundational role in protecting communities from the impacts of climate change. However, evidence highlighted persistent challenges: inadequate maintenance, outdated infrastructure, and the growing intensity of

climate-driven weather events. If mitigation infrastructure is not properly maintained or upgraded, it can lead to widespread failures in climate resilience across the built environment, putting lives, livelihoods, and economic stability at risk.

As established in Chapter 2, climate change is intensifying the frequency and severity of extreme weather events, and councils are already observing the limitations of existing infrastructure. Without proactive investment, critical assets such as bridges and drainage systems risk failing under increasing climate pressures. The Committee was informed that many mitigation assets are no longer adequate to meet the current threat posed by climate change and need to be adapted to meet risks established in new modelling. For example, Mayor Tom Crook from East Gippsland reflected on his community's assets, highlighting the need to 'build those bridges higher so they do not get washed away in the next flood'.⁹⁹ Mayor Crook called for collaboration between the Victorian and Federal Government to embed an expectation of betterment in disaster recovery funding.

Additionally, ongoing maintenance costs must be factored into infrastructure planning, as councils are already seeing the financial strain of maintaining aging assets. Without intervention, the continued deterioration of mitigation infrastructure will heighten vulnerability to extreme weather events and significantly undermine broader climate adaptation strategies. The Victorian Farmers Federation noted that the risk of 'road damage and failure is increased by ... failure to maintain levees and roadside drains'.¹⁰⁰ Stakeholders contended that retrofitting and upgrading infrastructure is essential to ensuring it remains fit for purpose, but this requires sustained support from all levels of government.

Table 6.2 canvasses different types of mitigation infrastructure and summarises the key concerns raised by stakeholders in relation to these specific assets. The information from the Table has been drawn from across the evidence received, including submissions and public hearings. The infrastructure types selected are based on those most raised by stakeholders.

⁹⁹ Cr Tom Crook, *Transcript of evidence*, p. 3.

¹⁰⁰ Victorian Farmers Federation, *Submission 252*, p. 5.

Table 6.2 Mitigation infrastructure, key vulnerabilities and risks to climate resilience

Infrastructure Type	Key vulnerabilities raised by stakeholders	Key risks to the resilience of the built environment when vulnerabilities are not addressed
Levees	• Aging infrastructure – many levees were built decades ago without factoring in climate change, making them structurally outdated and prone to failure. • Lack of regular maintenance – many levees suffer from inadequate upkeep, leading to structural weaknesses such as erosion, cracks, and vegetation overgrowth. • Structural weaknesses – gaps, animal burrows, and subsurface erosion (e.g., from rabbits and other burrowing animals) can create hidden vulnerabilities that compromise levee integrity. • Inconsistent monitoring & inspection – there is no standardised statewide approach to levee inspection, leading to inconsistencies in assessing and addressing risks. • Lack of funding for upgrades – many councils lack dedicated funding to reinforce or rebuild aging levees, leaving communities at risk of catastrophic failure. • Encroaching development – urban expansion and infrastructure projects near levees can put pressure on their structural integrity or reduce their ability to absorb floodwaters. • Climate change impacts – increased rainfall intensity, flooding, sea level rise, and storm surges are placing greater pressure on levees, often exceeding their design capacity.	• Buildings located in levee-protected areas are at high risk of structural damage or total loss when a levee breaches, leading to displacement and economic losses. • Roads, bridges, railways, and utilities (water, gas, electricity, telecommunications) can be severely impacted by flooding, disrupting transport and essential services. • Businesses, agricultural lands, and industrial areas may experience prolonged closures and financial losses due to flood damage and recovery delays. • Hospitals, emergency response centres, and government buildings can become inaccessible, reducing the capacity to respond effectively to disasters. • A failed levee can lead to increased erosion of riverbanks, roads, and surrounding land, destabilising the built environment over time. • Floodwaters can overwhelm sewage systems, industrial sites, and waste facilities, leading to pollution and public health risks. • Post-disaster rebuilding efforts can be significantly more expensive than preventive upgrades and maintenance of levees. • Properties within levee-protected areas may face increased insurance costs or loss of coverage due to heightened flood risk.
Drainage systems	• Aging infrastructure – Many drainage systems were built decades ago and are not designed to handle the increased frequency and intensity of extreme rainfall events. • Undersized capacity – Existing drainage networks may be inadequate to manage higher runoff volumes caused by climate change, urban expansion, and increased impermeable surfaces. • Blockages and sedimentation – Accumulation of debris, sediment, and pollutants can reduce drainage efficiency, leading to localised flooding. • Lack of regular maintenance – Insufficient funding and resources for cleaning, repairs, and upgrades result in reduced performance and increased failure risk.	• Insufficient drainage capacity can lead to flash flooding, inundating homes, businesses, and public spaces. • Buildings and infrastructure can suffer from water infiltration, foundation weakening, and structural degradation due to prolonged exposure to floodwaters. • Flooded streets and highways become impassable, leading to traffic gridlock, damage to road surfaces, and increased accident risks. • Poor drainage can cause soil erosion, destabilising roads, bridges, and building foundations. • Overloaded drainage systems can mix stormwater with sewage, spreading pollutants, bacteria, and hazardous chemicals into urban areas and waterways. (Continued)

Infrastructure Type	Key vulnerabilities raised by stakeholders	Key risks to the resilience of the built environment when vulnerabilities are not addressed
Drainage systems (Continued)	• Inadequate climate adaptation – Many drainage systems were designed based on outdated rainfall and flood modelling, making them vulnerable to intensifying climate impacts. • Sea level rise and tidal backflow – Coastal drainage systems are increasingly affected by rising sea levels, leading to saltwater intrusion and backflow flooding during high tides and storm surges. • Urban development pressures – Increased urbanisation and densification lead to higher runoff, overwhelming existing drainage infrastructure. • Interaction with groundwater – Rising groundwater levels can interfere with drainage outflows, reducing effectiveness and causing prolonged waterlogging. • Lack of integrated water management – Poor coordination between stormwater, wastewater, and flood management systems can result in inefficiencies and unintended vulnerabilities.	• Stagnant water creates breeding grounds for mosquitoes and other disease-carrying pests, increasing risks of waterborne illnesses. • Flooded or waterlogged areas can disrupt or damage essential underground infrastructure, including electrical cables, gas lines, and telecommunication networks. • Frequent drainage failures necessitate costly emergency repairs, clean-up operations, and long-term infrastructure upgrades. • Flooded hospitals, emergency response centres, and government buildings reduce the ability to provide essential services during and after extreme weather events. • Businesses may be forced to close temporarily or permanently due to flood damage, supply chain disruptions, and loss of customer access.
Seawalls	• Aging infrastructure – Many seawalls were constructed decades ago and are now deteriorating due to prolonged exposure to waves, saltwater, and weathering. • Increased wave energy and storm surges – Climate change is intensifying storms and increasing wave heights, subjecting seawalls to greater force than they were originally designed to withstand. • Foundation undermining – Strong waves and currents can erode the base of seawalls, leading to structural instability and eventual collapse. • Sea level rise and overtopping – Rising ocean levels increase the likelihood of waves overtopping seawalls, reducing their effectiveness in protecting coastal infrastructure. • Lack of regular maintenance – Without frequent inspections and repairs, small cracks and weaknesses can expand, leading to catastrophic failures. • Material degradation – Seawalls made of concrete, steel, or other materials degrade over time due to constant exposure to saltwater, leading to corrosion, cracks, and weakening of structural integrity. • Subsidence and land movement – Settling of land behind or beneath seawalls can cause misalignment, tilting, or cracking, reducing their protective capacity.	• If a seawall fails or is overtopped, seawater can inundate coastal towns, residential areas, and critical infrastructure. • Homes, businesses, and public facilities near the coast can suffer structural damage or total loss due to flooding and wave impact. • Seawall failures can accelerate coastal erosion, leading to the loss of roads, footpaths, utilities, and essential infrastructure. • Coastal highways, ports, and bridges may be damaged or washed away, cutting off communities and affecting trade and emergency response. • A compromised seawall can allow seawater to infiltrate groundwater systems and drinking water supplies, reducing water availability for communities and agriculture. • Water treatment plants, power stations, and telecommunication infrastructure located along coastlines are at risk of severe damage if seawalls fail. • Flooding and erosion can devastate tourism-dependent economies by damaging beaches, resorts, and other coastal attractions. • Increased wave action and flooding pose direct risks to human life, particularly in low-lying communities and areas with high foot traffic. (Continued)

Infrastructure Type	Key vulnerabilities raised by stakeholders	Key risks to the resilience of the built environment when vulnerabilities are not addressed
Seawalls (Continued)	- Limited design flexibility – Many older seawalls were built using rigid structures that do not adapt to changing coastal conditions, making them less resilient to dynamic environmental changes. - Adjacent coastal erosion – Seawalls can sometimes worsen erosion in nearby unprotected areas by redirecting wave energy, causing unintended damage to neighbouring coastlines. - Financial constraints – Retrofitting or replacing aging seawalls with modern, climate-resilient designs is expensive, and many councils lack dedicated funding for necessary upgrades.	- Seawall failures can lead to habitat destruction, affecting marine ecosystems, wetlands, and coastal vegetation. - The cost of rebuilding and strengthening seawalls, along with repairing flood and erosion damage, places a financial strain on governments and communities.

Source: Legislative Council Environment and Planning Committee.

Victoria's built environment and climate resilience strategies rely on mitigation infrastructure that is increasingly vulnerable due to inadequate maintenance, outdated design, and escalating climate impacts. Without targeted investment in levees, seawalls, drainage systems, and flood protection assets, the State faces escalating risks of disaster-related damage, economic loss, and reduced community resilience. A proactive, long-term funding model and a statewide strategy for infrastructure betterment are essential to strengthening Victoria's ability to withstand the impacts of climate change.

Chapter 8 considers opportunities for strengthening mitigation infrastructure in more detail, including examining important community-led projects.

FINDING 45: Victoria's climate mitigation infrastructure, including levees, seawalls, and drainage systems, is increasingly vulnerable due to inadequate maintenance, outdated design, and intensifying climate impacts.

6.2.5 Absence of critical infrastructure from Climate Adaptation Action Plans

As discussed in Chapter 4, Victoria's seven Climate Adaptation Action Plans serve as an important framework for managing climate change risks and opportunities across various sectors, including the built environment, transport, and water systems. Despite their broad scope, significant gaps remain in the inclusion of critical infrastructure.

The Plans do not address key critical infrastructure, such as telecommunication towers or poles. Infrastructure Victoria's *Weathering the Storm* report discussed this issue:

The plans cover most infrastructure, but not all. For example, the plans do not mention justice and community safety infrastructure, and do not mention some telecommunication infrastructure, such as telecommunications towers, poles and wires,

and VicTrack's telecommunications network. These omissions mean there are no clear actions to adapt some infrastructure types to climate change.¹⁰¹

The absence of these infrastructure categories from Victoria's Climate Adaptation Plans creates a policy gap that could undermine resilience efforts. Without dedicated actions to safeguard these systems, the State risks increased service disruptions, reduced emergency response capacity, and heightened vulnerabilities for communities reliant on these networks. Addressing these omissions should be a priority to ensure a more comprehensive and resilient adaptation strategy for Victoria's critical infrastructure.

Constitutional responsibility for telecommunications sits with the Federal Government, and the Victorian Government has a role to play in advocating federally that it improves the climate resilience of the telecommunications infrastructure that Victorians rely upon.

RECOMMENDATION 34: That the Victorian Government expand the scope of its Climate Resilience Adaptation Action Plans to explicitly include critical essential infrastructure, such as telecommunications infrastructure.

RECOMMENDATION 35: That the Victorian Government advocate to the Commonwealth Government to fund more resilient telecommunications infrastructure across the State.

6.2.6 Challenges in ensuring developers adopt climate-resilient practices

Stakeholders had varying perspectives on the planning and building industries transition to climate-resilient infrastructure. While some argued that increased regulation and financial burdens hinder housing affordability and project viability, others advocated for stronger regulations to prompt developers to future-proof builds against climate risk.

Developers raised concerns that increased regulatory requirements and associated financial costs are inhibiting the construction of new homes. The Housing Industry Association highlighted that Victorian builders face an expanding set of regulations, increased complexity in building codes, rising insurance premiums, and additional business compliance obligations.¹⁰² It argued that these factors have created significant barriers to housing delivery.¹⁰³

¹⁰¹ Infrastructure Victoria, *Submission 126, Attachment 1*, p. 31.

¹⁰² Housing Industry Association, *Submission 26*, p. 4.

¹⁰³ Ibid.

At a public hearing, Keith Ryan, Executive Director of the Housing Industry Association (Victoria), supported sustainability efforts but urged caution when implementing regulations which could further inflate housing costs. He noted that the sector is already heavily regulated and highlighted the recent implementation of 7-star energy efficiency standard as a significant reform, which the industry is still adjusting to.¹⁰⁴ While acknowledging the importance of sustainability and energy efficiency, Keith Ryan argued that the costs of compliance must be weighed against housing affordability. He emphasised that ‘unnecessarily overly targeted regulatory requirements’ makes it difficult for the industry and advocated for the need to avoid a one-size-fits-all approach.¹⁰⁵ The Housing Industry Association cautioned that ‘the law of diminishing returns is also going to start kicking in at some stage’, and questioned how much more regulation can be imposed before the benefits become marginal while the ‘cost to consumers [becomes] quite dramatic’.¹⁰⁶

The Housing Industry Association emphasised the trade-off between higher construction costs and lower living costs when implementing energy efficiency measures, urging policymakers to strike a balance between climate resilience and affordability. It warned against overly restrictive regulations that could ‘reduce consumer choice’ and impose unnecessary financial burdens on homebuyers.¹⁰⁷ While climate-resilient homes are necessary, regulations should not be applied as a one-size-fits-all approach, as different building sites and designs have unique requirements. Keith Ryan urged the State Government to recognise that ‘market demand over time will lead to that changing’.¹⁰⁸ Keith Ryan cautioned against excessive intervention that may drive up costs unnecessarily. In its submission, the Association called for a moratorium on any new regulatory requirements during this Inquiry, emphasising that ‘uncontrolled “red” and “green” tape burden is crippling the planning system’.¹⁰⁹

Other stakeholders disagreed that regulations concerned with climate risk place an undue burden on planning authorities and developers. For example, the Council Alliance for a Sustainable Built Environment believed there ‘are a wider set of factors’ impacting housing affordability and contended Victoria has no choice but to accept the necessity of climate resilient practices in the building industry.¹¹⁰ Natasha Palich, Executive Officer for the Council Alliance for a Sustainable Built Environment, argued that the Victorian Government needs to provide ‘strong and brave regulation to look after our future communities and the industry will even out’.¹¹¹

¹⁰⁴ Keith Ryan, *Transcript of evidence*, p. 64.

¹⁰⁵ *Ibid.*, p. 66.

¹⁰⁶ *Ibid.*, p. 63.

¹⁰⁷ *Ibid.*, p. 64.

¹⁰⁸ *Ibid.*

¹⁰⁹ Housing Industry Association, *Submission 26*, p. 4.

¹¹⁰ Natasha Palich, *Transcript of evidence*, p. 59.

¹¹¹ *Ibid.*

As noted elsewhere in the Report, stakeholders have raised significant concerns that elements of the planning system lack consistency, particularly regarding climate resilience measures at different levels of government. Local councils contended that the Victorian Government's approach has transferred climate risk to local government without providing adequate statutory mechanisms to enforce climate adaptation requirements at the precinct level.¹¹² Legislative gaps have also been identified, with frameworks permitting the construction of buildings and infrastructure that are inadequately prepared for projected climate events. East Gippsland Shire Council highlighted, despite wide-spread acceptance of climate risk, there remains 'ever-increasing pressure on our council to approve developments on land vulnerable to coastal inundation and flooding risk'.¹¹³

Additionally, some stakeholders criticised regulatory overlap or duplication for the planning and building sectors which adds to the complexity and uncertainty of regulations. Keith Ryan from the Housing Industry Association pointed out the ongoing friction between planning and building codes, urging the government to avoid unnecessary duplication that adds bureaucracy without meaningful benefits. He pointed to the adoption of standards already reflected in the National Construction Code as an example:

government has a role to play in providing more certainty about what is possible in the planning space ... planning and building do have an overlap, and there has been a constant source of friction about how much the [National Construction Code], which is a national reform, at least in theory, applies and how much planning can overlap with that. And so that is a challenge to ensure we do not have unnecessary duplication, and that is a point I would just stress as being important.¹¹⁴

Other stakeholders also warned against regulatory duplication in other areas relevant to the planning and building sectors, such as:

- approaches to assessing climate change risks across Victoria¹¹⁵
- roles and responsibilities of planning decision-makers and other stakeholders.¹¹⁶

Lack of clarity stemming from compounding regulatory duplication and overlap contributed to industry's uncertainty about regulations. In relation to updating ESD standards, the Planning Institute of Australia (Victorian branch) stated:

While 'policy' changes have been made as part of the State ESD Roadmap, the failure to progress any meaningful requirements for new development means the policy has no 'teeth' in implementation. Council is implementing their own policies, creating inconsistency and uncertainty around expectations for proponents. ESD is still seen as a

¹¹² Yarra City Council, *Submission 25*.

¹¹³ Cr Tom Crook, *Transcript of evidence*, p. 3.

¹¹⁴ Keith Ryan, *Transcript of evidence*, pp. 65–66.

¹¹⁵ Foundation for Rural and Regional Renewal, *Submission 212*.

¹¹⁶ Infrastructure Victoria, *Submission 126*.

‘luxury’ with design requirements critical to delivering ‘climate safe’ homes being viewed as ‘extras’ rather than core components of the design of new dwellings in the state.¹¹⁷

Infrastructure Victoria’s report on *Opportunities to reduce greenhouse gas emissions of infrastructure* (which it attached to its submission) noted multiple guides are available for carbon emissions management. However, this has resulted in an ‘increase[d] administrative burden’ and there is still uncertainty about the ‘most effective way to promote carbon reduction through procurement’.¹¹⁸

Keith Ryan from the Housing Industry Association also emphasised that builders and developers are experiencing a ‘lack of information and certainty’. This has made it difficult for them to ‘make informed decisions’ and called on the Victorian Government to improve certainty by providing clear regulations, avoiding unnecessary duplication and overlap.¹¹⁹

The capacity of developers and builders to take up climate resilient practices is also a significant barrier. The Committee heard that the industry faces financial constraints and other challenges when procuring equipment, materials or other items which are more climate resilient. This issue is discussed in detail in Chapter 7.

Improving the uptake of climate-resilient practices by developers is a multifaceted challenge that requires a strategic combination of regulatory measures, financial incentives, and collaborative efforts. To assist developers to take up climate-resilient practices several important actions are needed, such as:

- **Addressing developer concerns:** To mitigate the concerns raised by developers, policymakers should consider financial incentives to offset costs associated with compliance with climate-resilient building codes. Standardised regulatory frameworks should be introduced to reduce inconsistencies across local councils and ensure a coherent approach to climate resilience.
- **Strengthening climate resilience requirements:** Consideration should be given to whether planning schemes should be amended to incorporate mandatory climate resilience measures at the precinct level. This will ensure systematic adaptation rather than fragmented, case-by-case adjustments. State and federal governments must allocate greater funding support for local governments to facilitate large-scale infrastructure retrofitting projects.
- **Public-private cooperation:** Developing partnerships between government, industry, and environmental groups is crucial to integrating climate resilience measures in a cost-effective manner. Collaboration will help identify viable pathways for sustainable development that balance economic considerations with long-term community safety and environmental stability.

¹¹⁷ Planning Institute of Australia (Victoria), *Submission 258*, pp. 4–5.

¹¹⁸ Infrastructure Victoria, *Submission 126*, p. 54.

¹¹⁹ Keith Ryan, *Transcript of evidence*, p. 65.

In considering the challenges associated with ensuring developers adopt climate-resilient practices, the Committee acknowledges the complexity of balancing regulatory requirements, industry viability, and long-term climate resilience. While some stakeholders expressed concerns over increased regulation and financial burdens, others emphasised the necessity of strong and consistent policy interventions to future-proof developments against climate risk. The evidence received highlights the need for a more coordinated approach across all levels of government to reduce inconsistencies, regulatory duplication, and uncertainty within the planning and building sectors.

Addressing these issues requires a mix of well-targeted regulations and appropriate incentives to ensure that climate resilience measures are both practical and economically sustainable. The Committee recognises that collaboration between government, industry, and other stakeholders is essential to overcoming these barriers. By fostering clear and consistent regulatory frameworks, supporting developers through financial mechanisms, and facilitating public-private partnerships, the State can achieve a built environment that is climate resilient, viable for developers and accessible to homebuyers.

FINDING 46: Clear and consistent regulatory requirements provide greater certainty to the planning and building industries regarding the standards necessary to address climate risk. A combination of strong regulations and targeted incentives is required to encourage and assist them to adopt climate-resilient practices.

RECOMMENDATION 36: That the Victorian Government undertake a review of planning and building regulations to reduce duplication and inconsistencies related to climate resilience requirements. This should include developing a clear, standardised framework that aligns local, state, and national regulations to provide greater certainty for developers and planners.

RECOMMENDATION 37: That the Victorian Government work with property developers and the building and construction industry to improve climate-resilient building practices. This work should balance upfront costs with long-term affordability and sustainability.

6.3 Shifting from a ‘like-for-like’ approach to a betterment approach

The transition to a betterment approach is essential for ensuring long-term climate resilience. Evidence from stakeholders highlighted barriers and opportunities for implementing betterment practices in Victoria. Concern about the like-for-like approach was especially raised in relation to projects under the Disaster Recovery Funding Arrangements which supports restoration following disasters, including extreme weather events.

As discussed in Section 6.2 above, the like-for-like approach to restoring damaged public assets is often counterintuitive to progressing infrastructure resilience. Important assets, especially mitigation assets protecting a community’s broader built environment, are often at high-risk of damage from adverse weather events. The like-for-like approach to asset restoration results in a resiliency gap, leaving assets susceptible to recurrent damage and imposing ongoing financial burdens on councils. In its examination of the 2022 flood event, the Committee made recommendations to the Victorian Government to prioritise betterment (see Table 6.3 below).

Table 6.3 Betterment, Recommendations, *Inquiry into the 2022 flood event in Victoria*

No.	Recommendation	Government’s response
39	That the Victorian Government prioritise investment in betterment projects to improve resilience of mitigation infrastructure, and in doing so work with the Commonwealth Government to achieve this goal.	Support in principle
40	That the Victorian Government adapt policies and funding models to prioritise betterment initiatives, including ensuring that financial resources are allocated effectively to meet long-term needs of at-risk communities, and in doing so work with the Commonwealth Government to achieve this goal.	Support in principle

Source: Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into the 2022 flood event in Victoria*, July 2024; Victorian Government, Response to the Parliament of Victoria, *Inquiry into the 2022 flood event in Victoria*, 6 February 2025.

While like-for-like is the standard approach, the Victorian Government has recently approved betterment funding, acknowledging that ‘building back better’ can mitigate impacts of future climate-related events. The Municipal Association of Victoria highlighted that:

Betterment funding was first approved in Victoria for a select number of councils impacted by the October 2022 floods. Fourteen of the 63 councils affected by the floods received a share of a total \$9.4 million, announced ten months after the event, which allowed for these councils to make small scale improvements.¹²⁰

In 2023, the Victorian and Federal Governments issued joint funding for ‘priority betterment’ for select councils affected by the 2022 flood event. In a joint media release, Hon Murray Watt (Federal Minister for Emergency Management) and Hon Jaclyn Symes (Victorian Minister for Emergency Services¹²¹) explained that financial assistance—jointly funded through the Disaster Recovery Funding Arrangements—would support:

Fourteen of the most severely impacted councils from the October 2022 floods will receive funding through a \$9.4 million Council Priority Betterment Program to improve the resilience of essential public assets like roads, bridges and footpaths damaged as a direct result of the flood event.

¹²⁰ Municipal Association of Victoria, *Submission 232*, p. 10.
¹²¹ Hon Jaclyn Symes was Minister for Emergency Services between August 2021 and December 2024.

These councils are Buloke, Campaspe, Central Goldfields, Gannawarra, Loddon, Moira, Murrindindi, Benalla, Bendigo, Hepburn, Mildura, Pyrenees, Shepparton and Strathbogie.

...

Key assets that help communities stay connected and reduce hardship during and after disasters, such as culverts and roads, will be prioritised.¹²²

Evidence to the 2022 flood inquiry questioned whether the funding allocated would be able to support sufficient betterment.¹²³

The betterment approach provides a pathway to enhance infrastructure resilience and reduce future costs associated with repeated repairs. Sarah Matthee, Climate Solutions Portfolio Lead for the Foundation for Rural and Regional Renewal, reflected on the ‘missed opportunity’ of betterment and its capacity for more proactive adaptation, which is critical for ensuring infrastructure can withstand increasing climate risks.¹²⁴

I think the opportunity around building back better is to make sure that we are not facing the same impacts again and again.

Sarah Matthee, Climate Solutions Portfolio Lead, Foundation for Rural and Regional Renewal, public hearing, Mount Macedon, 3 December 2024, *Transcript of evidence*, p. 51.

Roads were particularly highlighted as important infrastructure which could benefit from a betterment approach, especially in areas at high-risk of extreme weather events. Frances Ford, Coordinator of Emergency Management and Resilience at City of Greater Bendigo, provided an example area for betterment:

Sometimes it is as basic as that: the thickness of your road base. If you have to do a really thin layer because you cannot afford any more, it will wash away really fast ... It was just as simple as that. Yes, it is more per metre, but it more than pays for itself within a very short period of time. That is just one example.¹²⁵

Kim O'Connor from Yarra Ranges Council explained how simple measures, such as applying light seals on steep roads and improving drainage, can significantly enhance infrastructure resilience with minimal additional costs:

We have invested in building back, and then for additional funds we are able to put a light seal over that road, especially on steep roads, and that helps actually build it back better and then improves the drainage. It does not necessarily need a lot more funds to do it, but it is just the approach and making sure that then there is a consistent way to build back better. There is definitely a benefit to having those available funds and how we then look at doing it differently or creatively as well when we build back. As you

¹²² Hon Murray Watt and Hon Jaclyn Symes, 17 August 2023, online, <<https://minister.homeaffairs.gov.au/MurrayWatt/Pages/priority-betterment-funding-flood-affected-victorian-councils-17082023.aspx>> accessed 29 January 2025.

¹²³ See, for example: Lincoln Fitzgerald, Chief Executive Officer, Loddon Shire Council, public hearing, Echuca, 24 August 2023, *Transcript of evidence*.

¹²⁴ Sarah Matthee, *Transcript of evidence*, p. 51.

¹²⁵ Frances Ford, *Transcript of evidence*, p. 14.

drive up here or as you drive the roads, I think you will see that where we interface our unsealed roads with a department of transport road, you will see that washouts occur. You will get gravel on the road just in those simple locations where there could be a build-back opportunity in just improving the asphalt aprons on those types of roads as well and investing in that.¹²⁶

The Committee heard broad calls from stakeholders, particularly local councils, for stronger support to transition from a like-for-like approach to a betterment approach in rebuilding infrastructure after disasters. Mayor Tom Crook from East Gippsland Shire Council emphasised the need for a shift in funding arrangements, stating:

council[s] must be supported to build back better. There seems to be a presumption in a lot of our existing funding arrangements that when infrastructure is damaged we just build it back the same. We need to build those bridges higher so they do not get washed away in the next flood.¹²⁷

Mayor Crook called on the Victorian Government to work with the Commonwealth to embed betterment principles in disaster recovery funding, noting that investing in resilient infrastructure is critical for economic productivity, community wellbeing, and quality of life.¹²⁸

Similarly, Merri-bek City Council highlighted the need for proactive funding, arguing that current disaster funding arrangements fall short. It stated:

There should be funding to allow local governments and state agencies to proactively upgrade and improve the resilience of infrastructure, rather than just after a disaster. Where assets are impacted by disasters, insurance payouts should account for “building back better” instead of like-for-like replacements that are untenable.¹²⁹

Merri-bek City Council also urged the establishment of betterment funds like those in Queensland and New South Wales, alongside resources to help councils assess and plan for effective and cost-efficient infrastructure adaptations. These calls underline the urgency of rethinking disaster recovery processes to ensure infrastructure is designed to withstand future climate challenges. Queensland’s betterment model is discussed further in the Section below.

Councils should also be supported with resources to effectively assess and determine appropriate adaptation actions and the cost-effectiveness of such actions, to understand the extent of refits or redevelopments required and plan appropriately in budgets and asset planning.

Merri-bek City Council, *Submission 186*, p. 8.

¹²⁶ Kim O’Connor, *Transcript of evidence*, p. 12.

¹²⁷ Cr Tom Crook, *Transcript of evidence*, p. 2.

¹²⁸ Ibid.

¹²⁹ Merri-bek City Council, *Submission 186*, p. 8.

Adjusting disaster funding arrangements or establishing a dedicated funding stream can embed a betterment approach into Victoria's approach to upgrading infrastructure. This was advocated for by many stakeholders. Warren Smith, Coordinator of Climate Change and Heritage at Cardinia Shire Council, argued that betterment is necessary for long-term resilience.¹³⁰ Similarly, Frances Ford from City of Greater Bendigo emphasised that 'from every angle, whether it be financial investment and what makes sense, social good of the community or community wellbeing more generally, the principles of build back better'.¹³¹

Ensuring we invest in more resilient infrastructure is critical to underpin our economic productivity, our quality of life, and ultimately the wellbeing of our communities.

Cr Tom Crook, Mayor, East Gippsland Shire Council, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, p. 3.

To overcome the barriers and fully realise the benefits of a betterment approach, a number of recommendations were proposed by stakeholders, such as:

1. **Establish a Victorian Betterment Fund:** The Victorian Government should create a dedicated fund, similar to the Queensland Betterment Fund. This fund could provide councils with the financial resources necessary to incorporate resilient designs during post-disaster reconstruction.¹³²
2. **Revise Disaster Recovery Funding Arrangements:** Betterment should be recognised as an eligible expense under disaster recovery funding.¹³³
3. **Encourage collaboration between governments:** Greater trust and coordination between local, state, and federal governments are needed to streamline funding processes.¹³⁴
4. **Support proactive adaptation:** Funding should also be available for proactive upgrades, rather than being limited to post-disaster reconstruction.¹³⁵
5. **Incorporate insurance reforms:** The Victorian Government should collaborate with the insurance industry to move towards build back better financing options. This would encourage insurance payouts that support resilient rebuilding rather than like-for-like replacements.¹³⁶
6. **Embed betterment in planning processes:** Betterment principles should be incorporated into state and local planning frameworks to ensure resilience is a fundamental consideration in infrastructure projects. This would align funding mechanisms with long-term sustainability goals.

¹³⁰ Warren Smith, *Transcript of evidence*, p. 12.

¹³¹ Frances Ford, *Transcript of evidence*, p. 4.

¹³² Victorian Greenhouse Alliances, *Submission 129*.

¹³³ Ibid.

¹³⁴ Bernie O'Sullivan, *Transcript of evidence*, p. 7.

¹³⁵ Merri-bek City Council, *Submission 186*.

¹³⁶ Victorian Greenhouse Alliances, *Submission 129*.

However, the Committee was made aware there are potential challenges to shifting towards a betterment approach. Given the significant financial requirements for a betterment approach to upgrading infrastructure, cooperation between all levels of government is necessary. At a public hearing, Bernie O'Sullivan from Macedon Ranges Shire Council argued that a key reason betterment has not been adopted in Victoria is because there 'needs to be a greater level of trust between levels of government'. He further stated:

The sense we get is the Victorian government is reluctant to go there because they feel that there will be financial exposure for them, that they might be carrying the financial risk. So that means from a council point of view we just see it not happening. What we implore is that the Victorian government and the Commonwealth government work it out. It is clearly working in other states, so there needs to be a high level of trust.¹³⁷

Bernie O'Sullivan explained the burden on local councils because the trust between governments is not there to support a betterment approach:

It is really clear when disasters happen that stuff needs to get fixed, and at the moment we are fixing it to the day-to-day standard, not a future standard, so when the disaster is not here, looking at what criteria are we are going to use. What is the process, how do we streamline that and how do we make it easy for councils, because at the moment it is a handball, we see from a council point of view, between the Victorian government and the Commonwealth government, both saying it is them.¹³⁸

The Committee acknowledges the critical need to shift from the current reactive approach of rebuilding infrastructure to its pre-disaster state toward a more proactive and sustainable betterment framework. Evidence presented to the Committee highlighted the economic, social, and environmental benefits of incorporating climate-resilient designs in post-disaster reconstruction and proactive adaptation. Stakeholders emphasised that existing disaster recovery funding arrangements in Victoria focus heavily on short-term fixes, leaving communities vulnerable to recurring damage and imposing higher long-term costs.

To address these challenges, the Committee has identified findings and developed recommendations aimed at embedding betterment principles into Victoria's disaster recovery and infrastructure planning processes. These measures are essential to enhance climate resilience, protect communities, and ensure sustainable and cost-effective infrastructure outcomes.

FINDING 47: Rebuilding infrastructure with a betterment approach reduces long-term costs by minimising the need for repeated repairs and ensuring assets are more resilient to future climate events.

¹³⁷ Bernie O'Sullivan, *Transcript of evidence*, p. 15.

¹³⁸ Ibid.

RECOMMENDATION 38: That the Victorian Government support betterment in rebuilding infrastructure with climate resilient designs and provide funding to local government to help achieve this.

RECOMMENDATION 39: That the Victorian Government work with the Commonwealth to reform disaster recovery funding frameworks to:

- a. Ensure that betterment is recognised as an eligible expense, and infrastructure is not just replaced 'like for like' where appropriate.
- b. Expand eligibility to include heatwaves, droughts, and other climate-related events in disaster declarations and funding access.
- c. Support local capacity by providing long-term funding to councils for resilient upgrades to roads, drainage, and community assets.
- d. Shift funding emphasis toward proactive mitigation, adaptation and resilience-building to reduce long-term recovery costs.

6.3.1 Queensland's betterment approach

Throughout the Inquiry, several stakeholders highlighted Queensland's approach to betterment as a best practice example of building climate resilience. Under the Queensland Government's *Strategy for Disaster Resilience 2022–2027*, betterment is the cornerstone of the State's disaster resilience approach aiming to enhance the durability of essential public assets against future natural disasters.

The betterment approach is implemented through targeted funding (Queensland Betterment Fund, see Box 6.9 below), which covers the additional costs of improving infrastructure beyond standard restoration expenses. By upgrading these assets to a more resilient standard, the approach seeks to mitigate the impact of future disasters, reduce economic and social disruption, and improve long-term sustainability. This strategy aligns with the National Strategy for Disaster Resilience and reflects a shift towards proactive disaster management, where infrastructure is designed to withstand future events rather than requiring repeated repairs.

Box 6.9 Queensland Betterment Fund

In 2013, the Queensland Reconstruction Authority established the Betterment Fund to provide ‘upfront investment’ in rebuilding disaster impacted assets to be more resilient. The Queensland Government explained that betterment funding can ‘save money for all levels of government in future disasters’. Since inception, the Fund has supported over 740 projects, with over \$533 million allocated.

The primary objectives of the Betterment Fund are to:

- restore essential public assets to a more resilient standard, enhancing their capacity to withstand future disasters
- reduce future disaster recovery costs by minimising the frequency and severity of damage
- address Queensland’s assessed natural hazard risks in alignment with Commonwealth and State strategies.

Eligible applicants for funding include local governments and state agencies responsible for essential public assets. The funding covers the additional costs incurred to rebuild these assets to a more resilient standard, beyond the expenses of restoring them to their original condition.

An example betterment project supported under the Fund was improvements to Gayndah Mundubbera Rd (North Burnett Regional Council), an essential freight and transport link. Following successive damage, 2km of the road was relocated and the entire road was made more resilient through new stormwater drainage (e.g., culverts). Since the project, the road has been impacted by eight disasters but remained functional with only minor expenditure.



(Continued)

Box 6.9 Continued

The 2024 Betterment Funds Paper described the outcomes of the initiative:

- 1,173 betterment sites have been impacted by 44 events, with 78% suffering no or minor/superficial damage.
- From re-impacted projects, an investment of \$244 million generated over \$988 million in savings or avoided costs.
- Essential public assets have been able to withstand extreme weather events and return to functionality shortly after the event.
- Other tangential benefits of more resilient assets are connected communities, continuity of essential services (i.e., telecommunications), continued business activity and reduced environmental impacts.

Source: Queensland Reconstruction Authority, *Queensland Strategy for Disaster Resilience 2022–2027*, 2022, <https://www.qra.qld.gov.au/sites/default/files/2022-09/queensland_strategy_for_disaster_resilience_high_res.pdf> accessed 2024; Queensland Reconstruction Authority, *Queensland Betterment Funds Paper*, 2023, <https://www.qra.qld.gov.au/sites/default/files/2023-07/0805_betterment_funds_paper_2023_0.pdf> accessed 2024.

Several stakeholders noted Queensland's approach to betterment, calling on the Victorian Government to consider a similar initiative. The Victorian Greenhouse Alliances emphasised the 'growing evidence that investment in betterment can prevent or reduce damages from disaster events'.¹³⁹ It outlined the outcomes from the Queensland Benefit Fund to demonstrate how substantial reconstruction costs were avoided.

Other stakeholders also highlighted the outcomes of Queensland's betterment approach, stating that it has demonstrated significant and positive results.¹⁴⁰

Tiffany Harrison, Coordinator of the Gippsland Alliance for Climate Action, recommended Victoria take a betterment approach using Queensland as an example:

One of the things that we would recommend as well as what has already been said is betterment, so building back better. You are probably aware of the Queensland model where they have a fund where instead of just disaster recovery funding they allow for betterment, and out of those results it is really fitting and showing that about 79 per cent of those projects which have been built back better ... have not had any subsequent damage or impact from having a better result in things like elevating or looking at that landscape and how to how to build for resilience.¹⁴¹

¹³⁹ Victorian Greenhouse Alliances, *Submission 129*, p. 3.

¹⁴⁰ Municipal Association of Victoria, *Submission 232*, p. 10.

¹⁴¹ Tiffany Crawford, *Transcript of evidence*, p. 5.

Frances Ford from the City of Greater Bendigo described the Queensland Betterment Fund as the ‘best-known example’ of a betterment approach demonstrating the ‘value of investment’:

it makes no sense to be spending money on work that can literally be washed away, sometimes not years later but a few weeks later. We feel really strongly that if we cannot have something similar to the Queensland Betterment Fund in Victoria, we are going to be continuing to waste money. For long-term sustainability those principles just make sense on all levels.¹⁴²

At a public hearing Victorian Government representatives were asked whether a similar approach could be taken in Victoria, especially a funding program. John Bradley, Secretary of the Department of Energy, Environment and Climate Action, responded that:

think one of the questions as you look at the changing flood risk and the nature of the current incumbent properties that are at risk is just how to mitigate the most acute risks and what the overall cost of a program would look like for the community if you were to look at a fund based around those kinds of principles. There has not been any decision to progress a model like that.¹⁴³

Andrew McKeegan from the Department of Transport and Planning echoed this:

I know one of the things we have been doing historically and one of the problems we have is around what the material information is you can provide to people to ensure that they know how to do adaption and actually manage the changes. If they are doing a small extension or changes or updates, they can do things like get power points to the right level or manage other things within a design context and look for ways in which we can try and address the problem you are talking about but not necessarily have a significant fund to be able to look at buybacks and do other things.¹⁴⁴

6.4 Insurance

While the insurance industry may seem to be outside the remit of the inquiry’s terms of reference, we suggest that there are clear linkages between the climate resilience of Victoria’s built environment and infrastructure, the affordability of insurance for homeowners, and the behaviour of insurers in their management of insurance claims after a climate-related disaster.

Financial Counselling Victoria, *Submission 151*, p. 5.

For communities, one of the most pressing barriers to strengthening climate resilience is the cost and availability of insurance. Rising premiums, policy exclusions, and the

¹⁴² Frances Ford, *Evidence of transcript*, p. 4.

¹⁴³ John Bradley, *Transcript of evidence*, p. 87.

¹⁴⁴ Andrew McKeegan, *Transcript of evidence*, p. 87.

financial burden of recovery disproportionately affect local governments, businesses, and residents, limiting the capacity to build back in a more climate-adaptive manner.

Insurance costs for climate-vulnerable areas are escalating, placing financial strain on communities and making it difficult for individuals and businesses to afford adequate coverage. As observed by Renae Littlejohn from Mornington Peninsula Shire Council, 'communities are struggling with rising insurance premiums and the costs associated with rebuilding to new climate-resilient standards'.¹⁴⁵ This was echoed by Merri-bek City Council which noted the findings of a NC Economics study which 'estimated that average annual damages to infrastructure in Merri-bek City Council are expected to double by 2050 and triple by 2100'.¹⁴⁶ As such, Merri-bek contended that:

Insurance costs will also continue to increase as climate change is being factored into premiums and insurers are limiting their coverage of significant risks. In many cases insurance for infrastructure and properties may be unavailable entirely, as risks to properties are deemed too high.¹⁴⁷

Other stakeholders also expressed that growing climate hazards are increasing risks to property and infrastructure which could be deemed uninsurable.¹⁴⁸ This is particularly concerning for properties in high-risk areas that become subject to new planning overlays based on emerging climate science. As climate risk assessments improve and new data on hazards such as flooding, bushfires, and coastal inundation become available, properties that were previously considered low or moderate risk may suddenly be designated as high risk. This can lead to a situation where homeowners and businesses face soaring insurance premiums or even become uninsurable, despite not being aware of these risks at the time of purchase.¹⁴⁹

Some high-risk areas are experiencing insurance retreat, where insurers either withdraw coverage or set prohibitive premiums, effectively making insurance inaccessible. This is particularly relevant for coastal regions vulnerable to sea-level rise and storm surges.¹⁵⁰ For example, East Gippsland Shire Council raised concerns about communities vulnerable to sea level rise, noting that locations such as Lakes Entrance and Raymond Island face heightened risks of coastal inundation.¹⁵¹ Updates to flood mapping or bushfire overlays may also result in properties being reclassified into areas where insurance providers either refuse coverage or impose excessive premiums that make continued occupancy financially unviable. Moira Shire Council highlighted that local governments are having difficult conversations with communities about whether to 'retreat or protect' against climate hazards, given the escalating costs associated with defending vulnerable properties.¹⁵²

¹⁴⁵ Renae Littlejohn, *Transcript of evidence* p. 2.

¹⁴⁶ Merri-bek City Council, *Submission 186*, p. 4.

¹⁴⁷ Ibid.

¹⁴⁸ See, for example: Benalla Sustainable Future Group, *Submission 189*.

¹⁴⁹ Eastern Community Legal Centre, *Submission 260*, pp. 9–11; Friends of the Earth Melbourne, *Submission 192*, p. 16.

¹⁵⁰ Insurance Council of Australia, *Submission 46*, p. 2.

¹⁵¹ Cr Tom Crook, *Transcript of evidence*, p. 2.

¹⁵² Bryan Sword, *Transcript of evidence*, p. 3.

The City of Greater Bendigo outlined its growing premiums which have coincided with increasing claims from the public:

Council has engaged its insurer for flood related damage in recent years. As a result, costs have continued to increase year on year. As an example, Council's property contribution increased by 25% from 2020/21 to 2023/24. At the same time Council's ability to claim for flood damages reduced from \$20M to \$2M.

There has also been an increase in members of the public pursuing claims against Council where they believe the organisation is liable for flooding to their property rather than lodging a claim with their insurer.¹⁵³

The unpredictability of insurance costs due to evolving risk assessments creates financial instability for property owners who may have purchased homes in good faith, only to discover years later that they are unable to secure affordable insurance. This also has flow-on effects for property values, mortgage lending, and the ability of local governments to manage growing infrastructure challenges.¹⁵⁴ Without a regulatory framework to ensure insurance remains available and affordable in these changing conditions, more properties and communities will face financial problems, undermining efforts to foster long-term climate resilience.

Beyond cost, many property owners and councils are discovering that their insurance policies do not provide adequate coverage for climate-induced damage. Bernie O'Sullivan, Chief Executive Officer of Macedon Ranges Shire Council, highlighted that:

Insurance that council might have, along with the Commonwealth disaster recovery funding arrangements, are the two key funding streams that council is reliant upon in extreme weather events. Both are subject to strict qualification criteria and exclusions which do not fully protect councils from the financial burden of climate change.¹⁵⁵

These exclusions often leave local governments responsible for the costs of infrastructure repairs and adaptation measures. However, as discussed in Section 6.1.1 above, local governments are under increasing financial constraint, making it difficult to match the funding gap between actual repair costs and insurance coverage.

Insurance costs are increasing while coverage is decreasing.

City of Greater Bendigo, *Submission 158*, p. 2.

The Macedon Ranges Shire Council provided a stark example of how increasing climate disasters are financially overwhelming local governments:

extreme weather events attributed to climate change are the largest financial burden for council. As an example, the windstorm damage sustained in mid 2021 – four weeks

¹⁵³ City of Greater Bendigo, *Transcript of evidence*, p. 12.

¹⁵⁴ Benalla Sustainable Future Group, *Submission 18*; Victorian Farmers Federation, *Submission 252*; Financial Counselling Victoria, *Submission 151*.

¹⁵⁵ Bernie O'Sullivan, *Transcript of evidence*, p. 2.

after I started at the Macedon Ranges Shire Council – resulted in Macedon Ranges Shire Council incurring \$21 million in associated expenditure. It took nearly three years to process all the claims arising from that single event, and significant costs in excess of \$5.6 million borne by council were not able to be claimed back.¹⁵⁶

In relation to private insurance, property owners are similarly facing increasing costs for their insurance premiums which may not be providing adequate coverage.¹⁵⁷ Friends of the Earth Melbourne discussed the findings of a 2022 report by the McKell Institute, supported by the Insurance Council of Australia, which detailed the significant cost growth anticipated due to climate change:

the average annual household cost of extreme weather has been \$888 over the past 10 years. This figure is expected to jump to more than \$2,500 a year by 2050. Disaster resilience currently accounts for 2% of spending, in comparison to \$24 billion of current Commonwealth expenditure on disaster relief. Evidence that the insurance cost to everyday Australians will be significant is demonstrated in the \$3.9 billion increase between 2021 and 2022. This insurer data provides insights based on a review of extreme weather events during the 12 month period.¹⁵⁸

This has raised adjacent concerns that renters will become responsible for bearing the costs of higher premiums with rental providers offsetting costs through increased rental rates. Bass Coast Shire Council discussed this, stating:

Increased costs of insurance premiums will be passed on to tenants, driving up rental expenses, and already some communities across Victoria are facing the prospect of being uninsurable within the decade. The Victorian and Federal government must work closely with the insurance industry to ensure address the insurability crisis in Australia, which is being driven by climate change.¹⁵⁹

Insurance concerns were also raised by stakeholders to the *Inquiry into the 2022 flood event in Victoria*. Box 6.10 details the Committee's Findings and Table 6.4 shows its recommendations (including the Government's response).

¹⁵⁶ Bernie O'Sullivan, *Transcript of evidence*, p. 2.

¹⁵⁷ Insurance Council of Australia, *Submission 46*.

¹⁵⁸ Friends of the Earth Melbourne, *Submission 192*, p. 16.

¹⁵⁹ Bass Coast Shire Council, *Submission 181*, p. 7.

Box 6.10 Findings from the Final Report on the Inquiry into the 2022 flood event in Victoria, insurance

- FINDING 88:** By September 2023, there were over 10,000 insurance claims from the 2022 flood event, totalling \$489 million; 87% of all claims have been closed, with a lower closure rate for residential and commercial property claims.
- FINDING 89:** Timely insurance processing is crucial for easing financial strain and expediting post-disaster rebuilding. Delays or inadequate coverage prolong hardships, hindering recovery for individual and communities.
- FINDING 90:** The significant challenges faced by insurers and policyholders during the 2022 flood event underscore the urgent need for enhanced national coordination and reform in disaster insurance practices.

Source: Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into the 2022 flood event in Victoria*, July 2024.

Table 6.4 Insurance, Recommendations, *Inquiry into the 2022 flood event in Victoria*

No.	Recommendation	Government's response
72	That following the outcomes of the House of Representatives' <i>Inquiry into insurers' responses to 2022 major floods claims</i> , the Victorian Government advocate to the Commonwealth Government that it take action to ensure residents and businesses in flood-affected areas can obtain and maintain necessary insurance.	Support in principle

Source: Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into the 2022 flood event in Victoria*, July 2024; Victorian Government, Response to the Parliament of Victoria, *Inquiry into the 2022 flood event in Victoria*, 6 February 2025.

In its response to the Committee's Final Report on the 2022 flood event, the Victorian Government acknowledged that insurance support is a significant issue for homeowners and businesses following disasters, particularly in cases of widespread flooding. It noted that:

It is challenging for some policy owners to access the full extent of their insurance payments following protracted negotiations with insurance providers. Complicating this further is the heightened demand on insurers following a disaster, which extends wait times for information and delays advice on what is claimable under each policy and the evidence required to demonstrate impact.¹⁶⁰

The Government has also indicated that it regularly engages with industry groups to highlight emerging risks and systemic challenges. However, as noted in the *Inquiry into insurers' responses to 2022 major floods claims*, the regulation of the consumer

¹⁶⁰ Government of Victoria, *Response to the Parliament of Victoria, Legislative Council Environment and Planning Committee Inquiry into the 2022 flood event in Victoria*, 6 February 2025, p. 22.

insurance industry falls under Commonwealth authority. Despite this, Victoria has positioned itself as the only State actively advocating for improved insurance outcomes as part of the Commonwealth review process.¹⁶¹

As part of its response to Recommendation 48 of the 2022 flood event report, the Victorian Government indicated that in 2025 it will:

launch a public awareness campaign encouraging the uptake of appropriate insurance for Victorian homeowners. This campaign will be delivered through a partnership model with councils and key emergency management agencies, using existing relationships to ensure communities receive tailored resources. Communication material will be developed in collaboration with councils and customised to meet local needs.¹⁶²

Addressing insurance barriers or issues generated by inadequate coverage requires a multi-faceted policy response. Stakeholders recommended the following key reforms:

- establishing public-private partnerships¹⁶³
- providing financial incentives or regulatory support¹⁶⁴
- shifting from a like-for-like approach to a build back better model¹⁶⁵
- implementing a statewide approach to risk mapping and insurance pricing.

The interplay between climate risk and the insurance industry is a critical determinant of Victoria's ability to build a resilient future. Rising premiums, policy exclusions, and limited access to funding for betterment are significant obstacles to adapting the built environment to increasing climate threats. Without targeted interventions to address these barriers, communities will face growing financial strain, reduced adaptive capacity, and increased exposure to disaster risks. Legislative and policy reforms are necessary to ensure that insurance supports, rather than hinders, the transition to a climate-resilient built environment.

FINDING 48: The rising cost and decreasing availability of insurance, particularly for properties newly designated as high-risk due to updated climate overlays, present a significant challenge to building climate resilience. Homeowners, businesses, and local governments are facing escalating premiums, policy exclusions, and financial strain that can undermine recovery and adaptation efforts.

¹⁶¹ Government of Victoria, *Response to the Parliament of Victoria, Legislative Council Environment and Planning Committee Inquiry into the 2022 flood event in Victoria*, 6 February 2025, p. 22.

¹⁶² Government of Victoria, *Response to the Parliament of Victoria, Legislative Council Environment and Planning Committee Inquiry into the 2022 flood event in Victoria*, 6 February 2025, pp. 58–59.

¹⁶³ ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*.

¹⁶⁴ Yarra Climate Action Now, *Submission 126*.

¹⁶⁵ City of Port Phillip, *Submission 155*.

6.5 Committee comment: Enabling communities to lead resilience

Ensuring a climate-resilient built environment requires not only strong policy frameworks, funding mechanisms, and planning reforms but also deep community engagement. As outlined in this Chapter, local governments face significant barriers in implementing resilience measures, from funding constraints and regulatory gaps to difficulties in securing public support. However, despite these challenges, community participation remains one of the most powerful drivers of effective climate adaptation.

Empowering communities to take an active role in resilience-building efforts ensures that adaptation measures are not only technically sound but also socially accepted and locally relevant. Local councils have emphasised the need for clear, accessible climate risk data, community education initiatives, and sustained investment in local infrastructure upgrades. Strengthening social licence for climate adaptation projects through transparent communication and participatory decision-making processes will be essential to overcoming resistance and ensuring long-term success.

The resilience of Victoria's built environment is intrinsically linked to the engagement and preparedness of the individuals and communities who inhabit it. While governments at all levels must lead in providing the necessary regulatory and financial support, climate adaptation cannot be solely reliant on top-down approaches. Community-led initiatives, such as neighbourhood-scale resilience planning, household energy efficiency upgrades, and local emergency preparedness efforts, will be critical components of a broader climate adaptation strategy.

Chapter 9 shifts the focus from community-wide resilience to individual action, exploring what homeowners, renters, and property owners can do to enhance the climate resilience of their own properties.

Chapter 7

Enhancing the climate resilience of Victoria's built environment

7.1 Introduction

The Committee heard from many stakeholders about existing opportunities to enhance the climate resilience of Victoria's built environment and infrastructure. In particular, stakeholders emphasised that construction practices and standards represent a critical area of opportunity to improve the climate resilience of the State's built environment and infrastructure. As highlighted in Chapter 2, climate change risks are increasing in both intensity and frequency. Many stakeholders stressed that construction practices and standards must adequately account for climate change risk to ensure that the built environment and infrastructure is climate resilient. The Committee received evidence calling for greater integration of climate resilience principles into construction practices and standards.

As discussed in Chapter 5, Victoria's planning and building system includes various regulatory components. The National Construction Code is a key regulatory piece that shapes construction practices and standards in Victoria. It is 'a performance-based code' which means that there are 'requirements for how the building design or construction must perform to be compliant'.¹ The Code sets minimum standards across Australia for safety, health, accessibility, and sustainability in building design and construction—including drainage and plumbing work. The National Construction Code 2022 is the most current version, adopted nationally on 1 May 2023.

Chapter 5 also examined the Building Code Australia, another key part of Victoria's regulatory building framework, which is also part of the National Construction Code. The Building Code Australia provides technical provisions within the National Construction Code, allowing for state-specific variations. Victoria's Building Regulations adopt the Building Code of Australia. The Regulations govern building permits, inspections, occupancy permits, enforcement, and maintenance. Victoria's building regulations are reviewed every ten years, with the Victorian Building Authority (VBA) playing a key role in this process. Section 5.1.2 provides a more detailed explanation of Victoria's building regulatory framework.

¹ ABCB, *NCC Tutor lesson - Understanding the performance-based code*, <<https://ncc.abcb.gov.au/resources/videos/ncc-tutor-lesson-understanding-performance-based-code>> accessed 26 March 2025.

This Chapter explores how the State's current building standards and practices influence progress toward a climate-resilient built environment. It examines opportunities for improvement and identifies areas where industry support is needed from the Victorian Government, whether through policy mechanisms or financial incentives. The Chapter also looks at how the Government can better support the construction industry to procure more climate-resilient equipment, materials, and other resources, as well as adopt more climate-resilient construction practices. Further, it considers opportunities for innovation highlighted by stakeholders.

7.2 Construction practices and standards to ensure climate resilience

Stakeholders emphasised to the Committee that construction practices and standards significantly influence the climate resilience of the built environment and infrastructure.² The Committee received substantial evidence calling for Victorian construction practices and standards to reflect and respond to the climate change risk facing the State's built environment.³ Stakeholders consistently highlighted to the Committee that the scale and magnitude of damage to the built environment caused by climate change risks will increase in the future, as these risks grow in severity and frequency, if construction practices and standards do not prioritise climate resilience.⁴ The Committee received evidence reinforcing that proactively addressing risk during the design and planning phases, rather than retroactively after construction, would better equip the built environment.⁵

As discussed in Chapter 6, one of the significant barriers to achieving a more climate-resilient built environment in Victoria is the limited capacity of developers and builders to adopt climate-resilient practices. Many stakeholders emphasised that the State has a significant opportunity to enhance the built environment's climate resilience by supporting the construction industry to adopt more climate-resilient practices and materials.⁶ This Chapter will explore how the Government can better support the industry's uptake of climate-resilient practices and materials.

² Victorian Forest Products Association (VFPA), *Submission 23*; Energy Efficiency Council, *Submission 38*; Council Alliance for a Sustainable Built Environment, *Submission 111*; Infrastructure Victoria, *Submission 126*; Infrastructure Victoria, *Submission 126, Attachment 1*; RMIT University - Urban Futures, *Submission 222*, p. 7; Victorian Council of Social Service, *Submission 237*; Resilient Building Council, *Submission 238*, pp. 7–8; Andrew White, Chief Executive Officer, Victorian Forest Products Association (VFPA), public hearing, Melbourne, 6 November 2024, *Transcript of evidence*, p. 2; Natasha Palich, Executive Officer, Council Alliance for a Sustainable Built Environment, public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 59.

³ Insurance Council of Australia, *Submission 46*, p. 5; *Ibid.*, pp. 2–5; Polar Environ, *Submission 131*, pp. 14–16; Bass Coast Shire Council, *Submission 181*, p. 3; *Ibid.*, p. 2; *Ibid.*, pp. 27–29.

⁴ Insurance Council of Australia, *Submission 46*, p. 6; Council Alliance for a Sustainable Built Environment, *Submission 111*, p. 5; Infrastructure Victoria, *Submission 126*, p. 1; Infrastructure Victoria, *Submission 126, Attachment 1*, p. 3; Merri-bek City Council, *Submission 186*, p. 4.

⁵ Dr Jonathan Spear, Chief Executive Officer, Infrastructure Victoria, public hearing, Melbourne, 9 October, 2024, *Transcript of evidence*, p. 24; Yarra City Council, *Submission 25*, p. 2; Council Alliance for a Sustainable Built Environment, *Submission 111*, pp. 17–19; Infrastructure Victoria, *Submission 126, Attachment 1*, p. 3; Architects Declare Australia, *Submission 228*, pp. 4–5.

⁶ Andrew White, *Transcript of evidence*, p. 2; Dylan Broomfield, Principal Adviser, Polar Environ, public hearing, Melbourne, 6 November 2024, *Transcript of evidence*, pp. 58–60; Insurance Council of Australia, *Submission 46*, p. 6.

7.2.1 Adequacy of building codes and regulations

Stakeholders explained that the building system is responsible for delivering many critical climate-related outcomes for the built environment.⁷ Andrew McKeegan, Deputy Secretary for Planning and Land Services at the Department of Transport and Planning, explained in greater detail to the Committee:

The building system also plays a critical role in ensuring the construction standards are continually improved over time and are based on developments in technology and on new information about climate change and hazard exposure. The building system deals with building performance and construction requirements at the site and building level. The system describes minimum construction standards and performance measures that take account of site-specific constraints and risk. Periodic updates to building standards are aimed at enhancing the resilience of structures to the impact of natural hazards such as bushfire, flood and severe storms.⁸

Despite this, the Committee received evidence from multiple stakeholders questioning the adequacy of Victoria's building regulations and codes in addressing climate change risk and enhancing the built environment's resilience.⁹ The Council for a Sustainable Built Environment expressed that 'there is an unavoidable reliance on the building system to deliver appropriate [climate] outcomes' from the State's planning system. It further explained to the Committee:

One of the main risks facing Victorians is that our legislative framework continues to allow the construction of buildings and infrastructure that are ill prepared for the scientifically predicted weather events that are likely to occur as a result of the changing climate.¹⁰

Jane Keddle, Vice-President, Victorian Division, Planning Institute of Australia, highlighted the difference between climate resilience and energy efficiency, emphasising that the National Construction Code focuses on energy efficiency outcomes rather than climate resilience ones. She stressed that building codes must be framed according to climate resilience principles, rather than simply focussing on energy efficiency standards that often fail to mitigate climate risks, stating:

Just in terms of the energy efficiency, I think we need to draw a distinction between energy efficiency and climate resilience, because while there is some crossover, there are a number of elements of building design and construction that talk to resilience that are not covered by the recent NCC updates which deal with energy efficiency.

⁷ Andrew McKeegan, Deputy Secretary, Planning and Land Services, Department of Transport and Planning, public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 75; Daniel Pleiter, Operations Manager, South East Councils Climate Change Alliance, public hearing, Emerald, 10 October 2024, *Transcript of evidence*, p. 10.

⁸ Ibid.

⁹ Energy Efficiency Council, *Submission 38*, p. 2; Insurance Council of Australia, *Submission 46*, p. 6; Gippsland Climate Change Network, *Submission 68*, p. 2; Council Alliance for a Sustainable Built Environment, *Submission 111*; Bass Coast Shire Council, *Submission 181*, pp. 2–3; RMIT University – Urban Futures, *Submission 222*, p. 7; Victorian Council of Social Service, *Submission 237*, pp. 28–29; Natasha Polich, Executive Officer, Council Alliance for a Sustainable Built Environment, public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 55.

¹⁰ Council Alliance for a Sustainable Built Environment, *Submission 111*, p. 5.

Energy-efficient homes under the NCC can be delivered in a variety of different ways, and some of those ways are more aligned with the objectives of climate resilience than others. At the moment the NCC does not think about how those two things work together.

...

It does not deal with climate adaptation at all. That is on the agenda for the next round of NCCs, which I have just been informed might be a bit longer than was previously scheduled for. The NCC does not deal with climate adaptation at the moment, it deals with energy efficiency. Obviously that is an important component in terms of mitigation, but it is not the same thing and it does not always align with those objectives.

I think one of the things with adaptation is: what is a climate-safe house? There is kind of a national standard that you might want to look at in terms of building regulations, but there are also spatial considerations in terms of what a climate-resilient home is, because there are different hazards which will affect different areas. I think that is where the planning system becomes really important, because it allows the targeting of that regulation to make sure that in particular areas where we do have climate hazards that we have either got now or that are going to increase over time, we can target those particular areas so we are not throwing a blanket everywhere, we are actually thinking about where those controls might be best targeted.¹¹

Brett Franke, a building designer, sole practitioner and representative for Better Building Design, also emphasised that the National Construction Code's limited focus on performance requirements and energy efficiency leads to weaker climate resilience outcomes. Brett stated:

Why can't we make it more that all homes must meet – I mean, we have got an energy rating, but even that is a bit of a furphy. You produce a home, you give it to a bloke, he runs it through a computer and changes figures until he gets a tick of approval for a 7-star energy-rated house. It is really not 7-star energy rated; it is a furphy.¹²

Section 7.2.2 examines how this challenge can be addressed.

The Council for a Sustainable Built Environment also added that the Building Code of Australia has 'yet to seriously address the efficiency improvements needed to support best practice responses to climate change'.¹³ Similarly, M9 reinforced in its submission that building regulations do not always adequately address key climate concerns, stating:

Gaps exist between the existing planning and building system and the achievement of climate change objectives. There is a lack of ability at local government level to implement and enforce key matters that are not addressed in the planning system and instead covered by the building regulations.¹⁴

¹¹ Jane Keddie, *Transcript of evidence*, p. 65.

¹² Brett Franke, *Transcript of evidence*, 3 December 2024, p. 24.

¹³ Council Alliance for a Sustainable Built Environment, *Submission 111*, p. 15.

¹⁴ M9, *Submission 188*, p. 5.

Gippsland Climate Change Network also highlighted the importance of 'upgrading building codes, retrofitting bridges, roads, and energy infrastructure to withstand extreme weather conditions'.¹⁵ The Network's submission highlighted that building codes are leading to poor climate resilience outcomes for the built environment, stating:

There is poor suitability of the existing housing stock to withstand future climate scenarios - this is not just extreme event, but also heating and cooling, draughtproofing, disproportionately impacting the least advantaged people.¹⁶

Dr Chris Jensen, University of Melbourne Lecturer in Construction Management and Environmental Design, identified that the failure of building codes and regulations to adequately evolve and respond to key climate change risks, results in an increasingly vulnerable built environment. Dr Jensen told the Committee:

... I will broadly just talk about flooding. It is obviously front of mind globally and locally, and in this case the planning and regulations are definitely not keeping up with what we are seeing in terms of extreme weather changes. We still refer to an ABCB - building codes board - document from 2012 related to construction in flood areas, and it is extremely basic. It is 19 pages. As an example, the insurance industry is so far ahead that the contrast is unbelievable. They released something in October 2024 that is very up to date, 450 pages; they are all over it. So regulations and planning are miles behind in flooding, yes.¹⁷

Elaborating to the Committee on how building codes and regulations fail to adequately consider climate risks such as flooding, Dr Jensen stated:

The system for residential at the moment is the council will determine the flood zones and the appropriate level, which is referenced to the flood plain manager - so Melbourne Water, for example. The building code requires that the floor level is a minimum height above that level, and they have no further comment on construction for habitable spaces above the flood level. There are some minimum requirements for non-habitable spaces below the flood level.¹⁸

Equally, RMIT University's submission emphasised that building codes need to evolve and consider both current and future climate change risks. The submission emphasised that current standards have resulted in the construction of built environments that are ill-equipped to deal with current or future climate change risks, stating:

... reforms to our planning scheme and building codes are necessary to ensure we avoid creating further risks. Existing recent built outcomes, both in infill and greenfield sites, do not suitably provide green infrastructure or heat protection at a standard that is essential to human health in extreme climatic conditions.¹⁹

¹⁵ Gippsland Climate Change Network, *Submission 68*, p. 2.

¹⁶ Gippsland Climate Change Network, *Submission 68*, p. 2.

¹⁷ Dr Chris Jensen, Lecturer in Construction Management, University of Melbourne, Australian Institute of Architects, public hearing, Melbourne, 6 November 2024, *Transcript of evidence*, p. 37.

¹⁸ Dr Chris Jensen, *Transcript of evidence*, p. 39.

¹⁹ RMIT University - Urban Futures, *Submission 222*, p. 2.

In addition, many stakeholders raised concerns about the widening performance gap between new buildings and existing housing stock constructed under previous, less rigorous regulations and codes. David Blore highlighted the issue in greater detail to the Committee:

we commented on the state government data on housing that showed, in terms of thermal comfort, for example, that Benalla lagged. Forty-six per cent reported that our houses were too hot, compared to the state average of 44 per cent, and so on, so we have a bit of a gap there. In Benalla, while newer houses, of course, are being built to more modern standards of insulation and so on – thermal performance – we have a very significant stock of older housing, and a lot of it is also housing that is rented. So we have a lower socio-economic group, we have old housing and renters – it is a bit of a perfect storm, if you like. And being able to adequately address the needs there in our community is one of the big conundrums, in our view.²⁰

The Energy Efficiency Council noted that, ‘there are very few policy drivers in place to stimulate meaningful improvement in the quality and climate resilience of existing Victorian homes’.²¹ It affirmed the ‘wide quality gap between newer builds and much of Victoria’s existing housing stock,’ noting:

Victoria’s poorest performing housing stock offers the biggest opportunity for improvement. For example, it is possible to take a Melbourne home from a 1 to 4 star NatHERS home energy rating through insulation alone, and deliver an energy reduction of about 65 per cent. This can have a material impact on the long-term health and comfort of the occupants, while taking pressure of the energy system during times of peak demand.²²

Stakeholders emphasised that the consequences of inconsistent building codes and regulations overtime are stark, and include:

- inconsistent building quality and resilience due to uneven application of building codes and regulations over time²³
- older homes that burden occupants with high energy costs, discomfort, and climate vulnerability, disproportionately affecting disadvantaged groups²⁴
- retrofitting guidance that is lacking in clarity and detail, leaving existing infrastructure unprepared for extreme weather.²⁵

²⁰ David Blore, President, Benalla Sustainable Future Group, public hearing, Wangaratta, 4 December 2024, *Transcript of evidence*, pp. 69–70.

²¹ Energy Efficiency Council, *Submission 38*, p. 2.

²² Ibid.

²³ Natasha Palich, *Transcript of evidence*, p. 55; Donna Taylor, Acting General Manager, Place Making, Bass Coast Shire Council, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, p. 4; James Legge, Founding Director, Six Degrees Architects, Australian Institute of Architects, public hearing, Melbourne, 6 November 2024, *Transcript of evidence*, p. 38; Energy Efficiency Council, *Submission 38*, p. 2; Affiliated Insulation Industry Coalition, *Submission 39*, p. 2.

²⁴ Yarra City Council, *Submission 25*, pp. 2–3; Energy Efficiency Council *Submission 38*, p. 2; Affiliated Insulation Industry Coalition, *Submission 39*, p. 2; Community Housing Industry Association Victoria, *Submission 180*, p. 1; Greater Dandenong Environment Group Inc., *Submission 226*, p. 2; City of Greater Bendigo, *Submission 158*, p. 3; Dan Cowdell, Chief Executive Officer, Geelong Sustainability, public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 23; Tenants Victoria, *Submission 277*, p. 3.

²⁵ Donna Taylor, *Transcript of evidence*, p. 4.

In addition, some stakeholders expressed concern early in the Inquiry about the absence of climate resilience principles in Victoria's building codes and regulations. The Insurance Council of Australia emphasised that the consideration of climate resilience in the National Construction Code is critical 'given the long-term costs associated with extreme weather events on the built environment'.²⁶ The Insurance Council of Australia stressed the importance of 'embedding the principle of resilience in the National Construction Code' as 'fundamental' to 'design[ing] and construct[ing] stronger new homes that are both more resilient and durable'.²⁷

FINDING 49: Victoria's building codes and regulations do not adequately respond to climate risks facing the State's built environment and infrastructure.

FINDING 50: Victoria's current building codes and regulations are contributing to inconsistent climate resilience outcomes for the built environment and infrastructure.

FINDING 51: Victoria's building codes and regulations have changed over time, leading to diverging standards in climate resilience for newer and older built environments and infrastructure.

RECOMMENDATION 40: That the Victorian Government include in its forward planning upgrades to older infrastructure to reflect modern building codes and regulations and ensure that modern climate resilience standards are consistently reflected across the State.

Issues associated with historical climate data

The Committee received evidence from several stakeholders highlighting that historical climate data has informed Victoria's building codes and regulations. This undermines the climate resilience of the built environment as it leads to standards that do not adequately prepare the built environment for current or future climate change risks.²⁸ Stakeholders such as the Bayside Climate Crisis Action Group reinforced that 'the Victorian Government needs to continue detailed hazard mapping to inform planning and building regulations'.²⁹ Infrastructure Victoria explained in its submission that 'historical climate data is no longer a reliable indicator of future weather patterns and events due to climate change'.³⁰

²⁶ Insurance Council of Australia, *Submission 46*, p. 5.

²⁷ *Ibid.*, p. 6.

²⁸ *Submission 126, Attachment 1*, pp. 34–35; *Submission 222*, p. 17; *Submission 228*, p. 3; *Submission 237* p. 28; *Submission 275*, p. 10.

²⁹ *Submission 227*, p. 3.

³⁰ *Submission 126, Attachment 1*, p. 34.

The Committee heard from Associate Professor Ailie Gallant and Dr Kimberley Reid, representatives from the Australian Research Council Centre of Excellence for Climate Extremes and 21st Century Weather, who stressed that historical climate data leaves the built environment and infrastructure increasingly vulnerable to climate risks in future scenarios. They reinforced the role of up-to-date climate data in ensuring the built environment's climate resilience in future climate change scenarios. Dr Kimberley Reid stated:

I really think this speaks to Dr Gallant's point about preparing for a future climate. A lot of the flood modelling will be based on the present climate, so the rules that are 20 years old are based on what was done 20 years ago, but if we are already incorporating the future climate information into the current policies, then we are at least already planning for the future flood risks today.³¹

Associate Professor Ailie Gallant elaborated further:

I would echo that. I think by planning further into the future perhaps than you think you need to to bake in that planning time you may end up being slightly over resilient – if that is a thing – but you at least have that resilience baked in from the start. I think continued dialogue with not only climate scientists but also other experts so that you are at the forefront of the science; oftentimes the science that is being incorporated into some of these things – we have talked about the rainfall run-off estimations. That is science from a decade ago that is being incorporated now, so continued dialogue with experts. I commend the fact that there is a climate science report that is put out and tabled in the Victorian Parliament every five years.³²

Consequently, stakeholders stressed that as climate risks grow in both severity and frequency, minimum building standards must respond to changing climate conditions to ensure structures remain safe, resilient, and habitable.³³ Dan Cowdell, Chief Executive Officer of Geelong Sustainability, stated to the Committee:

I actually think it might come back to regulation and setting better standards in the first place – so the fact that our homes have been allowed to be built in this way. It is coming back to: are there ways we can increase the minimum standard and continue ratcheting star ratings up in homes?³⁴

Bernie O'Sullivan, Chief Executive Officer of Macedon Ranges Shire Council, also explained to the Committee that minimum standards do not necessarily reflect a standard that is climate resilient and adequate in responding to climate change risks. Bernie O'Sullivan explained:

it is essential that all levels of government strive for best practice rather than minimum standards. Business as usual will not cut it when it comes to planning and futureproofing for our communities.³⁵

³¹ Dr Kimberley Reid, *Transcript of evidence*, p. 18.

³² Associate Professor Ailie Gallant, *Transcript of evidence*, p. 18.

³³ Tiffany Crawford, 20 November 2024, *Transcript of evidence*, p. 3; *Submission 222*, pp. 16–17.

³⁴ Dan Cowdell, *Transcript of evidence*, 20 November 2024, p. 27.

³⁵ Bernie O'Sullivan, *Transcript of evidence*, 3 December 2024, p. 3.

Bernie O'Sullivan elaborated further:

we need to be funding infrastructure and constructing infrastructure not to minimum standards but to standards that we would all like to have in terms of it being comfortable, it being environmentally friendly and sensitive, it being temperature controlled, it being insulated. We need to make sure that when the state is constructing buildings across the state – the Victorian government – that built into its standards is environmental, sustainable design.³⁶

Stakeholders emphasised to the Committee that building codes and regulations must reflect detailed, up-to-date climate science, particularly as they set minimum performance standards.³⁷ Stakeholders stressed that as Victoria's building codes and regulations enforce minimum performance standards, many built environments are designed to meet these baseline requirements, not necessarily to exceed them.³⁸ Keith Ryan explained:

I would argue that the recent changes to 7-star have gone a long way towards setting a reasonable standard. Now, it is important to keep in mind that that is a minimum, and we have plenty of customers who are actually quite happy to go above that and indeed at times very happy to tell the world about it, which is great.³⁹

Stakeholders emphasised that robust minimum standards in building codes and regulations must be informed by data reflecting both current and projected climate conditions to ensure the climate resilience of the built environment.⁴⁰

Architects Declare Australia pointed out that the National Construction Code is designed for current climate conditions but fails to prepare the built environment for future climate change risks. The submission stressed the need for a proactive code to ensure the built environment is resilient against future conditions as climate change risks are projected to change significantly from current conditions. The submission stated:

'[The] National Construction Code is only updated every four years and changes have often been debated for many update cycles before they are implemented. This is too slow and they are based on current conditions. Our buildings (bridges, roads etc) should require construction based on projected future extreme climate conditions – particularly increased heat and storms. In Victoria, we should now be designing for cyclonic conditions and the way we handle rainwater should be ramped up to tropical standards. This would make new buildings more resilient.'⁴¹

³⁶ Bernie O'Sullivan, *Transcript of evidence*, 3 December 2024, p. 9.

³⁷ *Submission 46*, p. 5; *Submission 111*, p. 17; *Submission 257*, p. 3; *Submission 259*, pp. 17–18; *Submission 260*, p. 18.

³⁸ Chris Jensen, *Transcript of evidence*, 6 November 2024, p. 39; Dan Cowdell, *Transcript of evidence*, 20 November 2024, p. 27. Keith Ryan, *Transcript of evidence*, 20 November 2024, p. 64.

³⁹ Keith Ryan, *Transcript of evidence*, 20 November 2024, p. 64.

⁴⁰ *Submission 38*, p. 2; *Submission 111*, p. 5; *Submission 222*, p. 17; *Submission 237*, p. 28; *Submission 258*, p. 4.

⁴¹ *Submission 228*, p. 3.

Similarly, Natasha Palich, Executive Officer of the Council Alliance for a Sustainable Built Environment, acknowledged progress in climate mitigation efforts, but stressed to the Committee:

Some industry sectors and government jurisdictions threaten to delay this progress. We urge the Victorian Government to maintain momentum through regular NCC updates – this work cannot stall. Australia's current emissions targets already lag behind the science demanding net zero by 2035 to limit catastrophic warming. The building industry must adapt rapidly, requiring unprecedented action across all procurement stages.⁴²

The Victorian Council of Social Service further highlighted how out-of-date climate data in building codes and regulations undermines the climate resilience of the built environment. The submission stated:

Buildings that are constructed now must meet certain energy efficiency requirements. However, modelling of building materials and design to meet these requirements is based on historic weather data. We know the climate is going to get much hotter and weather more extreme. Today's energy efficient homes will seem highly inefficient in the coming decades, and today's inefficient homes will be even less capable of providing adequate shelter against the heat.

Explicitly requiring consideration of the impacts climate change will have on new buildings will help ensure new homes, and community and public infrastructure, are built to withstand the temperatures we expect to experience in the second half of this century and beyond.

Being able to build to these standards requires up-to-date climate projection data. With building requirements set at the Federal level through the National Construction Code, the Victorian Government must advocate for building codes to be based on future climate projection data.⁴³

Similarly, Environment Victoria highlighted how the use of historical climate data in the NatHERS program has resulted in outdated thermal efficiency ratings standards which fail to prepare the State's built environment and infrastructure for future weather and climate extremes:

Up until 2022, thermal efficiency ratings for new homes under the NatHERS program were based on outdated climate data from 1969 to 2004. Since then, the data was updated, but is now based on climate data from 1990 to 2015 – meaning there was a 7-year delay from climate data collection to implementation in standards. This excludes eight of the 10 warmest years on record. Housing ratings are based on climate data that excludes weather extremes.⁴⁴

⁴² Natasha Palich, *Transcript of evidence*, 20 November 2024, p. 54.

⁴³ *Submission 237*, p. 29.

⁴⁴ *Submission 275*, p. 10.

The Energy Efficiency Council highlighted that modelling found that by 2070, a 7-star home built in 2024 will face similar indoor temperatures during hot summer conditions as a 1.1-star uninsulated home does today.⁴⁵ The submission suggested that while 7-star homes will outperform older homes, their resilience will still be under pressure in the long term.⁴⁶

Stakeholders stressed that up-to-date climate data is critical not only for guiding performance standards but also for determining the location of built environments and infrastructure. The Insurance Council of Australia highlighted the need to integrate current and future climate projections, particularly in assessing risks such as flooding. The submission stressed that '[h]ousing can only be built if adequate resilience infrastructure is programmed and funded and/or buildings are constructed to stronger standards that consider current and future climate projections'.⁴⁷ The Victorian Council of Social Service asserted that building codes must fully account for current and future climate risks to avoid constructing in highly vulnerable areas. The submission added:

Similarly, the planning system and building code that dictates how and where new buildings and infrastructure are built must be amended to ensure current construction can withstand future climate impacts for decades to come.⁴⁸

The Committee heard from Brett Franke, a Registered Building Designer with Better Building Design, about the significant increase in costs to meet building requirements in a fire zone:

With just about every job I do, probably 60 or 70 per cent of the work I do, the property is affected by bushfire. It is usually a low rating or a very high rating, and more so a very high rating. I had one job recently where the client had a large parcel of 20 acres of land. He wanted to do a large extension, but his BAL rating was BAL 40, and parts of it were flame zone as well. It was a good exercise for me because it was a challenge to meet all these requirements, but I felt sorry for the client because it meant an extra \$200,000 on the cost of the build.⁴⁹

FINDING 52: Reliance on historical data undermines the climate resilience of Victoria's building codes and regulations, as current and future climate trends are changing in a way that do not reflect historical trends. This can mean that the built environment is unprepared for current and future climate change risks.

FINDING 53: Up-to-date climate data ensures that construction does not occur in areas highly vulnerable to climate change risks.

⁴⁵ Submission 38, p. 2.

⁴⁶ Submission 38, p. 2.

⁴⁷ Submission 46, p. 4.

⁴⁸ Submission 237, p. 32.

⁴⁹ Brett Franke, *Transcript of evidence*, p. 40.

FINDING 54: Minimum standards reflected in building codes and regulations must be sufficiently robust to effectively reduce the built environment's exposure to climate risk.

FINDING 55: The Committee heard that the cost of building a home in a flame zone has increased to meet bushfire safety requirements.

RECOMMENDATION 41: That the Victorian Government ensure that the current regulatory framework and any proposed updates to minimum housing standards support the supply of urgently needed dwellings in Victoria.

RECOMMENDATION 42: That the Victorian Government advocate to the Federal Government for building codes and regulations to be informed by up-to-date climate data and future climate projection data.

RECOMMENDATION 43: That the Victorian Government update minimum standards reflected in building codes and standards to reflect climate-resilient design based on climate projections, with evidence-based future climate scenarios rather than historical climate data and modelling.

Recent changes to energy efficiency standards under the National Construction Code

Stakeholders noted recent changes to Victoria's building regulations, particularly the enhanced energy efficiency standards under the National Construction Code. The new changes in the National Construction Code, which have been in place since 1 May 2024, require that Victorian houses and apartments meet a minimum 7-star energy efficiency rating.⁵⁰ In its submission, Housing Industry Association explained:

For multi-unit development, it is an overall average of 7-stars, with no individual dwelling less than 6.5. This is an increase of one star on the previous NCC2019 requirement (i.e. 6-star).⁵¹

Other stakeholders such as the Energy Efficiency Council noted that this represents a critical improvement given that 'the average star-rating of a Victorian home is just 1.8 stars, whereas the current standard for new builds is significantly higher, at 7 stars'.⁵²

⁵⁰ Victorian Building Authority, *Energy efficiency requirements*, 2025, <<https://www.vba.vic.gov.au/consumers/home-renovation-essentials/energy-efficient-requirements>> accessed 2024.

⁵¹ *Submission 26*, p. 3.

⁵² *Submission 38*, p. 2.

The Committee heard from stakeholders who explained that this new standard aims to improve the thermal performance and reduce the environmental footprint of new dwellings by considering factors like insulation, lighting and power, building orientation, window glazing, shading, subfloor finish, water heating, and air conditioning. For example, the Housing Industry Association explained in its submission:

NatHERS ratings do the 'heavy lifting' when it comes to improving thermal performance and reducing a dwelling's environmental footprint. It covers things like insulation, lights/power, building orientation, window glazing, shading, subfloor finish, water heating, air conditioning.⁵³

Alex Trudzik, Policy Officer for Community Housing Industry Association Victoria, also explained that new social housing is built to this 7-star NatHERS rating, and that the rating is considered a very high standard compared to other residential buildings across Australia.⁵⁴ Alex Trudzik elaborated to the Committee:

[New social housing stock is] all built to a 7-star NatHERS rating, which is the national energy system rating, which is a very high standard compared to other residential buildings across Australia. We have seen lots of gains made in recent years around this, and again new stock is built to a really high standard.⁵⁵

The Committee received evidence explaining that 7-star rating can be achieved cost-effectively. Jeremy Spencer, Director of the Sustainable Builders Alliance, told the Committee '7 stars is now a requirement, and the cheapest way to achieve that is to build using passive solar design to achieve 7 stars, if you want to go for minimums, or beyond'.⁵⁶ Andrew McKeegan explained to the Committee that these updated energy efficiency requirements are expected to result in benefits for household occupants, primarily through reduced energy bills and increased resilience during extreme weather events. Andrew McKeegan stated:

The new energy efficiency requirements will increase the minimum thermal shell's insulation and glazing requirements from 6- to 7-star under the nationwide house energy rating scheme. Modelling undertaken by Renew for the *Future Climate Impacts on Home Energy Standards 2024* report indicated that homes in Melbourne built to 7-star standard continue to perform effectively through a range of model climate scenarios right through to 2090. Updated energy efficiency requirements will result in a range of benefits to household occupants. Primarily these will be felt through reduced energy bills, increased resilience during hot and cold weather events but also more generally as Victorian average temperature changes over time as a result of climate change.⁵⁷

⁵³ Submission 26, p. 3.

⁵⁴ Alex Trudzik, *Transcript of evidence*, 6 November 2024, pp. 41–43.

⁵⁵ Alex Trudzik, *Transcript of evidence*, 6 November 2024, p. 42.

⁵⁶ Jeremy Spencer, *Transcript of evidence*, 6 November 2024, p. 55.

⁵⁷ Andrew McKeegan, 20 November 2024, p. 75.

Andrew McKeegan suggested that 7-star homes in Melbourne should perform effectively under future climate scenarios until 2090.⁵⁸ Keith Ryan, Executive Director at Housing Industry Association Victoria, also expressed that 'recent changes to 7-star have gone a long way towards setting a reasonable standard'.⁵⁹ He explained that imposing higher minimum standards on building codes and regulations 'to some extent is going to be necessary' to ensure that homes are comfortable and healthy to live in. Keith Ryan added further:

We need to have homes that are fit to be occupied, and the National Construction Code and associated laws have done a great job in over the years improving the quality. Safety of homes is also an important thing, and we have a number of other issues that are currently being addressed, particularly with multiunits with water leakage ...⁶⁰

In its submission, the Council Alliance for a Sustainable Built Environment also emphasised the benefits of the 7 Star Homes Program, stating:

We know that key design decisions are made prior to planning that influence the long-term impact of buildings. The State Government's work with the 7 Star Homes Program was based on the principle that early good design saves money on future energy bills. This is why the planning system has such an important role to play alongside other building regulations in delivering ESD outcomes.⁶¹

The Committee further acknowledges the Victorian Government's work to introduce a ceiling insulation discount, to be implemented as a Victorian Energy Upgrades initiative from early 2026.⁶² Many stakeholders emphasised the importance of insulation's role in improving the built environment's thermal and energy efficiency.⁶³ Consequently, the Committee welcomes the inclusion of ceiling insulation in the Victorian Energy Upgrades Initiative.

Addition of climate resilience in the Australian Building Codes Board's objectives

On 21 June 2024, Australian state, territory and federal ministers responsible for building and construction agreed to add climate resilience to the Australian Building Codes Board's objectives in the next Intergovernmental Agreement. However, this Agreement will take effect from 1 July 2025. Therefore, it is unclear if the new objective will be reflected in the National Construction Code 2025. Given the Board typically updates the Code every three years, the new objective may not be reflected in the Code until 2028.

⁵⁸ Ibid.

⁵⁹ Keith Ryan, *Transcript of evidence*, 20 November 2024, p. 64.

⁶⁰ Ibid.

⁶¹ *Submission 111*, p. 6.

⁶² Infrastructure Victoria, *Victoria's infrastructure strategy 2021–2051*, 2021, <<https://www.energy.vic.gov.au/victorian-energy-upgrades/products/insulation-discounts>> accessed 2024.

⁶³ Tom Crook, *Transcript of evidence*, 3 September 2024, p. 11; David Blore, *Transcript of evidence*, 4 December 2024, p. 69; David Brian, *Transcript of evidence*, 4 December 2024, p. 32; Natalie Egleton, *Transcript of evidence*, 3 December 2024, p. 46; Brett Franke, *Transcript of evidence*, 3 December 2024, p. 36.

During the public hearings, the Committee received evidence from Andrew McKeegan who affirmed the Committee that climate resilience will be added as an objective of the Australian Building Codes Board. He stated:

To respond to recommendations made through the Royal Commission into National Natural Disaster Arrangements in June 2024, the state and territory building ministers meeting agreed to including a new climate change objective in the National Construction Code. Building ministers agreed to expand the objectives of the national building standards to include resilience, in recognition that Australia's buildings need to be more resilient to extreme weather events resulting from climate change. The impact of that new objective will allow the National Construction Code, which sets minimum building and plumbing requirements for new residential and commercial constructions, to consider the impact of climate change as part of its periodic amendments and updates and for new standards to be developed that directly address the impact of natural disasters on housing and other community facilities.⁶⁴

Andrew McKeegan further elaborated to the Committee what the inclusion of the new climate resilience objective will mean:

[W]hen the NCC consider future changes to the construction code, that will be a core part of their consideration. One of the critical discussions that is going on at the moment, for example, is embedded carbon ... Currently the economics of that are stacking up in such a way that it does tend to lead to people looking at a new construction rather than considering the embedded carbon value that sits within the existing building ... now that we have climate as sort of part of the consideration of the National Construction Code, it will mean that there will be more focus on looking at what is the way in which the various states and jurisdictions and the Commonwealth will address matters such as: can we have a consideration for embedded carbon? One of the challenges is around how we might put a financial value, for example, on that embedded carbon to make the value of that consideration stack up when people are doing their feasibilities in relation to built form. So it is just making sure that whenever the construction code comes up and is reviewed – and that is done periodically whereby we work with industry, we work with jurisdictions and we think about all the potential changes that can happen – and whenever they are making those reforms, they are thinking about climate as a key part of that consideration.⁶⁵

Andrew McKeegan clarified that the inclusion of the objective in the framework means that future revisions of the National Construction Code will need to take the climate objective into account. He stated:

Noting that the last two iterations of the National Construction Code have gone very significantly to matters that relate to climate in many cases with the changes in the star ratings for residential buildings, which are starting to roll out, plus a significant amount

⁶⁴ Andrew McKeegan, *Transcript of evidence*, 20 November 2024, p. 75.

⁶⁵ *Ibid*, p. 82.

of commercial environmental matters happening in the next sort of form of the construction code. So these things are already being captured in changes, but this really just embeds it to make sure it continues to happen continually going forward.⁶⁶

The Committee acknowledges that recent work has been undertaken to improve Victoria's building codes and regulations. However, there remain issues with the use of historical data. There is a need for a more up-to-date, climate risk-informed framing of these codes and regulations that better accounts for future climate change projections.

7.2.2 Updating building practices and standards

Renew and revise the building code and relevant Australian standards as mechanisms to set minimum standards of construction quality to be able to address some of these climatic risks; require adequate construction management, superintendency and inspection processes to ensure and assure that the building codes are being followed; encourage retention and adaptation of existing building fabric and consider how these might be modified to become more resilient...

David Wagner, *Transcript of evidence*, 6 November 2024, p. 31.

As discussed in Section 7.2.1, stakeholders expressed to the Committee that current building practices and standards do not adequately consider climate change risks or lead to strong climate resilience outcomes for the built environment. Stakeholders called for building practices and standards to be updated to improve climate resilience outcomes for the State's built environment.

Stakeholders identified focus areas where building practices and standards need updating to strengthen climate resilience outcomes for the built environment and infrastructure.⁶⁷ They include:

- Strengthening design standards: New buildings and infrastructure need improved design standards based on climate resilience principles that enables construction to withstand climate change risks.
- Retrofitting existing buildings and infrastructure: Existing buildings and infrastructure need to be upgraded in line with modern standards to ensure resilience to climate change risks.

Strengthening design standards

The Committee heard consistent evidence from multiple stakeholders about the urgent need to enhance design standards for new constructions to address and respond to climate change risks. Infrastructure Victoria advised the Committee that climate resilience must be embedded from the earliest planning and design phases,

⁶⁶ Ibid., p. 83.

⁶⁷ Submission 46, p. 2; Submission 61, p. 11; Submission 111, p. 5.

recommending infrastructure be designed to withstand projected climate impacts.⁶⁸ The Council Alliance for a Sustainable Built Environment stated that a 'resilient building design is one which considers the likely extreme weather events for that area and responds accordingly'.⁶⁹

As identified in Section 7.1, the National Construction Code is 'a performance-based code' which means that there are 'requirements for how the building design or construction must perform to be compliant'.⁷⁰ Section 7.2.1 identified that the performance-based nature of the code causes builders to approach construction in a way that satisfies minimum performance requirements as opposed to prioritising climate resilient construction practices. Brett Franke called for 'better regulation' to address this:

At the moment, the way we get a 7-star is we design a house to the best of our ability, it goes for an energy rating, the energy rater will tell us that it does not meet the energy rating and the first thing we say is, 'Oh, how can we meet it?', and rather than looking at redesigning or moving the house a little bit, we just say, 'Oh, just put some more bulk insulation in the wall or the ceiling,' and so we try that. We just look at the figures, and once we get the figures we go, 'Bang, yes, out.' We do not look at heat loss – well, we do, but we do not look at sealing the home up properly and doing draft tests and things like that.⁷¹

Stakeholders emphasised that climate resilient buildings and infrastructure need to implement design measures that wholistically address climate risks, rather than prioritising energy and thermal efficiency. They identified a range of design measures that could lead to better climate resilience outcomes for Victoria's built environment and infrastructure.

- The Council Alliance for a Sustainable Built Environment outlined several design measures that respond to specific climate change risks, shown in Table 7.1.
- The Victorian Forest Products Association presented measures that enhance the climate resilience of houses, shown in Figure 7.1.
- Jeremy Spencer, Director for Sustainable Builders Alliance outlined a climate-resilient design approach to building houses, shown in Figure 7.2, and a design trajectory where energy efficiency measures lead to strong climate resilience outcomes, shown in Figure 7.3.

⁶⁸ Submission 126, Attachment 1, p. 37.

⁶⁹ Submission 111, p. 5.

⁷⁰ <<https://ncc.abcb.gov.au/resources/videos/ncc-tutor-lesson-understanding-performance-based-code>> accessed 26 March 2025.

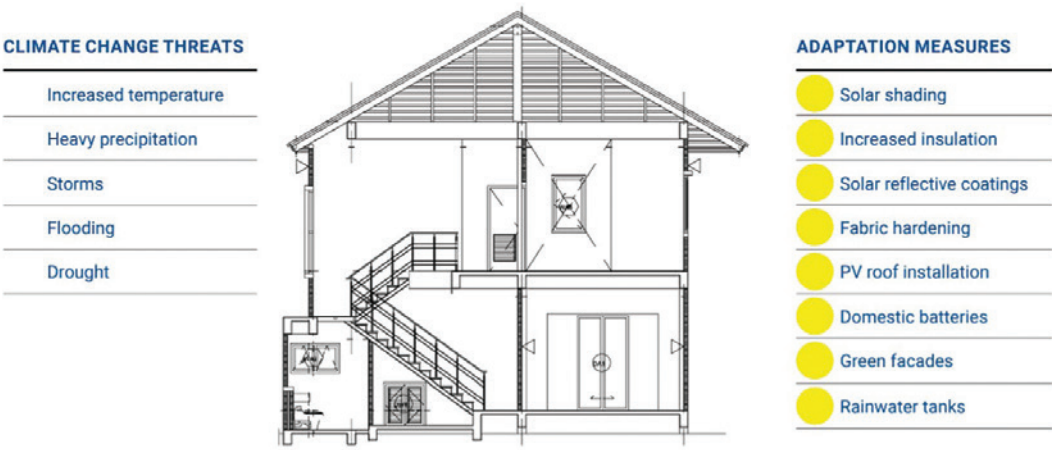
⁷¹ Brett Franke, *Transcript of evidence*, Tuesday 3 December 2024, p. 35.

Table 7.1 Examples of targeted climate resilient design measures

Weather event	Climate resilient design measure
Increased heatwaves	Buildings or infrastructure are designed to be thermally comfortable during heat waves and in the event of a power outage.
Power outage	Buildings or infrastructure are designed to remain functional during heatwaves that result in power outages. This may include having the capacity to switch to the use of renewable, resilient power supplies, for example off grid power sources.
More extreme storm events	Buildings or infrastructure are designed to structurally withstand more extreme storm events.
Coastal storm surge	Buildings or infrastructure are structurally designed to withstand coastal storm surge or are prevented from building in at-risk areas.
Drying and warming trend for Victoria	Buildings or infrastructure can capture and store rainwater. Rainwater tanks contribute to water security and management of flow during heavy rain events

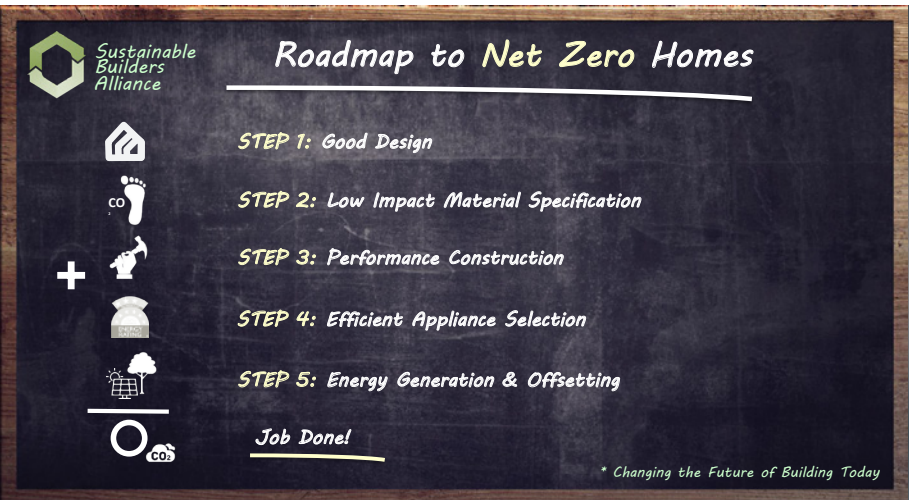
Source: Adapted from Submission 111, p. 5.

Figure 7.1 Design measures that enhance the climate resilience of built environments



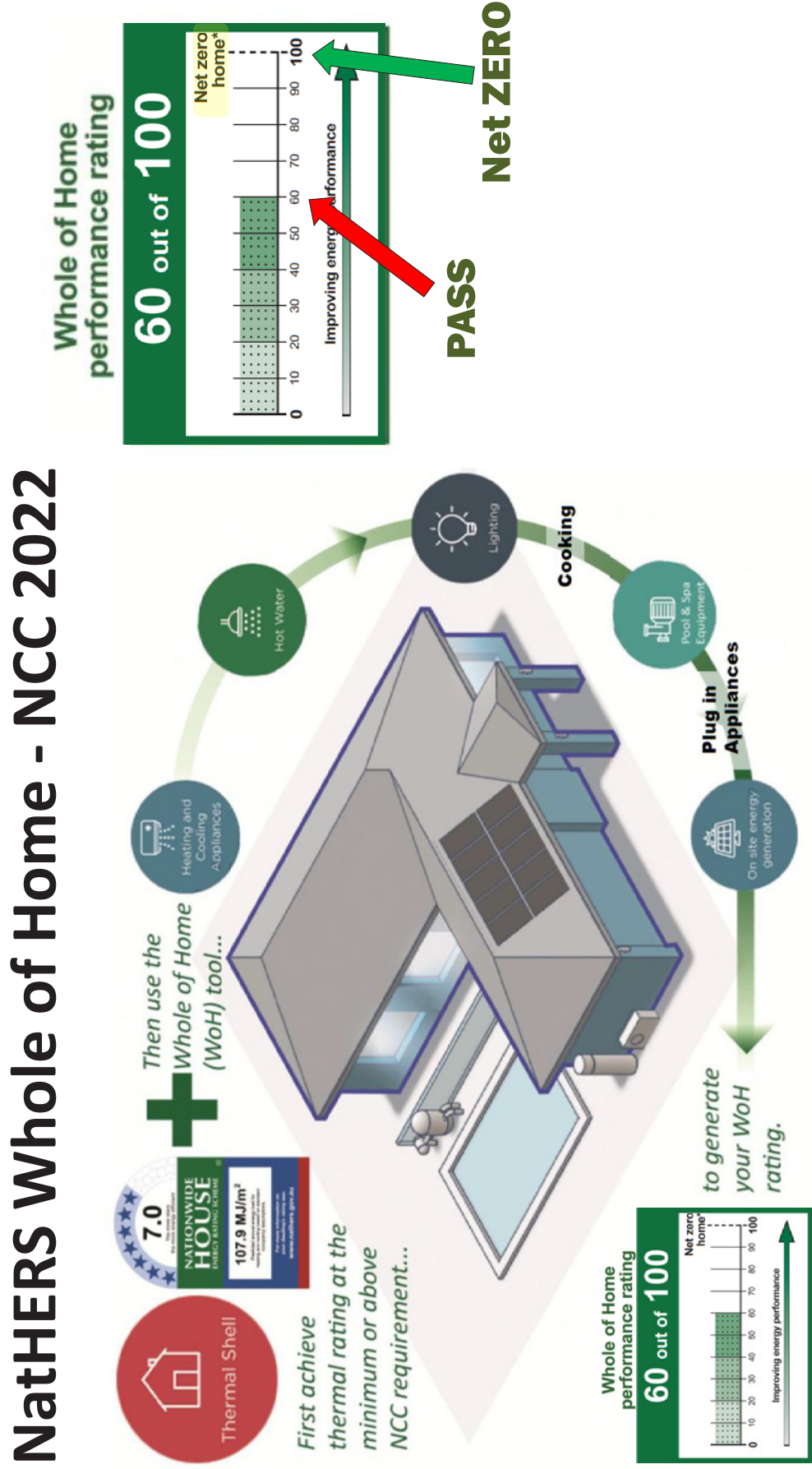
Source: Submission 23, p. 7.

Figure 7.2 Hierachy of measures: designing a climate-resilient home



Source: Jeremy Spencer, Sustainable Builders Alliance, public hearing, 6 November 2024, Presentation, p. 3

Figure 7.3 Implementing energy efficiency measures to achieve a climate resilient home



Source: Jeremy Spencer, Sustainable Builders Alliance, public hearing, 6 November 2024, Presentation, p. 4

Table 7.2 summarises other design measures that stakeholders consistently identified as critical to strengthening design standards’ ability to produce climate-resilient outcomes for the built environments and infrastructure.

Table 7.2 Summary of design measures that lead to climate resilient outcomes

Climate resilient design measure	Explanation
Passive solar design principles	Orienting buildings to maximize winter solar heat gain and minimize summer heat gain is frequently mentioned as a fundamental, low-cost strategy. This includes considering northerly orientations, appropriate siting, and the use of thermal mass to regulate internal temperatures. Good design is highlighted as the most cost-effective way to achieve energy efficiency.
High levels of insulation	Increasing insulation in walls, ceilings, and floors is a crucial measure for improving thermal performance, reducing heating and cooling loads, and enhancing comfort. Insulation is a last line of defence during power outages in extreme temperatures.
Effective ventilation	Adequate ventilation is recommended for both energy efficiency and health, helping to regulate temperature and air quality. Security screens can enable natural cooling through open windows.
High-performance windows and glazing	Double or triple glazing is recommended to reduce heat loss in winter and heat gain in summer, improving energy efficiency and comfort.
External shading	Incorporating shading devices such as overhangs, awnings, and blinds on windows, particularly on north and west-facing aspects, is seen as vital for reducing unwanted solar heat gain in summer. Tree shading is also beneficial.
Light-coloured roofs and cool roof finishes	Using light-coloured roofing materials with a high Solar Reflectance Index (SRI) is emphasised as a key strategy to reduce the urban heat island effect and lower cooling loads.
Air tightness	Improving the air tightness of the building envelope is crucial to ensure that the performance assumed in energy ratings is achieved in practice, preventing uncontrolled air leakage.
Selection of low-impact materials	Choosing materials with lower embodied carbon and considering durability, recyclability, and the potential for disassembly are important for overall sustainability.
Water management	Incorporating design elements for better stormwater management, such as permeable driveways and potentially green roofs, is recommended to buffer runoff during heavy rain events.

Sources: *Submission 45*, p. 5; Jeremy Spencer, *Transcript of evidence*, 6 November 2024, pp. 52–53; Brett Franke, *Transcript of evidence*, 3 December 2024, pp. 33–34; *Submission 111*, pp. 23–24; *Submission 38*, pp. 1–2; *Submission 39*, pp. 1–2; Ben Selby-Hele, *Transcript of evidence*, 10 October 2024, p. 61; *Submission 222*, p. 17; Natasha Palich, *Transcript of evidence*, 20 November 2024, p. 59; Andrew White, *Transcript of evidence*, 6 November 2024, pp. 3–4.

Stakeholders advocated for stronger and earlier integration of climate resilience principles in building design and construction, highlighting its long-term benefits. These include reduced operational costs, less damage from extreme weather events, and avoidance of costly, complex retrofitting later.⁷² Stakeholders stressed to the Committee that stronger building standards are essential, as current failures to

⁷² *Submission 111*, p. 5; Tom Crook, *Transcript of evidence*, 3 September 2024, p. 11; Tiffany Crawford, *Transcript of evidence*, 20 November 2024, p. 3; *Submission 42*, p. 5; *Submission 46*, p. 6.

build resilience will create future liabilities.⁷³ The Committee consistently heard that strengthening standards to proactively address climate risks and embed resilience principles proves more cost-effective than retrofitting buildings later.⁷⁴ Ensuring that the measures as identified above are reflected in design and construction standards will lead to stronger climate resilience outcomes.

Stakeholders reinforced that design and construction standards that treat climate resilience as a core principle are crucial for achieving the strongest outcomes for the built environment and reducing vulnerability to climate change risks.⁷⁵ The Committee heard evidence urging stronger climate resilience requirements in building codes and planning regulations.⁷⁶ Embedding climate principles at the highest level across all key regulatory mechanism that affect construction and design practises would ensure:

- more consistent climate-resilient designs
- widespread adoption in construction practices.

As outlined in Section 7.2.1, the Committee acknowledges the inclusion of climate resilience in the Australian Building Codes Board's objectives. As previously mentioned, Andrew McKeegan specified that the addition of the objective means that future revisions of the National Construction Code will need to take the climate objective into account.⁷⁷

FINDING 56: Simple design measures can significantly enhance the climate resilience of buildings and other infrastructure.

FINDING 57: The performance-based nature of the National Construction Code leads to building and design practices that do not adequately consider climate resilience.

FINDING 58: There needs to be more consistent incorporation of climate resilience principles in the building system's regulatory mechanisms to ensure a stronger climate-resilient approach by the building and construction sector.

⁷³ Submission 111, p. 6; Submission 228, p. 4; Submission 126, Attachment 1, p. 37.

⁷⁴ Submission 122, p. 2; Submission 228, p. 1; Submission 46, pp. 5–6.

⁷⁵ Submission 46, pp. 5–6; Submission 113, p. 2; Submission 155, p. 2; Natasha Palich, *Transcript of evidence*, 20 November 2024, p. 54.

⁷⁶ Submission 46, pp. 5–6; Natasha Palich, *Transcript of evidence*, 20 November 2024, p. 54.

⁷⁷ Andrew McKeegan, *Transcript of evidence*, 20 November 2024, p. 83.

RECOMMENDATION 44: That the Victorian Government update minimum standards for design measures that lead to stronger climate resilience outcomes for built environments and infrastructure. This should include the measures outlined by stakeholders:

- passive solar design principles
- high levels of insulation
- effective ventilation
- high-performance windows and glazing
- external shading
- light-coloured roofs and cool roof finishes
- air tightness
- selection of low-impact materials
- water management.

Retrofitting existing buildings for climate resilience

The Committee heard consistent evidence about the urgent need to retrofit Victoria's existing and older buildings and infrastructure to meet modern climate resilience standards.⁷⁸ Stakeholders emphasised that retrofitting is critical to ensuring state-wide climate resilience in the built environment and infrastructure and encouraged retrofitting existing buildings as a key action for improving Victoria's climate resilience.⁷⁹

Several stakeholders underscored the poor state of existing buildings. The Energy Efficiency Council indicated that the average star rating of a Victorian home is just 1.8 stars, significantly lower than the 7-star standard for new builds, emphasising that this gap presents a major opportunity for improvement.⁸⁰ Other stakeholders identified that many homes are poorly sealed and insulated, making residents vulnerable to extreme heat and cold.⁸¹

The increasing frequency and intensity of extreme weather events due to climate change further necessitates urgent retrofitting.⁸² As highlighted in Chapter 2, Victoria is projected to experience more hot days, longer fire seasons, and more intense rainfall.⁸³ As previously mentioned, the Energy Efficiency Council highlighted that thermally efficient homes will face increased pressure, with modelling suggesting

⁷⁸ Submission 158, p. 3.

⁷⁹ Submission 111, p. 5.

⁸⁰ Submission 38, p. 2.

⁸¹ Submission 158, p. 13.

⁸² Submission 68, p. 1; Submission 238, p. 7; Rosemary Sinclair, *Transcript of evidence*, 9 October 2024, p. 3.

⁸³ Submission 38, p. 1.

that by 2070, a 7-star home built in 2024 could face similar indoor temperatures to a 1.1-star uninsulated home today.⁸⁴ Unrenovated older homes will experience even more extreme temperatures.⁸⁵ Infrastructure Victoria also stated that Victoria's infrastructure was not built for frequent and severe events.⁸⁶

The Committee heard from stakeholders who highlighted the multiple benefits of retrofitting:

- **Improved health and wellbeing:** energy-efficient upgrades like insulation and double-glazed windows improve thermal performance, leading to more comfortable and healthier homes by maintaining healthy indoor temperatures.⁸⁷
 - For example, the Victorian Healthy Homes Program demonstrated that for every \$1 saved in energy, more than \$10 was saved in healthcare.⁸⁸
- **Reduced energy demand:** retrofitting cuts energy use, efficient buildings lower strain on energy networks and better thermal performance also reduces demand for new infrastructure and boosts grid resilience.⁸⁹
 - For example, upgrading a Melbourne home from 1-star to 4-star with insulation alone can reduce energy demand by 65%.⁹⁰
- **Enhanced resilience to climate risks:** retrofitting can make homes more resilient to specific climate risks like extreme heat, flooding, and bushfires.⁹¹
- **Long-term affordability:** sustainable buildings deliver long-term savings through lower energy and water bills, reduced operating and insurance costs, and decreased need for future upgrades.⁹²

Although stakeholders outlined a clear need for retrofitting, several barriers to widespread retrofitting were identified:

- Retrofitting costs often exceed homeowner and local government budgets, while community housing organisations face additional barriers as their rental models prevent large-scale upgrades without government support.⁹³
- Victoria currently lacks strong policy drivers to improve climate resilience in existing homes.⁹⁴
- Planning regulations can discourage or complicate attempts to retrofit buildings.⁹⁵

⁸⁴ Submission 38, p. 2.

⁸⁵ Ibid.

⁸⁶ Submission 126, Attachment 1, p. 10; Jonathan Spear, *Transcript of evidence*, 9 October 2024, p. 24.

⁸⁷ Submission 38, p. 1.

⁸⁸ Ibid.

⁸⁹ Ibid., p. 3.

⁹⁰ Ibid., p. 2.

⁹¹ Submission 158, p. 13.

⁹² Submission 111, p. 6.

⁹³ Ibid., p. 12; Alex Trudzik, *Transcript of evidence*, 6 November 2024, p. 42.

⁹⁴ Submission 38, p. 2.

⁹⁵ Submission 155, p. 5.

Some stakeholders advocated for a hierarchy-of-needs approach to retrofitting. For example, Geelong Sustainability uses a hierarchy model to prioritise upgrades in its Climate Safe Room program, shown in Box 7.1. Geelong Sustainability also provided a general hierarchy of home upgrades, shown in Box 7.2.

Box 7.1 Home Upgrade Hierarchy of Retrofits for Climate Safe Rooms

1. Rectifying any safety issues—i.e. replacing or decommissioning unsafe heaters.
2. Replacing halogen downlights
3. Draught proofing
 - a. door & window strips & seals
 - b. filling gaps holes & cracks
 - c. fitting draft-stoppers to exhaust fans
4. Insulation
 - a. adding additional ceiling insulation
 - b. adding underfloor insulation
5. Windows Finishes & Glazing
 - a. Heavy drapes and pelmets, or other curtains
 - b. External blinds
 - c. Removable reflective foil (Renshade)
 - d. Secondary glazing
6. Heating/Cooling
 - a. Split System Heating & Cooling
7. Solar PV System
8. Replacing whitegoods and major appliances (if budget allows)
 - a. Old inefficient whitegoods (ie. Fridge / Freezer)
 - b. Replacing Hot Water Service

Source: Geelong Sustainability, public hearing, 20 November 2024, handout, p. 1.

Box 7.2 General Hierarchy of Home Upgrades

1. Safety issues—decommission unflued gas heaters, CO2 emissions testing, fix unsafe electrical wiring, replace halogen downlights.
2. Draught proofing—make the home more airtight. Seal fireplaces, vents, exhaust fans, windows, doors, floorboards and skirting boards, gaps and cracks.
3. Insulation—increase the amount of existing insulation in your roof space. Floors can also be insulated if you have a house built on stumps which is accessible from underneath.
4. Window finishings—improve heat loss / gain through windows with blinds, curtains and pelmets, external shading and/or secondary glazing.
5. Major fixed appliances—replace old and inefficient major appliances - Heating and Cooling, Hot Water with efficient heat pump technology.
6. Renewable energy and storage—generate and store your own renewable energy. Solar PV and Battery Storage.

Source: Geelong Sustainability, public hearing, 20 November 2024, handout, p. 2.

7

Stakeholders also identified the following options as ways to encourage and support retrofitting initiatives:

- **Targeted financial support towards low-income households and poorly performing homes:** Implement state-wide retrofitting programs offering loans, grants, rebates, and direct service delivery.
 - For example, the Victorian State Government was encouraged to establish a Resilient Homes scheme like those in Queensland and New South Wales to assist vulnerable homeowners in high-risk areas (see Case Study 7.1).⁹⁶
- **Mandatory minimum standards for rental properties:** Introduce minimum energy efficiency and climate resilience standards for rental properties and potentially at the point of sale.⁹⁷
- **Government leadership:** The Victorian Government should invest in energy efficiency and resilience upgrades to its own facilities, including social housing.⁹⁸
- **Information and awareness:** Implement a mandatory home energy rating disclosure scheme to inform consumers and encourage retrofitting.⁹⁹
- **Community-driven initiatives:** Provide funding to support local governments to retrofit and upgrade existing buildings and infrastructure.

⁹⁶ Submission 147, p. 2.

⁹⁷ Submission 277, p. 5.

⁹⁸ Submission 237, pp. 13–14.

⁹⁹ Submission 38, pp. 1–2.

Case Study 7.1 New South Wales and Queensland's Resilient Homes scheme

In New South Wales the Resilient Homes Program helps communities recover from disasters. It also makes eligible homes in high-risk areas more resilient to the impacts of future disasters. This program is being delivered by the NSW Reconstruction Authority. The program offers money to:

- Buy back homes at high risk.
- Make homes more resilient to future floods.

This funding supports voluntary home buybacks and measures to increase resilience to future flooding in impacted communities in the Northern Rivers and Central West local government areas.

Similarly, the Queensland and Australian Governments released the \$741 million Resilient Homes Fund to help Queenslanders across 39 local government areas whose homes were impacted by the 2021–2022 flood event.

Eligible homeowners can apply for funding to enhance resilience, raise, or demolish and rebuild or relocate their flood-affected homes. Voluntary Home Buyback was available for the most severely impacted homes and those at the greatest risk of future flooding.

In addition, the Queensland Government operates the Resilient Retrofit program which provides funding to repair (enhance resilience) or retrofit homes to:

- incorporate flood resilient design and materials in liveable rooms or areas
- raise or relocate services essential to the continued liveability of the home.

Source: New South Wales Government, *About the Resilient Homes Program*, 2025, <<https://www.nsw.gov.au/departments-and-agencies/nsw-reconstruction-authority/our-work/resilient-homes-program/about-program>> accessed 2024; Queensland Government, *About the Resilient Homes Fund*, 2024, <<https://www.qld.gov.au/housing/buying-owning-home/financial-help-concessions/resilient-homes-fund/overview/about>> accessed 2024.

The Committee consistently heard evidence from stakeholders emphasising that retrofitting existing buildings and infrastructure is an urgent and critical action required to enhance Victoria's climate resilience and protect communities from the increasing impacts of climate change. Stakeholders identified that coordinated efforts involving government support, policy changes, and community engagement are essential to overcoming the existing barriers and achieve widespread retrofitting of the State's built environment and infrastructure.

FINDING 59: In response to climate change, existing buildings and infrastructure should be examined for retrofitting to meet modern standards of climate resilience.

RECOMMENDATION 45: That when the Victorian Government undertakes significant upgrades or renovations to existing buildings, those upgrades include retrofitting to strengthen resilience to climate change risk.

RECOMMENDATION 46: That the Victorian Government establish a Resilient Homes scheme, similar to those in NSW and QLD which are in partnership with the Commonwealth Government, to support communities recovering from disasters. This would include funding support to enhance resilience, raise, demolish and rebuild/relocate homes.

7.2.3 Financial incentives and mechanisms to support the building and construction industry

As mentioned in Chapter 6 the construction and building industry faces financial constraints and other challenges when procuring equipment, materials or other items which are more climate resilient. Developers and builders face significant barriers when attempting to take up climate resilient practices. The Government can improve the capacity of the building system to respond to climate risks by providing the industry with support and guidance regarding climate resilient practices.

Stakeholders told the Committee that the Government could significantly enhance the climate resilience of the built environment by working more closely with the construction and building industry and providing targeted support.¹⁰⁰ Stakeholders identified several approaches through which this could be achieved such as a mix of direct funding, financial incentives, accessible loans, support for innovation and mechanisms that integrate climate resilience into financial decisions such as adjusted insurance premiums.¹⁰¹ Stakeholders stressed to the Committee that the Government should lead by example, both by commissioning resilient demonstration projects and using these financial measures to steer the entire industry toward climate-smart practices.¹⁰²

Addressing barriers and improving funding mechanisms

As discussed in Chapter 6, stakeholders highlighted to the Committee several systemic challenges with current funding models. They noted that existing reconstruction funding arrangements fail to enable 'betterment' approaches, significantly limiting opportunities to create climate-resilient infrastructure assets.

Stakeholders stated that infrastructure managers remain reluctant to invest in comprehensive risk analysis and cost-benefit assessments due to uncertainty about

¹⁰⁰ Submission 26; Submission 180.

¹⁰¹ Submission 68, pp. 1–3; Submission 131, pp. 7–8.

¹⁰² Submission 126, Attachment 2, pp. 3–4.

government support for resilience projects.¹⁰³ The Committee heard repeated concerns about unclear accountability frameworks, with stakeholders emphasising the lack of defined responsibility for infrastructure upgrades and climate preparedness measures.¹⁰⁴

Regarding the rental sector, submissions identified the persistent split-incentive problem, where property owners bear upgrade costs and tenants lack agency to make modifications to improve homes. Addressing this requires targeted government intervention through dedicated funding or financing solutions.

Stakeholders advised the Committee that financial barriers continue to hinder broader adoption of innovative models like Community Energy Retailers, despite their potential benefits.¹⁰⁵

FINDING 60: Current reconstruction funding and standards do not support a betterment approach.

RECOMMENDATION 47: That the Victorian Government provides stronger support for adaptation projections to encourage certainty for infrastructure managers to undertake investment in risk analysis and cost-benefit assessments of reconstruction efforts.

RECOMMENDATION 48: That the Victorian Government provide clear accountability frameworks and clarify responsibility for infrastructure upgrades and climate preparedness measures.

Financial incentives and funding mechanisms for climate resilient buildings and upgrades

The Committee heard from stakeholders working in the building and construction industry who recommended multiple financial incentives to accelerate climate-resilient construction, including tax rebates, subsidies, and low-interest loans for energy-efficient retrofits. Stakeholders suggested these could be delivered through expanded programmes like Victoria's Energy Upgrades with several stakeholders specifically proposing a payback scheme where property owners fund improvements through energy bill savings, facilitated by government-industry partnerships.¹⁰⁶

Other stakeholders emphasised to the Committee that additional targeted measures should include tax incentives to rebuild to higher resilience standards after disasters, alongside government procurement policies favouring local sustainable materials.

¹⁰³ Jonathan Spear, *Transcript of evidence*, p. 25.

¹⁰⁴ *Submission 101*, p. 6.

¹⁰⁵ *Submission 184*.

¹⁰⁶ *Submission 131*, pp. 7–8; *Submission 238*.

The Committee received evidence that innovation grants and Research & Development Tax Incentives could significantly increase industry adoption of climate-resilient approaches, while preferential procurement terms and subsidies for green certifications would particularly support smaller builders and developers. Commercial building specialists separately highlighted to the Committee the proven cost-effectiveness of targeted grants for high-efficiency technologies in larger projects.¹⁰⁷

The Committee heard from council representatives and industry experts about complementary approaches to create market demand for resilience upgrades. Several stakeholders suggested expanding the VEU program to offer rebates for Resilience Rating Assessments, which would drive building industry demand for these services, while others proposed broadening the Solar Homes Programme to include rebates or interest-free loans for approved resilience measures. Local government stakeholders particularly emphasised to the Committee the value of staged grant programmes (staged through phases such as feasibility, design, construction) to help councils with limited resources progressively develop resilience projects in partnership with stakeholders in the construction industry.¹⁰⁸

Multiple submissions to the Committee stressed that successful implementation requires combining these financial mechanisms with clear rating systems like the Resilience Rating Scheme, along with workforce training and procurement reforms to create a comprehensive framework supporting Victoria's transition to climate-resilient construction

RECOMMENDATION 49: That the Victorian Government expand the Victorian Energy Upgrades program and offer rebates for Resilience Rating Assessments for households.

FINDING 61: Climate resilient buildings and upgrades can be delivered using existing financial mechanisms such as the Victorian Energy Upgrades program.

FINDING 62: A comprehensive framework for climate-resilient construction would lead to market demand for resilience upgrades and include:

- financial mechanisms such as grant and funding programs
- a clear rating system
- workforce training
- procurement reforms.

¹⁰⁷ Submission 126, Attachment 2, pp. 71–72.

¹⁰⁸ Submission 238.

RECOMMENDATION 50: That the Victorian Government develop a comprehensive and unified framework supporting the State's transition to a climate-resilient construction industry through further improvements to workforce training and procurement.

Support for industry innovation and capacity building

Stakeholders emphasised to the Committee that government can accelerate decarbonisation and innovation in the building and construction sector by piloting new materials. Stakeholders stressed the need for government-funded research and development to improve affordability and availability of low-carbon material alternatives. Stakeholders specifically called on the government to work collaboratively with industry to:

- update building standards and specifications to facilitate low-carbon material use
- develop and deliver targeted training programmes to upskill both public and private sector workers in low-carbon construction techniques
- streamline administrative processes to reduce burdens on smaller projects
- jointly build industry capacity through knowledge-sharing initiatives
- provide transitional timeframes and financial incentives to help smaller operators adopt low-carbon practices.¹⁰⁹

The Committee heard repeated calls for this partnership approach to ensure there is widespread participation from the construction and building sector, ensuring that the industry can contribute to and benefit from the low-carbon transition.¹¹⁰

FINDING 63: Support for research into alternative building materials would assist industry use of climate-resilient materials.

RECOMMENDATION 51: That the Victorian Government work with the building and construction industry and workforce representatives to develop better climate resilience practices.

7.3 Climate resilient construction practices and processes

As discussed in Chapter 6 and above, significant opportunities exist to enhance building practices and standards to better meet climate resilience and mitigation goals. Whereas Section 7.2 focused on how the Government can update building practices and standards to improve climate resilience, this Section highlights

¹⁰⁹ Submission 126, Attachment 2, pp. 8–9.

¹¹⁰ Ibid., p. 3.

existing best practice in the construction industry to demonstrate opportunities for improvement for other builders.

The Committee spoke with several builders who have embedded climate resilience principles into their core decision-making processes for construction and building practices. These practices are critical for strengthening the capacity of buildings and infrastructure to endure escalating climate impacts. Stakeholders emphasised that climate-resilient construction requires integrating resilience measures at every phase of the building process. Builders identified the following practices as integral to reflecting a climate resilient approach:

- consideration of climate risks in the planning and development phase of construction
- adoption of climate-resilient building and construction designs that focus on climate risk mitigation and adaptation
- utilisation of climate-resilient materials and construction methods.

Stakeholders identified to the Committee that a climate-resilient approach to the built environment involves the consideration of climate risks in the planning and development phase of construction. Stakeholders expressed that this means that managing climate risks should be a key aspect of rethinking how and where infrastructure is built in the future. For example, the City of Stonnington expressed how it is already experiencing climate change impacts like increasing urban heat, reduced rainfall, flooding, and storm events, highlighting the need for considering these risks when undertaking further development of the built environment.¹¹¹ Likewise, Transurban integrates climate projections and associated risks within its business processes and systems as a key goal for building asset resilience.¹¹² Transurban explained to the Committee that it also conducts climate scenario analysis to identify asset-specific adaptation pathways.¹¹³

Stakeholders also told the Committee that a climate-resilient approach necessitates the adoption of climate-resilient building and construction designs that focus on climate risk mitigation and adaptation. Infrastructure Victoria illustrated to the Committee that a resilient building design considers likely extreme weather events for a specific area and responds accordingly.¹¹⁴ For example, Infrastructure Victoria stated that designs should address increased heatwaves by being thermally comfortable. The Insurance Council of Australia states that more frequent and severe extreme weather events means that design and construction approaches must lead to stronger new homes that are both more resilient and durable.¹¹⁵

¹¹¹ *Submission 108.*

¹¹² *Submission 47*, pp. 1–3.

¹¹³ *Ibid.*

¹¹⁴ *Submission 126.*

¹¹⁵ *Submission 46.*

Other stakeholders underscored the importance of the utilisation of climate-resilient materials and construction methods. The types of construction materials and technologies that reflect climate-resilient principles will be discussed in further detail in Section 7.4. Stakeholders emphasised that when rebuilding infrastructure and built environments, construction practices should reflect more resilient standards or approaches and should consider areas with reduced vulnerability to climate change risks. The Committee received evidence from the Council Alliance for a Sustainable Built Environment highlighting the need for climate-responsive building designs that consider a range of solutions, such as drainage systems designed to withstand increasing flood events.¹¹⁶ The Council further emphasised that climate-resilient approaches, particularly best-practice Integrated Water Management strategies, are essential for mitigating flood risks and other climate change impacts.¹¹⁷

The Committee heard from several building industry professionals who have successfully incorporated climate resilience principles into their work. Two case studies (7.2 and 7.3) demonstrate how these principles can be practically applied in construction processes and projects.

Case Study 7.2 'we need to get smarter in the way we build houses – using the materials, siting, orientation of the house, makes a big difference.'

Brett Franke is a building designer and sole practitioner who operates from Woodend, servicing the Macedon Ranges and beyond. He stresses the urgent need to rethink construction practices, saying, 'we really need to rethink how we are doing things ... I think we can do it a bit cleverer, a bit smarter. We seem to have just been building the same way for the last 50 years. Growing up in Melbourne and seeing development and urban sprawl, nothing has really changed in 50 years.'

He advocates for smarter approaches to materials, orientation, and solar passive design, explaining that 'siting, orientation of the house, makes a big difference'. He expresses that current development approaches lack 'consideration on siting' and 'on the environment around them'. Brett reiterates that 'by not going direct north-south and by being a bit more clever in the way you shape the streets and everything, you can get better results'. He emphasises the 'need to stop this thing with a front door at the front of the house and the driveway having to be at the front; the garage does not have to sit at the front of the house'

(Continued)

¹¹⁶ Submission 111.

¹¹⁷ Ibid., p. 20.

Case Study 7.2 Continued

Brett explains that 'we cannot stop [global warming], we can only try to live with it. The way to do that would be to build a comfortable home that is energy efficient, that does not need a lot of heating and does not need a lot of cooling. And it does not stop at the home, it also goes outside the home, the way we landscape the areas, because it has equal effect on providing comfort to the home by way of natural cooling ...'

Brett identifies climate resilient building materials, emphasising that 'plantation pine is a good start. I think they do a great job from what I have seen'. He explains that 'with steel and concrete there is a lot of embodied energy'. However, he states that a 'concrete floor is a fantastic start, because it gives a lot of thermal mass and it can be heated'. Brett emphasises that 'the best way to heat a home is through the floor – through the concrete. But if the house is orientated properly and it has the correct glass, we can also heat the home ...'

Brett summarises climate resilient approaches to building, underlining that climate resilience is connected 'with bigger parcels of land that give you more freedom to design better homes and solar passive homes. We need to reinvent building materials. The old brick – it costs a lot of money to produce a brick, and now it costs a lot of money to lay a brick. And nobody wants to lay bricks anymore ... We need to find something that is easy to construct and sustainable, like hemp, straw, pine. We need to orientate our homes the right way, and the infrastructure around them.'

Source: Brett Franke, *Transcript of evidence*, 3 December 2024, pp. 32–42.

Case Study 7.3 'If there was one item that I would put on a house to make it more comfortable, more affordable, that has the most overall positive impact – insulation.'

Ben Selby-Hele is Director of 'a small building company called Mountain Ash Developments Victoria' operating in the Dandenong Ranges. With 30 years of experience as a builder working in both commercial and residential construction, he notes he's 'been a member of the Master Builders Association of Victoria for that whole time'.

Ben emphasises that 'one of the best things you can do is insulate your house, and that is relatively cost effective. So just a bulk insulation to walls and ceilings can really improve the comfort of your living and your ongoing costs.' He consistently reiterates that 'insulation is probably the biggest thing. If there was one item that I would put on a house to make it more comfortable, more affordable, that has the most overall positive impact – insulation.' While acknowledging that double glazing involves a higher upfront investment, he describes 'it is an excellent additive to a home'. In Ben's assessment 'the two main things: double glazing and insulation are very good for your houses.'

(Continued)

Case Study 7.3 Continued

In addressing extreme heat, Ben highlights that 'the simplest thing you can do is put an eave on a home. That just makes a massive difference. It protects the windows; it provides some sort of shade. It is just a massive win all round – and a verandah is even better if you can afford to do that.' He also cautions against dark roofing materials, noting their heat retention, stating that 'with dark roofs we know the heat that that gives off – so maybe mixing up the colours as opposed to monument black, which is so boring and plain'.

Regarding bushfire resilience, he references Bushfire Attack Level (BAL) ratings, which dictate construction standards in fire-prone areas. Ben explains that 'a building fabric, with regard to tolerance to fires and winds ... obviously we have a thing called a BAL rating, a bushfire attack level ... They are all good building fabric suggestions and ideas to help prolong the life of a building in the case of these events. They do, once again, add to the cost of the building.' Ben expressed that the 'more extreme things are like the building fabric of a building in a fire-zone place. That increases the cost of a building by almost 50 per cent.'

On mitigating flood and storm risks, Ben points to practical design adjustments. He clarifies that 'the average depth of a gutter at the moment is 100 mil, we need to probably build them 200 mil – so just really simplistically.' He emphasises that 'it is just finding that balance between cost and building that infrastructure into it ... a deeper gutter, for example – that is a relatively cheap solution.'

Ben stresses that building standards are 'being driven by policy and regulation, so that is good.' He explained that climate risks are increasing in frequency and 'we need to allow for those storm events happening every one in 10 years.'

Source: Ben Selby-Hele, Director, *Transcript of evidence*, 10 October 2024, pp. 60–66.

7.4 Climate resilient construction materials and technologies

Stakeholders highlighted to the Committee a key aspect of climate-resilient construction: the use of climate-resilient materials and technologies. The Committee engaged with several stakeholders who are developing innovative solutions to strengthen the built environment's ability to withstand and recover from climate impacts. These stakeholders underscored the performance benefits of climate-resilient materials and technologies in mitigating climate risks, stressing the need for broader industry adoption. Builders also shared their experiences, emphasising how these

materials and technologies improve the durability, safety, and functionality of buildings and infrastructure under climate-related stresses.¹¹⁸

The Committee received evidence from stakeholders who expressed that designing and constructing stronger new homes and infrastructure using durable materials is essential to withstand more frequent and severe extreme weather events. Stakeholders explained that building elements could be required to be resistant to fire and mould, particularly in bushfire and flood-prone areas, which would enable buildings to better cope with floods, fire, storms, and heatwaves.¹¹⁹

Moreover, the Committee heard evidence that highlighted the importance of energy efficient technologies such as solar panels and batteries, which can enhance resilience, especially during power outages. Stakeholders illustrated that these technologies can provide backup electricity capacity for essential functions like cooling and heating.¹²⁰

Many stakeholders also told the Committee that implementing passive design principles in urban planning, such as shading devices and increased canopy cover, can reduce energy use and mitigate the urban heat island effect, contributing to both energy efficiency and climate resilience.¹²¹

Other stakeholders emphasised that decarbonised building materials are critical to enhancing the built environments climate resilience. Stakeholders expressed that considering the embodied carbon of building materials is important. The Committee heard that current and future building materials and techniques need to be rapidly decarbonised to meet the needs of both climate change mitigation and adaptation. Some stakeholders stated that maximising the use of timber could be an essential tool to reduce embodied and operating carbon, and timber can perform well in fire due to its charring behaviour.¹²²

The Committee's discussions were strongly shaped by stakeholders who showed how climate-smart building materials and technologies can transform construction. Three key case studies (7.4, 7.5 and 7.6) provide practical examples from the industry that demonstrate how updating Victoria's building practices is both technically achievable and beneficial across the whole system.

¹¹⁸ Hugh Ong, Portfolio Director, public hearing, 6 November 2024, pp. 20–29; David Brian, *Transcript of evidence*, 4 December 2024, pp. 23–32; Sherri Smith-Hoyer, *Transcript of evidence*, 4 December 2024, pp. 23–32; Andrew White, *Transcript of evidence*, 6 November 2024, pp. 1–3.

¹¹⁹ Ibid.

¹²⁰ Ibid.

¹²¹ Ibid.

¹²² Ibid.

Case Study 7.4 'We do use a lot of concrete as a species. It is the second most used substance in the world ... but it is also the third-largest contributor to greenhouse emissions.'

Hugh Ong is the Portfolio Director for SmartCrete CRC, a company whose research work aims 'to really drive positive impacts' with regard to 'a whole bunch of different opportunities and problem spaces where concrete is relevant, especially when it comes to climate change.'

Hugh explains that concrete 'is the second most used substance in the world'. Yet concrete is the 'third-largest contributor to greenhouse emissions.' Hugh emphasises that 'by itself number three is concrete' with 'the majority of the emissions in concrete manufacturing come from the manufacturing of cement.'

Hugh explains that 'cement and concrete are different things ... Concrete can be thought of as a composite material. It is made up of sand and rocks and water and cement. Cement is kind of like a mineral glue powder which activates when you add water to it. It is made of limestone, and it is heat treatment of limestone that creates cement. So you add a whole bunch of energy to it, and it converts limestone into cement. There are two problem spaces. There is the energy that goes into it, which is carbon-intensive, but also there is an offgassing process, a chemical reaction when limestone is heat treated where it offgases CO².'

Hugh explains that 'in terms of the opportunity spaces in concrete and cement that we see as relevant for the industry participants we work with, cement replacement is obviously a big one ... The other really important aspect or the other opportunity for us to reduce our reliance on cement is good old-fashioned, just more efficient, concrete structures.'

Hugh expresses that there are 'different strategies that can drive down CO² in the concrete industry, and one really big one is just reducing and having more efficient structures, and more sophisticated structures as well. ... There are other ways to make concrete structures which are more volume-efficient, and that can reduce down the amount of cement that is involved in concrete structures as well.'

Source: Hugh Ong, Portfolio Director, Smartcrete CRC, public hearing, Melbourne, 6 November 2024, *Transcript of evidence*, pp. 20–29.

Case Study 7.5 Southern Hemp

David Brian is the owner of Southern Hemp a business that specialises in producing hemp-based products that are used as building materials. David explains 'for the building side of things, the reason I am in hemp is basically just the whole environmental, sustainable – to be able to grow something. We can grow a hectare of hemp and build a house. It is that whole renewable thing, and also the greatest thing is the little amount of energy that people use in keeping their hemp houses warm or cool.' He states that hemp is 'such a great insulator in building'.

David explains that there is significant international demand for hemp, stating that 'apparently in China at the moment there is a shortage of hemp fibre. It is growing in demand, and we are looking as an industry at trying to capitalise on filling that gap as we get more processing.'

David highlights that hemp is 'bio-degradable', affirming that 'all that carbon [is] locked up in a house. You are saving energy on heating and cooling. With the lime that we use, in the lime process there is a thing called the lime cycle. When lime is processed it releases carbon dioxide, but when it is curing all that carbon dioxide is sucked back into the wall, so it cancels itself out. So you end up with a carbon-negative house.'

David stresses the benefits of hemp, highlighting that 'mould is a big factor in a lot of modern houses, and it is the mould that you cannot see, and that is partly because there are plastic paints, plastic carpets, plastic underlay. And all that sweats, even just from breathing and kettles, whereas the hemp absorbs the excess moisture and then, when the air dries out, releases the moisture. So that is where the breathability is. It is vapour-permeable. It is not that air just passes through it.'

Sherri, a supporter of Southern Hemp, explains that it 'is great for retrofitting too. As opposed to pulling down whole houses that have got perfectly good frames with footings and trusses et cetera, you could just literally take off all of that ineffective wrapping of a house and windows and hempcrete the whole lot. So there is a great opportunity to save on built infrastructure and not waste those good materials that are there.'

David explains that their product hempcrete and hemp 'has been certified as flame zone, but ... the building code thing ... is a big limiting factor. It is not around the fire resistance, it is around the water resistance of the render, so it is not even about the hemp. We have had a client in Kallista in the Dandenongs go through what we thought was going to be a 10-day process but has become 10 weeks-plus of getting a performance solution report and all sorts of things. So it does need to be in the National Construction Code so building surveyors can see it and sign it off.'

Source: David Brian, *Transcript of evidence*, 4 December 2024, pp. 23–32; Sherri Smith-Hoyer, *Transcript of evidence*, 4 December 2024, pp. 23–32.

Case Study 7.6 'mass timber can actually perform better in fire compared to steel and concrete ...'

Andrew White is the CEO of the Victorian Forest Products Association, 'the peak industry body representing the forest products value chain in Victoria ... [including] those processing and producing our sustainable wood.'

Andrew talks about 'the development of engineered wood products like GLT and CLT' which have 'been instrumental in the move towards a greater use of timber, particularly in medium- and high-rise buildings'. He explains that 'CLT and GLT ... are essentially pieces of timber that are glued together to make a super-strong piece of timber'. Andrew emphasises that the use of these products has 'led to construction efficiency through increasing prefabrication and modular housing opportunities.' He explains that 'engineered wood products, have traditionally been used in the housing sector' but 'these are now being used in buildings that are higher than eight storeys, larger buildings, as a way of minimising the embodied emissions in those built environments.'

Andrew explains that 'mass timber can actually perform better in fire compared to steel and concrete due to its inherent charring behaviour. When exposed to fire the outer layer of mass timber will char, which creates a protective layer that insulates the underlying wood and slows down the spread of fire, and this is known as self-charring. The unaffected wood behind the sacrificial char maintains its structural integrity. In contrast, steel and concrete can lose their strength and structural integrity when exposed to high temperatures. Steel can weaken and buckle when heated, and concrete can spoil and crack due to the expansion of water inside the material. So overall, we would argue that code-compliant timber frame construction is robust and resilient when subjected to adverse and extreme conditions, including those associated with floods, bushfires and cyclones.' He states that 'currently, globally we have around 203 tall timber buildings either proposed or under construction.'

Andrew further highlights the benefits of wood products, saying 'there is a significant opportunity for Victoria as the home of plantation forestry to do more and be a leader in the decarbonisation of the environment within Australia and globally. We know that each single-storey house contains around 12 cubic metres of wood, which sequesters 22.2 tonnes of CO₂, while each two-storey house sequesters 37.4 tonnes and a mid-rise commercial building can store 2280 tonnes of carbon.'

Source: Andrew White, *Transcript of evidence*, 6 November 2024, pp. 1–3.

Chapter 8

Enhancing climate preparedness: opportunities for government

8.1 Introduction

This Chapter examines opportunities for the Victorian Government to enhance the climate resilience of the built environment and infrastructure.

It looks at existing legislation including enforceability, adherence to climate objectives and further notes recent changes to the *Climate Change and Energy Legislation Amendment (Renewable Energy and Storage Targets) Act*. This includes opportunities to improve future strategies and the Adaptation Action Plan.

Chapter 8 also focuses on how to ensure there is sufficient climate mitigation infrastructure across Victoria and considers opportunities for the government to strengthen mitigation infrastructure. This Chapter also considers opportunities for enhancing community resilience through social capital investment, climate equity and inclusion, and raising public awareness. Chapter 8 explores how the State Government can enhance its partnerships and collaboration with other stakeholders to achieve stronger climate resilience outcomes for the built environment and infrastructure.

As discussed in Chapter 6, essential services and infrastructure are increasingly vulnerable to climate change. Chapter 8 examines opportunities to increase the resilience of Victoria's telecommunications infrastructure, including options for increasing the security of Victoria's energy infrastructure during extreme weather events and climate change and the need to work with the Commonwealth Government to ensure ongoing services during extreme weather events. Chapter 8 also discusses the impact of delayed integration of resilience measures into regulations guiding maintenance and updates of roads.

As identified in Chapter 5 and 6, stakeholders lack access to consistent, accurate, and locally relevant climate risk data which undermines their capacity to create climate-resilient built environments and infrastructure. Chapter 8 examines how the State Government can address these challenges and discusses the need for a statewide climate risk assessment methodology.

8.2 Is existing legislation sufficient?

Stakeholders emphasised that Victoria's existing climate legislation represents a significant achievement in terms of responding to climate changes risk.¹ The Council Alliance for a Sustainable Built Environment commended the State Government for the preparation of the Built Environment Adaptation Action Plan 2022–2026 period, emphasising its critical influence in making the built environment more climate-resilient.² Bronwyn Lay, a Strategic Lead in the Climate Justice Support Unit for the Federation of Community Legal Centres stated that:

Of all Australian states, Victoria has the legislative and policy environment to ensure Victorians are climate resilient, all of us, and that our laws embed climate justice considerations. We have the groundbreaking Climate Change Act, the Victorian adaptation action plans and the Victorian Charter of Human Rights and Responsibilities. These are all headliner legislative and policy tools which can lay the foundations for a holistic, genuinely just response to climate change. The treaty process also is particularly vital to the realisation of climate justice in Victoria.³

Jane Keddle, Vice-President, Victorian Division, Planning Institute of Australia, also emphasised that we have quite a lot of good policy in this state, so we got a lot of the right things in our policy.⁴

Michael Nolan, Director, Climate Physical Risk and Resilience, Aurecon, elaborated further to the Committee about existing legislation and the current regulatory environment. Michael emphasised that there is a 'whole range of different legislation' that exists currently to manage climate change impacts:

You have got a Water Act; there are elements within there. It does not say 'climate change', but there are elements that can be worked with within the existing Act to help specify or encourage the application of a changing climate to the way water is managed. You have got an EPA Act, and that has had some upgrade to include some climate change aspects. You have got a whole range of different legislation that helps, that can be interpreted, and you can apply some of this to change in climate, like the buildings, with regard to construction and things like that. So, you have got lots of levers there; it is how you apply it. I think it is a prioritisation process. You would not try and tackle everything. Pick those things where there is a gap and that can over time improve or that are going to have the biggest impact.⁵

Dylan Broomfield, Principal Adviser at Polar Enviro, told the Committee that there appears to be a 'policy misalignment' with climate change policy and government procurement models.⁶ Dylan emphasised that 'with the current frameworks that exist

1 Infrastructure Victoria, *Submission 126, Attachment 1*, p. 19; Municipal Association of Victoria, *Submission 232*, pp. 7–8.

2 Council Alliance for a Sustainable Built Environment, *Submission 111*, pp. 9–11.

3 Bronwyn Lay, *Transcript of evidence*, 20 November 2024, p. 14.

4 Jane Keddle, *Transcript of evidence*, 20 November 2024, p. 63.

5 Michael Nolan, *Transcript of evidence*, p. 25.

6 Dylan Broomfield, *Transcript of evidence*, 6 November 2024, p. 59.

government could be doing more without having to pass any legislation' to support action on climate change.⁷ Dylan went on to state:

We think there are several enduring legacies that could come as a result of this inquiry: better alignment of climate change policy with procurement across state and local government; a stronger circular economy; a legislative framework and delivery ecosystem; and clear and strong incentives and teeth to enforce the uptake of preferred local and recycled content. Leading the country in addressing imminent risks to recycling and landfill helps grow sovereign manufacturing in Victoria and improve the return on investment and bottom line of state and local governments.⁸

Some stakeholders highlighted several challenges in relation to Victoria's legislative framework on climate change. Stakeholders recognised the progress made in embedding climate considerations into law and policy. However, many stakeholders highlighted challenges related to enforcement, accountability, and adherence to climate change objectives. They raised questions about whether current legislation is sufficient. This is examined in further detail in Section 8.2.2.

Other stakeholders stated that 'progress under [the Built Environment Adaptation Action Plan 2022–2026] is constrained because the proposed actions remain largely unfunded.'⁹ Infrastructure Victoria highlighted that the state's spending to adapt infrastructure is limited. They identified that in the recent Victorian budget there was minimal funding for infrastructure adaptation to enhance the climate resilience.¹⁰ Moreover, Infrastructure Victoria emphasised that 'the vast majority of identified spending [for climate action] is for reducing greenhouse gas emissions.'¹¹

Jane Keddie, Vice-President, Victorian Division, Planning Institute of Australia, spoke about the complexity of state frameworks in managing climate risk. Jane emphasised the need for clarity and transparency regarding how the framework operates, stating:

One of the considerations and one of the complexities that has been added by the recent reform program is that ... precincts sit under, or can sit under, different legislation than the Planning and Environment Act. There are complexities that have been added into the system and into the pathways for approval that I am not sure have been fully integrated into some of the thinking around the reforms needed, because we have a situation where we now have a number of different authorities and they have different legislative obligations and the like and different pathways that are embedded into that legislation. So, making sure that there is transparency around what that complexity is ...¹²

⁷ Ibid.

⁸ Ibid.

⁹ Municipal Association of Victoria, *Submission 232*, p. 7.

¹⁰ Infrastructure Victoria, *Submission 126, Attachment 1*, pp. 19–20.

¹¹ Ibid.

¹² Jane Keddie, *Transcript of evidence*, p. 71.

Other stakeholders highlighted issues with the *Local Government Act 2020* and the lack of clarity surrounding state and local government responsibility for managing climate change risk.¹³ Stakeholders said that while the Local Government Act includes environmental sustainability and planning principles, it lacks specific operational accountability for mitigating climate change impacts on the built environment.¹⁴ Some stakeholders criticised the lack of direct references to climate change within the Act.¹⁵ Martin Gill, Chief Executive Officer, Borough of Queenscliffe, told the Committee:

I think the Local Government Act has attempted to make climate response something that is core business, but the language is not strong enough. I think that is where we all turn to, the Local Government Act, so how does the Act help us? It helped the politicians that we were still dealing with understand that this is not a priority, or this is not the number 4 priority, or this is not something we can put aside – that it has to actually be core business. That is a big change, but legislation always helps.¹⁶

The Committee heard from multiple witnesses who outlined how current laws and regulations address climate risk, particularly for marine and coastal areas. Michael Nolan shared his views on whether existing legislation does enough to manage climate change risk in coastal and marine zones, which he believes are particularly challenging:

The coastal zone – that is a tough one. There is a long, long run-up, and it is very expensive to manage sea level rise. You do not want to be doing it once you are getting step changes in sea level. You want to be planning it over time. And if there is high population, you are not going to retreat; you are going to stand your ground and you are going to invest and protect those areas. So doing that sort of thinking now will help. I do not know if I have answered your question.¹⁷

Jacquie White, Deputy Chair, Victorian Marine and Coastal Council told the Committee regarding the effectiveness of legislation in relation to marine and coastal adaptation to climate change risk:

[I]n the context of risk from climate change and preparing for and mitigating the impacts of climate change, there are two really key legislative tools, and they are gold class in terms of what marine and coastal legislation looks like. These are looked on across Australia, across the other states, as modern pieces of legislation, and I think they put Victoria on the front foot in how we can adapt to climate change. The challenge is policy to practice, and I heard my colleagues talking about that before.¹⁸

¹³ Victorian Greenhouse Alliances, *Submission 129*, p. 2.

¹⁴ Jillian Carroll, *Transcript of evidence*, p. 58.

¹⁵ David Blore, *Transcript of evidence*, p. 68.

¹⁶ Martin Gill, *Transcript of evidence*, p. 10.

¹⁷ Michael Nolan, *Transcript of evidence*, p. 26.

¹⁸ Jacquie White, *Transcript of evidence*, p. 15.

Jacque points out one objective which includes a hierarchy of adaptation actions, and which takes a new approach to promoting resilience:

The Act sets out nine objectives. I will not go through them, but there is one in particular which specifically promotes resilience to climate change, which is a big shift from our traditional ‘protect’ model. The policy is what has driven this step change. It includes a hierarchy of adaptation actions that have to be considered when planning and making decisions about the coast. For example, the policy requires you to work through a system of considerations before you reach ‘protect’ as your option. It looks at nature-based models, accommodating the risk and retreat, and the very last step is to protect. That is a big shift from the way we used to think about our coast and the way we used to plan and make decisions around it.¹⁹

Jacque White spoke to the Committee about six adaptation options that must be considered as part of the *Marine and Coastal Policy Act 2018*, shown in Figure 8.1.

Figure 8.1 *Marine and Coastal Act 2018: six adaptation options to be considered as part of management of coastal and marine areas*



Source: VMaCC, public hearing, 23 October 2024, PowerPoint Presentation, p. 3.

Jacque outlined the hierarchical approach to coastal adaptation, stating that ‘you must demonstrate you have considered [the hierarchy] as part of your planning and decision-making’ with the six adaption options. Jacque explained the adaptation options as:

1. non-intervention: centred around community dialogue, do we need to replace what’s there and should we rebuild the same way, or rethink our approach?
2. avoid—does the built environment or infrastructure need to be on the coast or can it go elsewhere?

¹⁹ Ibid.

3. nature-based method—‘using a different approach, which is a really emerging piece of work.’²⁰
4. accommodate—‘how do you accommodate the risk? ... What degree of comfort or what degree of risk are we prepared to accommodate versus “protect at all cost”’.²¹
5. retreat
6. protect.²²

Jacquie emphasised ‘where it comes back to: these are local decisions that are being made, so across that whole region, all of those local decisions would be part of the consideration.’²³ She also highlighted the ‘challenge of having ... hard infrastructure in our coastal areas and the cost of maintaining those over time.’²⁴ Jacquie pointed out that ‘we are starting to see aging infrastructure now, which is one of the biggest costs,’ posing further challenges—such as whether it is feasible to ‘replace them’ and, if so, ‘what is the hazard they are now causing, given the environment around them has changed?’²⁵

Stakeholders consistently expressed the need for legislative support and clarity, noting that local decision-making within regional contexts necessitates a coordinated, multilevel governance approach.²⁶ Stakeholders emphasised the need for the government to provide clear frameworks and support mechanisms for local councils.²⁷ There was strong consensus amongst stakeholders that addressing these challenges requires improved collaboration across government tiers, with better-defined responsibilities and guidance. This would enable state agencies and local actors to make proactive, informed infrastructure decisions.²⁸ This will be discussed in greater detail in Section 8.5.

Consequently, Stakeholders emphasised that Victoria’s climate change legislation demonstrates significant progress. However, there are challenges which are undermining the current climate change framework.

FINDING 64: Current legislation supporting the Victorian Government’s action on climate resilience could benefit from further development and improvement through a coordinated, multilevel governance approach.

²⁰ Jacquie White, *Transcript of evidence*, p. 19.

²¹ Ibid.

²² Ibid.

²³ Ibid.

²⁴ Ibid.

²⁵ Ibid.

²⁶ City of Melbourne, *Submission 75*, p. 8; Infrastructure Victoria, *Submission 126*, p. 10; Merri-bek City Council, *Submission 186*, p. 4; Sue Phillips, *Transcript of evidence*, p. 5.

²⁷ City of Melbourne, *Submission 75*, p. 8; Merri-bek City Council, *Submission 186*, p. 4.

²⁸ Municipal Association of Victoria, *Submission 232*, p. 6; Sue Phillips, *Transcript of evidence*, p. 5.

8.2.1 Adherence to climate objectives

Victoria's climate objectives, including in relation to the State's built environment and infrastructure, are spread across numerous key policy and legislative documents. As highlighted in Chapters 3 and 4, the *Climate Action Act 2017* (Vic) has five key policy objectives:

- to reduce Victoria's greenhouse gas emissions consistently with emission reduction targets
- to build the resilience of the state's infrastructure, built environment and communities through effective adaptation and disaster preparedness action
- to promote the resilience of the state's natural resources, ecosystems and biodiversity
- to promote and support the state's regions, industries and communities to adjust to the changes involved in the transition to net zero
- to support vulnerable communities and promote social justice and intergenerational equity.²⁹

Likewise, Victoria's Climate Change Strategy has 2030 and 2050 objectives. The 2050 objectives are:

- climate-resilient built and natural environments
- prosperous liveable and healthy communities
- an orderly and just adaptation process.³⁰

The Government's actions will be guided by its 2030 objectives, which relate to:

- emergency management and disaster preparedness
- built environment and infrastructure
- industry and livelihood
- communities and regions
- biodiversity, ecosystems and natural resources.³¹

More specifically in relation to Victoria's built environment and infrastructure, the Built Environment Adaptation Action Plan 2022–2026 outlines adaptation objectives that support Victoria's broader Climate Change Strategy. These include:

- by the end of 2026, policies and standards that provide support for climate change adaptation and emission reduction across the built environment system, and a commitment by institutional organisations and major infrastructure providers to adaptation and emission reduction

²⁹ *Climate Action Act 2017* (Vic) s 22.

³⁰ Victorian Government, *Victoria's Climate Change Strategy*, 2021, p. 41.

³¹ Ibid.

- by the end of 2031, integration of climate change adaptation and emission reduction into all relevant investment and decision making across the system
- by the end of 2050, an entire built environment system that is adapted to climate change and contributes to emission reduction.³²

In 2024, the *Planning and Environment Act 1987* (Vic) was also amended to include as an objective of the Act ‘to provide for explicit consideration of the policies and obligations of the State relating to climate change’.³³ A further section was added to require planning authorities to have regard to emission reduction targets and climate risk in preparing a planning scheme or amendment.³⁴ This is explored in further detail below in Section 8.2.3.

As discussed in Section 7.2.1, Australia’s building and construction ministers recently agreed to add climate resilience to the Australian Building Codes Board’s objectives. However, the National Construction Code is unlikely to reflect this objective until 2028.

Notwithstanding the adequacy of Victoria’s climate objectives, a lack of accountability and enforceability mechanisms in the state’s key policy and legislative documents make it difficult to ascertain to what extent different levels of government and the private sector are adhering to these objectives. Sections 8.2.2 and 8.2.3 explore this lack of enforceability and accountability, as well as the recent changes to the *Planning and Environment Act 1987* (Vic) to more explicitly require planning authorities to consider climate resilience.

8.2.2 Enforceability and accountability

The Committee heard from stakeholders who questioned the enforceability of the Built Environment Adaptation Action Plan 2022–2026 as well as the accountability mechanisms that exist for the Action Plan.

Jane Keddie, Vice-President, Victorian Division, Planning Institute of Australia, expressed that ‘we do not have the kind of meaningful requirements that actually give that policy some teeth.’³⁵ Jane explained the consequences of strong enforceability in legislation, stating that ‘[i]t means that people actually making the day-to-day decisions about an application have the right tools and the right regulations to actually allow them to deliver that state-level policy.’ Jane explained the consequences of the current enforceability arrangements that influence climate resilience outcomes, stating:

What that does in not having the right tools and not having the right policy and guidance from state level is it sits slightly at odds with a lot of the obligations and the ambitions of a lot of different local governments. So what you find is that they do a lot of work to meet the obligations under the Local Government Act and to meet their

³² Victorian Government, *Built Environment Climate Change Adaptation Action Plan 2022–2026*, 2022, p. 11.

³³ *Planning and Environment Act 1987* (Vic) s 4(2)(da).

³⁴ *Planning and Environment Act 1987* (Vic) s 12(2A).

³⁵ Jane Keddie, *Transcript of evidence*, 20 November 2024, p. 63.

obligations under the Planning and Environment Act around climate change and we then get quite different and inconsistent responses across the state as they try and respond to climate change.

We also get a lot of frustration from planners in all walks of life at the barriers that they encounter. Most planners want to create places that are much more climate-resilient, and they are coming up against a lot of barriers in doing that. The concern we have also with that inconsistent approach is that it potentially disadvantages large numbers of our communities who might live in areas where their local governments do not have the resources or the capabilities to undertake that detailed work to support those changes to their built environment or to their land use patterns.³⁶

The Federation of Community Legal Centres Victoria communicated to the Committee the need for enforceability in relation to the Adaptation Action Plans:

Enforceability of the objectives and intention of the VAAPs is absent from Victoria's policy and regulatory environment erected to secure climate resilience. For equitable adaptation to be achieved in Victoria, VAAPs must include resources that enable access to justice.³⁷

Bronwyn Lay went on to affirm to the Committee that the Victorian Adaptation Action Plans lack accountability or enforcement mechanisms, and reviews are not mandatory. Bronwyn stated that:

the Victorian adaptation plans do not have accountability or enforcement mechanisms and the reviews are not even mandatory in effect. To make these systems and have some funding to also ensure that accountability and implementation occur – I would say that would be a frontliner. Also, I just want to add that having climate justice considerations across these adaptation plans ... is really important in order to ensure that it is not just the biophysical impacts that are met but also the social, economic and other issues related to our Victorian communities, so viewing climate resilience beyond just the frame of biophysical mitigation.³⁸

Bronwyn Lay called for funding to give effect to Adaptation Action Plans. She expressed concern that 'without robust and implemented adaptation plans, many communities will face compounding precarity'. Further that the 'Built Environment Climate Change Adaptation Plan 2022–2026 ... determines the future legal needs of many Victorians.' Gaps in justice may be made worse by climate change or be brought to light by its effects. This may include displacement from extreme weather that would lead to tenancy issues, a need for disaster relief or insurance claims. Loss of land because of climate change may raise questions about property rights, land titles and relocation. Certain groups like remote communities may be more vulnerable to these effects.

³⁶ Ibid.

³⁷ Federation of Community Legal Centres Vic, *Submission 259*, p. 30.

³⁸ Bronwyn Lay, *Transcript of evidence*, p. 19.

Bronwyn said the Adaptation Plan could be more effective at addressing legal barriers and opportunities despite current vague accountability mechanisms:

In determining its key priorities for the 2022–2026 period, the [Built Environment Climate Change Adaptation Plan] recommends 19 actions, yet just one of them considers the legal component of adaptation. Action 19 recognises that legal mechanisms are needed to support climate resilient urban developments, and that it is the role of the Victorian Government to “identify legal barriers and reform opportunities to support long-term adaptation by assessing options across the legal framework”. Unfortunately, this recognition fails to provide specificity about which legal tools will be deployed and how they will be used to support climate resilient environments. Additionally, this action fails to consider the unmet legal needs that are being created or exacerbated by climate change impacts and to provide adequate resources to the legal assistance sector to meet these needs.³⁹

John Bradley explained to the Committee how the Departments responsible for the Built Environment Adaptation Action Plan 2022–2026 are monitoring progress on the implementation of those action plans:

There is a reasonably formal process – the statutory requirement – to prepare the seven adaptation action plans and then to update them again, with the next review being required in 2026, and there is a formal requirement to report on the implementation of the climate change strategy which the actions plan sit under that is due in 2025. As you say, we are about halfway through the adaptation action plans at the moment. Each of them is being delivered under the leadership of the minister, and the minister is responsible in each of the action plans as they were released. There is also a coordinated oversight of the delivery of those occurring through reports to the Victorian Secretaries Board. We do look at the overall health and progress of those action plans, but they represent a fairly broad suite of measures, with some of things being changes to systems and processes and some of them being quite practical. From the PAEC questionnaire responses you can see quite specific things in relation to the delivery of the energy efficiency and social housing program, the residential efficiency scorecard program or the work that the Department of Government Services has done to introduce a basic requirement for all rental properties to have an energy-efficient heater with a minimum of 2 stars – that was introduced in 2023. We do acquit, if you like, specific measures that are speaking to the built environment action plan and the natural environment action plan –⁴⁰

John Bradley explained that specific measures under the Plan are ‘mainstreamed into the delivery activity of the department. All of these things are being funded through budgets’.⁴¹ He added that:

they are there and transparently identified as resilience and adaptation and actions in relation to climate. It is touching every part of mainstream government activity. If you think about where I was going with my opening comments about the breadth of what

³⁹ Federation of community legal centres vic., *Submission 259*, p. 30.

⁴⁰ John Bradley, *Transcript of evidence*, p. 77.

⁴¹ Ibid.

we touch, it is not a new activity to bolt on climate action and adaptation into the work of the department. It is fundamentally changing every investment proposal we put up. Every asset we are investing in has to have regard to climate risk, and you can see that being reported in a holistic way in our climate risk disclosures which are now coming out as part of our annual report. You can see in the budget papers as we are funding these initiatives. But I think to your point, when we complete the climate change strategy assessment in 2025 there will be a thorough report about the effect of the cumulative measures. There are 127 separate measures.⁴²

John Bradley clarified the work taking place on the 127 measures and addressed concerns about whether people would have to wait until the end of 2025 to see outcomes:

I do not think we are waiting for the end of 2025 to tell people about the action that is being taken or the commitments that are being made by government or to disclose climate risk in our annual reports with an increased level of transparency than we have before, but it does recognise that there is a very significant array of measures. We also have within the framework, if you like, statutory obligations for climate risk to be taken into account in decision-making, and that is reasonably formal in legislation through the climate legislation but then also through other legislative requirements, including the Public Administration Act and the Financial Management Act, which require the consideration of risk.⁴³

John Bradley told the Committee that climate resilience measures should be part of the mainstream functions of government:

This is, I guess, my reflection, which is that it is based on mainstreaming the activity into the kind of core functions of government, so the way we operate under the Financial Management Act, the way we take account of risk in the Financial Management Act and the way we undertake investment proposals that are put forward for asset development, as well as specific things we can point to and discuss with you like resilient coast investment or the upgrade of electricity infrastructure or water infrastructure in the water entities and progress around adaptation action plans. There is a significant body of progress being made in each of those cases that we are happy to talk to the committee about, but it is very broad because it is being mainstreamed into the functions of government.⁴⁴

FINDING 65: The Built Environment Climate Change Adaptation Action Plan 2022–2026 is a critical tool for state and local government but lacks adequate legal accountability and enforcement mechanisms.

⁴² Ibid.

⁴³ John Bradley, *Transcript of evidence*, p. 78.

⁴⁴ Ibid.

FINDING 66: It is unclear what legal tools the Victorian Government will use and deploy to support climate resilient environments under Action 19 of the Built Environment Climate Change Adaptation Action Plan 2022–2026.

RECOMMENDATION 52: That the Victorian Government clarify the legal tools that will be used to support climate resilient environments and how they will be deployed under the Built Environment Climate Change Adaptation Action Plan 2022–2026.

RECOMMENDATION 53: That the Victorian Government clarify the legal mechanisms that operate to enforce and deliver accountability on the Built Environment Climate Change Adaptation Action Plans and implement mandatory reviews for existing and future Adaptation Action Plans.

RECOMMENDATION 54: That the Victorian Government improve the state's climate legislation framework by:

- strengthening accountability mechanisms
- accelerating the implementation of supporting regulations
- improving transparency in monitoring and reporting progress in relation to climate change objectives.

8.2.3 Changes to the *Planning and Environment Act 1987*

As discussed in Chapter 5, the *Planning and Environment Act 1987* was 'amended by the *Climate Change and Energy Legislation Amendment (Renewable Energy and Storage Targets) Act 2024* (Vic) to make express provision for climate change to be considered while making certain planning decisions'.⁴⁵ The Committee heard from stakeholders who were positive about recent changes made by the government.⁴⁶ Annika Kearton, Chief Executive Officer of the Central Victorian Greenhouse Alliance, acknowledged the significance of recent amendments to the Planning and Environment Act, stating 'for the first time in Victoria [this] will create a mandate for climate change to be considered in planning decisions and will enable councils to ask for more environmentally sustainable design.'⁴⁷ Andrew McKeegan, Deputy Secretary,

⁴⁵ Federation of Community Legal Centres Vic, *Submission 259*, p. 23.

⁴⁶ Merri-bek City Council, *Submission 186*, p. 9; Rohan Hogan, *Transcript of evidence*, p. 57; Jane Keddie, *Transcript of evidence*, p. 70; Sue Phillips, *Transcript of evidence*, p. 8; Natasha Palich, *Transcript of evidence*, p. 57; Annika Kearton, *Transcript of evidence*, p. 6.

⁴⁷ Annika Kearton, *Transcript of evidence*, p. 6.

Planning and Land Services, Department of Transport and Planning elaborated to the Committee further:

Most significantly all planning schemes have been amended to support Victoria's transition from fossil gas to renewable energy sources and to introduce responses to climate change as a new purpose of the planning scheme. The government has amended the Planning and Environment Act to introduce mitigating climate change and emission abatement as a new objective of the planning framework alongside social, environmental and economic objectives. The amendments to the planning legislation mandate the consideration of climate change during the preparation of planning schemes and amendments to planning schemes. They will come into effect by no later than March 2025.⁴⁸

However, the Federation of Community Legal Centres Victoria highlighted in its submission that 'climate change does not expressly appear in the [*Planning and Environment Act 1987*], although many provisions are cast widely enough to encompass the phenomenon' and the 'amendments will have a disappointingly limited effect on the present situation.'⁴⁹ The submission elaborated further on the role of the amendments in strengthening the sufficiency of existing legislation with regard to enhancing the climate resilience of the State's built environment:

The amendments will exist within a framework of central control through greenhouse gas reduction targets and ultimately the potential for directions to be made by the Minister. The amendments refer to impacts of climate change on envisaged land use or development and not likely contributions by the new land use or development to climate change. The amendments allow this narrow vector of climate change to be taken into account with respect to a planning authority making or amending a planning scheme but not a responsible authority making decisions about planning permits, including conditions on permits. Ultimately, the narrow vector of climate change considerations provided for has no express connection to considerations of climate or disaster justice.⁵⁰

The Federation of Community Legal Centres Victoria's submission also emphasised the continued absence of climate justice principles across key pieces of legislation such as the Planning and Environment Act:

none of the provisions, in the PE Act or in the VPPs, require consideration of climate justice issues, such as equitable distribution of harms brought by climate impacts. Thus, no planning decisions in the state are bound to consider matters of climate justice. There must be a requirement for mandatory systematic consideration of climate and disaster justice issues in all decision making under the *Planning and Environment Act 1987* (Vic).⁵¹

⁴⁸ Andrew McKeegan, *Transcript of evidence*, p. 75.

⁴⁹ Federation of Community Legal Centres Vic, *Submission 259*, p. 23.

⁵⁰ Federation of Community Legal Centres Vic, *Submission 259*, p. 24.

⁵¹ Ibid.

In its submission, Merri-Bek City Council identified that the Amendment ‘responds to the recommendation from the *Climate Change & Planning in Victoria: Ensuring Victoria’s planning system effectively tackles climate change* report’.⁵² The initiative outlined in the report calls on the Government to ‘Seek an amendment to the Planning & Environment Act 1987 to provide clearer direction on the consideration of climate change in assessment and decision-making.’⁵³ Merri-bek City Council encouraged the Victoria Government ‘to implement all the findings and recommendations’ which was supported by other councils and organisations such as the Council Alliance for a Sustainable Built Environment and the Victorian Greenhouse Alliances.⁵⁴ Sue Phillips, Executive Officer for Barwon South West Climate Alliance, stated:

The recent work by the state government to build that into the *Planning and Environment Act* through the *Climate Change and Energy Amendment (Renewable Energy and Storage Targets) Act* ... is really great. We received our invitation yesterday to comment on the ministerial direction and guidance on that, so that is fantastic. I echo what Surf Coast shire has said about the *Climate Change & Planning in Victoria* report. I point you to the Victorian Greenhouse Alliances submission, which has detail on where it sees some of the gaps in planning...⁵⁵

Victorian Greenhouse Alliances explained to the Inquiry that full implementation of the recommendations in the report would assist with protecting Victoria from the impact of climate change:

would significantly improve the adequacy of the current Victorian planning system as it relates to its adaptation to, preparation for, and mitigation of climate change impacts, and in doing so, protect current and future generations of Victorians from climate impacts.⁵⁶

Annika Kearton cautioned that as well as legislative change ‘further measures are required to effectively operationalise this legislation.’⁵⁷ Annika highlighted the sustained advocacy efforts of local governments, noting that ‘in 2022, 24 Victorian councils, led by Council Alliance for a Sustainable Built Environment, lodged an elevating Environmentally Sustainable Design targets amendment articulating minimum standards in key areas such as energy efficiency and green infrastructure.’⁵⁸ Despite this coordinated push, Annika pointed to bureaucratic delays, stating that ‘two years on we continue to call for this amendment to be approved by the minister, for exhibition.’⁵⁹ This underscores a disconnect between policy development and implementation, leaving councils without enforceable sustainability standards.

⁵² Merri-bek City Council, *Submission 186*, p. 9.

⁵³ Ibid.

⁵⁴ Council Alliance for a Sustainable Built Environment, *Submission 111*, p. 21; Ibid, p. 28; Merri-bek City Council, *Submission 186*, p. 10; Municipal Association of Victoria, *Submission 232*, p. 12; Sue Phillips, *Transcript of evidence*, p. 8.

⁵⁵ Sue Phillips, *Transcript of evidence*, p. 8.

⁵⁶ Victorian Greenhouse Alliances, *Submission 129*, p. 6.

⁵⁷ Annika Kearton, *Transcript of evidence*, p. 6.

⁵⁸ Ibid.

⁵⁹ Ibid.

Likewise, Natasha Palich, Executive Officer of Council Alliance for a Sustainable Built Environment, reinforced these concerns while outlining key priorities, telling the Committee that ‘the priority actions would be to deal with the new buildings, get Environmentally Sustainable Design planning reform for buildings into place because then councils can turn to the more adaptation and resilience aspect.’⁶⁰ She emphasised the challenges local governments face in long-term climate planning: ‘Councils need help undertaking long-term planning for a 50-year timeframe ... it is very difficult for local government to undertake adaptation measures, particularly where it leads to discussions of retreat.’⁶¹ Natasha explicitly linked these challenges to systemic gaps, stating that ‘what councils need is a framework, and a planning system is part of that framework.’⁶² Natasha emphasised that the Built Environment Adaptation Action Plan is a critical solution, arguing it provides ‘the framework for councils to manage adaptation [and] retreat in their communities.’⁶³

In effect, while legislative recognition of climate change in planning marks progress, the absence of approved standards and adaptation frameworks leaves stakeholders, such as councils, ill-equipped to execute meaningful change. Stakeholders emphasised that Victoria’s planning reforms remain incomplete without urgent follow-through on Environmentally Sustainable Design standards and structured support for local adaptation planning.

FINDING 67: Climate justice is not adequately considered across Victoria’s regulatory and legislative framework, that informs adaptation on climate change and climate resilience.

FINDING 68: Victoria’s recent amendments to the *Planning and Environment Act* represent a crucial step toward integrating climate change into planning decisions, but some gaps remain in implementation, enforcement, and long-term adaptation support.

FINDING 69: Without action to approve Environmentally Sustainable Design standards, clear ministerial guidance, and establishment of adaptation frameworks, local governments will continue to struggle in translating policy into tangible climate resilience measures.

RECOMMENDATION 55: That the Victorian Government undertake a review of the Planning and Environment Act to strengthen and clarify climate considerations and compliance measures and include provisions regarding climate justice.

⁶⁰ Natasha Palich, *Transcript of evidence*, p. 57.

⁶¹ Ibid.

⁶² Ibid.

⁶³ Ibid.

8.3 Strengthening mitigation, adaptation and resilience through Targeted Funding Mechanisms

As outlined in Chapter 6, climate mitigation and adaptation infrastructure play a vital role in protecting communities and improving the built environment's resilience. The Committee heard that when this infrastructure suffers from poor maintenance, inadequate design, or insufficient investment, it can inadvertently undermine climate resilience.

Stakeholders emphasised that the State Government can play a critical role in ensuring infrastructure across Victoria is resilient by providing adequate funding mechanisms for mitigation and adaptation. Stakeholders emphasised that the best approach is to have actions localised and highly specific to the environment. Tailored approaches to mitigation, adaptation and resilience lead to stronger outcomes.

Direct Funding and Financial Mechanisms that support mitigation, adaptation and resilience

Stakeholders called on the State Government to prioritise direct funding for local government climate initiatives that support mitigation, adaptation and resilience. The growing cost of managing the impact of climate change disadvantages local government from creating climate resilient communities. Other stakeholders stated that the Victorian Government should urgently advocate for a substantial increase in Federal funding through the National Disaster Ready Fund, specifically earmarked for local and regional risk mitigation projects. Stakeholders unanimously stressed the need for coordinated State-Federal financing mechanisms to deliver large-scale grants for climate-mitigation infrastructure.

The Committee received evidence calling for the government to address significant mitigation financing gaps. Stakeholders proposed two key funding mechanisms:

- A permanent Victorian Community Climate Adaptation Fund to provide grants for localised resilience projects.
- A dedicated betterment fund to ensure assets are rebuilt to more resilient standards post-disaster.
- A funding scheme for homeowners affected by disaster to support rebuilding or relocating homes at high risk.

Victorian Community Climate Adaptation Fund

Stakeholders indicated that the purpose of the Victorian Community Climate Adaptation Fund (the Fund) would be to distribute grant money annually to community groups undertaking localised adaptation, mitigation and resilience

projects. They suggested this approach would empower communities to proactively enhance their resilience by supporting tailored, community-led solutions.⁶⁴

The Fund would enable action to be tailored to local need, emphasising the government's role in supporting community-led investments in critical infrastructure adaptation and innovation. They identified key examples including community batteries, emergency shelters, advanced warning systems, and reinforcement of vulnerable infrastructure.⁶⁵

The Fund would recognise the highly localised nature of climate impacts through its bottom-up approach to community-led adaptation. Stakeholders emphasised that communities understand their area's unique needs best. Several submissions highlighted how similar one-off programs such as the 2017 Victorian Climate Change Innovation Program and 2019 Community Climate Change Adaptation grants were both successful, with demonstrated strong demand for such ongoing funding.

Stakeholders explained that establishing a permanent Fund would provide continuing budget support, ensuring climate adaptation receives adequate and sustained funding. Some suggested funding could come from making major polluters pay, such as through a fossil fuel export levy. They emphasised the Fund would help government meet its obligations under *the Victorian Climate Change Act 2017* to prepare for climate impact. As a practical first step, stakeholders recommended beginning with an initial investment to review demand and project viability before scaling up the Fund.

A Dedicated Betterment Fund

The Committee received evidence suggesting that current disaster recovery funding initiatives often only allow for the replacement of infrastructure 'like for like', preventing councils from upgrading assets, such as drainage infrastructure, to better respond to future events.

Stakeholders called for adopting betterment as an eligible expense under the Disaster Recovery Funding Arrangements and establishing a betterment fund similar to the Queensland model. The Committee heard how the Queensland government model has 'build back better' financing options and stakeholders emphasised how a betterment fund would support the rebuilding of assets to a more resilient standard after disasters.

Stakeholders emphasised that financial mechanisms which allow for investment in betterment leads to better climate resilience outcomes than a business-as-usual approach. A betterment approach would address the increasing intensity and frequency of extreme weather events. This would allow councils to upgrade infrastructure when rebuilding, for example, building bridges higher to avoid future flood damage. Some stakeholders suggested that the Victorian Government could expand future climate change funding to allow for betterment of assets and infrastructure.

⁶⁴ Friends of the Earth Melbourne, *Submission 192*, pp. 15–19.

⁶⁵ Ibid.

Stakeholders highlighted that although betterment funding was approved for some councils after the October 2022 floods in Victoria, it was limited and there was a consistent call for a more consistent approach. The Committee received evidence encouraging the Victorian Government to work with the Commonwealth to embed an expectation of betterment for climate resilience as part of disaster recovery funding arrangements.⁶⁶

FINDING 70: An infrastructure funding model based on a betterment approach leads to more climate resilient results.

A Victorian Resilient Homes Scheme

Several submissions and witnesses highlighted the success of the Queensland and New South Wales schemes that support communities recovering from disaster, such as flooding, with raising or demolishing and rebuilding their properties. Where this is not possible, support for home relocation can be considered.

8.4 Enhancing community resilience

Inquiry stakeholders noted that the impacts of climate change are experienced most acutely at the local level.⁶⁷ They also noted that community resilience in facing the repercussions of climate change is an important element of climate resilience.⁶⁸ Emergency Management Victoria has defined community resilience as ‘the capacity of communities and the systems and structures that support them to survive, adapt and grow in the face of challenges.’⁶⁹

Evidence to this Inquiry indicated that community resilience in Victoria could be enhanced through increased social capital, greater equity and inclusion and more public awareness. These are discussed below and summarised in Box 8.1.

⁶⁶ City of Stonnington, *Submission 42*, p. 6.

⁶⁷ Merri-bek City Council, *Submission 186*, p. 12; Foundation for Rural and Regional Renewal, *Submission 212*, p. 2; Jules Jay, *Submission 148*, p. 1.

⁶⁸ Ibid.

⁶⁹ Emergency Management Victoria, *A modern emergency management system for Victoria*, 2015, p. 2.

Box 8.1 Ways to enhance community resilience in Victoria

1. Invest in social capital with a focus on:
 - People,
 - Community infrastructure, and
 - Community organisations.
2. Foster greater climate equity and inclusion, particularly among disadvantaged and marginalised communities.
3. Raise public awareness of climate change.

Source: Legislative Council Environment and Planning Committee.

8.4.1 Social capital investment**What is social capital?**

There is no universally agreed definition of social capital, but the Victorian Government has noted it as ‘the resources that are accessed by individuals as a result of their membership of a network or a group’.⁷⁰ Measures of social capital can include social and support networks, such as community organisations, in addition to community and civic engagement, such as volunteering.⁷¹

Social capital as a tool to enhance community resilience

Social capital is an important tool for enhancing community resilience⁷² because it may:

- promote social cohesion and social connections,⁷³
- support communities to prepare for, and manage, the impact of climate change,⁷⁴
- help communities respond to, and recover faster from, climate events,⁷⁵
- provide communities with a support network in challenging times,⁷⁶

⁷⁰ Department of Health, *Inequalities in the social determinants of health and what it means for the health of Victorians*, 2024, p. 2.

⁷¹ Ibid., p. 3.

⁷² Foundation for Rural and Regional Renewal, *Submission 212*, p. 2; Port Philip EcoCentre, *Submission 248*, p. 8; Councillor Tom Crook, Mayor, East Gippsland Shire Council, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, p. 2; Stuart McConnell, General Manager of Assets and Environment, East Gippsland Shire Council, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, p. 8.

⁷³ Merri-bek City Council, *Submission 186*, p. 12; Councillor Tom Crook, Mayor, East Gippsland Shire Council, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, p. 8.

⁷⁴ Councillor Tom Crook, Mayor, East Gippsland Shire Council, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, p. 2.

⁷⁵ Ibid., p. 8.

⁷⁶ City of Melbourne, *Submission 75*, p. 12.

- encourage higher productivity of individuals and groups,⁷⁷ and
- promote better health outcomes.⁷⁸

Community generated networks which address issues that concern them, allow the Government to directly connect with these networks to develop related policy. This Committee was able to connect to community members through social networks to inform its Inquiry.

Evidence to this Inquiry noted that social capital could be enhanced through people, community organisations and community infrastructure. These are discussed below.

Enhancing social capital through people

Volunteers

Inquiry stakeholders noted that volunteers play a key role in developing and sustaining social capital.⁷⁹ However, evidence to this Inquiry highlighted that the volunteer workforce is under challenge from a declining volunteer rate, burnout and constraints on volunteer availability.⁸⁰

Indeed, the volunteer rate has declined from 45.1% in 2010 to 42.1% in 2019. It further declined to 21% in 2020 during the COVID-19 pandemic.⁸¹ The most recent data on volunteering in Victoria was published amid the pandemic.⁸² It is therefore unclear what the current, post-pandemic volunteer landscape in Victoria is like. Overall, these challenges to the volunteer workforce could impact the governance and longevity of community organisations reliant on volunteers, which in turn could undermine social capital and community resilience.⁸³

FINDING 71: People play an important role at the local level in supporting community resilience through volunteering. It is important that Victoria has a sustainable volunteer workforce to support climate resilience responses.

⁷⁷ Department of Health, *Inequalities in the social determinants of health and what it means for the health of Victorians*, 2024, p. 4.

⁷⁸ Department of Health, *Inequalities in the social determinants of health and what it means for the health of Victorians*, 2024, p. 4.

⁷⁹ Foundation for Rural and Regional Renewal, *Submission 212*, p. 3. CERES EARTH Ltd, *Submission 183*, p. 48; David Coates, Unit Controller, State Emergency Service Myrtleford Unit, public hearing, Wangaratta, 4 December 2024, *Transcript of evidence*, p. 45.

⁸⁰ Sustain, *Submission 223*, p. 48.

⁸¹ The declining rate is reflective of wider trends across the country. Australian Bureau of Statistics, *Voluntary Work, Australia*, 2010, 2011, <<https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4441.0Main+Features12010>> accessed 14 March 2025; Victorian Government, *Opportunities and challenges in the changing landscape of volunteering*, 2022 <<https://www.vic.gov.au/victorian-volunteer-strategy-2022-2027/opportunities-and-challenges-changing-landscape-volunteering>> accessed 15 March 2025.

⁸² Volunteering Australia, *State of Volunteering Victoria*, 2020.

⁸³ Foundation for Rural and Regional Renewal, *Submission 212*, p. 3; Sustain: The Australian Food Network, *Submission 223*, p. 48.

RECOMMENDATION 56: The Victorian Government work with community organisations and other relevant stakeholders to reduce the barriers to volunteering and to encourage people of all ages and backgrounds to volunteer.

Children and young people

In 2024, a Deloitte report commissioned by UNICEF Australia reported that 1.4 million Australian children and young people are impacted by climate events in an average year.⁸⁴ However, despite the impact climate change has on the lives of children and young people – and will continue to have on their lives as climate events increase in frequency and severity – the Youth Affairs Council Victoria said children and young people do not feel appropriately engaged on climate preparedness and responses.⁸⁵

Inquiry stakeholders argued it was important to better engage children and young people, and suggested engagement could be increased by establishing safe and age-appropriate roles for children and young people in local emergency planning.⁸⁶ For example, they could support the gathering and dissemination of information after a storm or flood event.⁸⁷

Inquiry stakeholders argued the benefits of this could be twofold:

1. It could encourage a culture of volunteering among younger generations, in turn boosting and sustaining the volunteer workforce, which as noted above, is in decline.⁸⁸
2. Climate change can have an effect on the mental health of children and young people.⁸⁹ Increasing engagement could foster a sense of agency and control among children and young people and help mitigate the negative effects of climate change on their mental health.⁹⁰

⁸⁴ Deloitte, *The Impact of disasters on children and young people*, report for UNICEF Australia, Brisbane, 2024, p. 8.

⁸⁵ Ibid., p. 5; Youth Affairs Council Victoria, *Submission 142*, p. 15.

⁸⁶ The Centre for Excellence in Child and Family Welfare, *Submission 49*, p. 1; Youth Affairs Council Victoria, *Submission 142*, p. 10; David Coates, Unit Controller, State Emergency Service Myrtleford Unit, public hearing, Wangaratta, 4 December 2024, *Transcript of evidence*, p. 46.

⁸⁷ David Coates, Unit Controller, State Emergency Service Myrtleford Unit, public hearing, Wangaratta, 4 December 2024, *Transcript of evidence*, pp. 45–46.

⁸⁸ David Coates, Unit Controller, State Emergency Service Myrtleford Unit, public hearing, Wangaratta, 4 December 2024, *Transcript of evidence*, p. 45.

⁸⁹ Deloitte, *The Impact of disasters on children and young people*, report for UNICEF Australia, Brisbane, 2024, p. 10; Dr Michael Spencer, Adjunct Senior Research Fellow, Green Lab, Monash Business School, public hearing, Wangaratta, *Transcript of evidence*, 4 December 2024, p. 56; The Centre for Excellence in Child and Family Welfare, *Submission 49*, p. 1; Youth Affairs Council Victoria, *Submission 142*, p. 18; Good Shepherd Australia New Zealand, *Submission 251*, p. 31.

⁹⁰ Michael Spencer, Adjunct Senior Research Fellow, Green Lab, Monash Business School, public hearing, Wangaratta, *Transcript of evidence*, 4 December 2024, p. 56.

Indeed, in evidence to this Inquiry Emerald Village Association said its experience with volunteers of secondary school age had been a success. Their knowledge of social media had enabled the Association to boost its online presence, which in turn, enabled it to expand the scale of its communications.⁹¹

FINDING 72: Engagement of children and young people in climate preparedness and responses benefits the community immensely through the knowledge and resources they bring to groups seeking to influence climate resilience.

RECOMMENDATION 57: That the Victorian Government work with local government, community organisations and children and young people to incorporate youth-specific roles into local emergency management planning.

Enhancing social capital through community infrastructure

Evidence to this Inquiry noted the importance of community infrastructure in supporting social capital and building climate resilience, particularly in rural areas.⁹² Examples of community infrastructure include Neighbourhood Houses, community halls and leisure facilities. Such infrastructure can enhance social capital by providing:

- refuge during and after climate events,
- a space for communities to engage and build social networks, and
- a space for communities to develop skills, including those relevant to enhancing climate resilience.⁹³

The Victorian Government has recognised the importance of making community infrastructure climate resilient. For example, to boost energy resilience, the Government has supported the installation of energy back-up systems at community hubs (such as solar power and generators) in 27 towns across Victoria.⁹⁴ Cardinia Shire Council said that towns within the area had benefited from the project and that:

[I]t has genuinely been a partnership approach between the community groups that operate and manage those facilities with council and external providers to really provide that resilience for that community centre.⁹⁵

⁹¹ Trevor Budge, Chair, Planning, Tourism and Environment sub-committee, Emerald Village Association, public hearing, Emerald, *Transcript of evidence*, 10 October 2024, p. 21.

⁹² Carlton Neighbourhood Learning Centre Inc, *Submission 99*, p. 4; Foundation for Rural and Regional Renewal, *Submission 212*, p. 2; Natalie Egleton, CEO, Foundation for Rural and Regional Renewal, public hearing, Mount Macedon, *Transcript of evidence*, 3 December 2024, p. 44.

⁹³ Carlton Neighbourhood Learning Centre Inc, *Submission 99*, p. 4; Vicky Ellmore, *Submission 139*, p. 11; Natalie Egleton, CEO, Foundation for Rural and Regional Renewal, public hearing, Mount Macedon, *Transcript of evidence*, 3 December 2024, p. 44.

⁹⁴ Department for Energy, Environment and Climate Action, *Community hubs with energy back-up systems*, 2025, <<https://www.energy.vic.gov.au/about-energy/safety/community-hubs-energy-backup-systems>> accessed 15 March 2025.

⁹⁵ Warren Smith, Coordinator Climate Change and Heritage, Cardinia Shire Council, public hearing, Emerald, *Transcript of evidence*, 10 October 2024, p. 11.

However, other stakeholders expressed concern that community infrastructure in Victoria may not be sufficiently resilient to climate events, which in turn, has made the management of community infrastructure more challenging.⁹⁶ Several stakeholders advocated for greater financial investment to adapt community infrastructure and improve its climate resilience.⁹⁷ It was noted that existing financial constraints risk even basic maintenance being postponed, which could undermine ambitions for climate resilience adaptations.⁹⁸

The Foundation for Rural and Regional Renewal also noted that it had observed a trend of local government handing over the maintenance and management of community buildings to community committees. The Foundation argued that this, coupled with an increase in financial constraints and a decline in volunteer rates, could place the sustainability and longevity of community infrastructure at risk.⁹⁹

In addition to greater financial investment, evidence to this Inquiry emphasised the need to:

- engage communities in adaptations to community infrastructure,¹⁰⁰
- ensure facilities are accessible and tailored to the cultural, religious, linguistic and demographic characteristics of the community, and¹⁰¹
- measure investment in community infrastructure in terms of social capital returns (in addition to financial returns) because it can account for a range of positive outcomes in health, community cohesion and community connection.¹⁰²

FINDING 73: Community infrastructure, such as community halls, are important places for communities to gather, engage and develop. To enhance social capital and serve communities, community infrastructure needs to be made more resilient to the climate risks facing Victoria. However, financial resources may not be available to support enhancements.

⁹⁶ Councillor Tom Crook, Mayor, East Gippsland Shire Council, public hearing, Traralgon, *Transcript of evidence*, 3 September 2024, p. 6; Tiffany Harrison, Coordinator, Gippsland Alliance for Climate Action, public hearing, Traralgon, *Transcript of evidence*, 3 September 2024, p. 8.

⁹⁷ Yarra City Council, *Submission 25*, p. 3; City of Melbourne, *Submission 75*, p. 11; Carlton Neighbourhood Learning Centre Inc, *Submission 99*, p. 3; Foundation for Rural and Regional Renewal, *Submission 212*, p. 2; Victorian Council Social Service, *Submission 237*, p. 14; Natural Hazards Research Australia, *Submission 113*, p. 2; Natalie Egleton, CEO, Foundation for Rural and Regional Renewal, public hearing, Mount Macedon, *Transcript of evidence*, 3 December 2024, p. 45.

⁹⁸ Foundation for Rural and Regional Renewal, *Submission 212*, p. 2; Victorian Council Social Service, *Submission 237*, p. 14; Tiffany Harrison, Coordinator, Gippsland Alliance for Climate Action, public hearing, Traralgon, *Transcript of evidence*, 3 September 2024, p. 8.

⁹⁹ Foundation for Rural and Regional Renewal, *Submission 212*, p. 3.

¹⁰⁰ Kim O'Connor, Acting Director, Built Environment and Infrastructure, Yarra Ranges Council, public hearing, Emerald, *Transcript of evidence*, 10 October 2024, p. 13; Victorian Council Social Service, *Submission 237*, p. 26; Labor Environment Action Network, *Submission 61*, p. 13.

¹⁰¹ Ande Bunbury, *Submission 9*, p. 2; Foundation for Rural and Regional Renewal, *Submission 212*, p. 2; Victorian Council Social Service, *Submission 237*, p. 14.

¹⁰² Foundation for Rural and Regional Renewal, *Submission 212*, p. 2.

RECOMMENDATION 58: That the Victorian Government adequately fund climate resilience adaptations to community infrastructure. The funding should be allocated to both local governments and relevant community organisations or groups with management oversight of community infrastructure.

Enhancing social capital through community organisations

Stakeholders noted that community organisations play an important role and argued that responses to climate change should account for this.¹⁰³ For example, community organisations can provide:

- essential services to people such as legal aid, family violence support and food relief,
- social connection and wellbeing through sport or other activities, and
- support and shelter before, during and after climate events, particularly for people experiencing disadvantage.¹⁰⁴

However, evidence to this Inquiry expressed concern that community organisations may lack capacity to respond to increasing demand for services by communities affected by climate change, which may undermine community resilience.¹⁰⁵ Community Health First noted that ‘adversity does not breed resilience unless people are supported to recover from that adversity and learn from it.’¹⁰⁶

Evidence drew attention to two services that may be of increasing importance as the frequency and severity of climate events increase. These are summarised in Box 8.2.

¹⁰³ Victorian Council of Social Service, *Submission 237*, p. 8; Good Shepherd Australia New Zealand, *Submission 251*, p. 31; La Trobe University, *Submission 236*, p. 3; Natural Hazards Research Australia, *Submission 113*, p. 2; South-East Monash Legal Service, *Submission 133*, pp. 22–23.

¹⁰⁴ Victorian Council Social Service, *Submission 237*, p. 8.

¹⁰⁵ Victorian Council of Social Service, *Submission 237*, p. 15.

¹⁰⁶ Community Health First, *Submission 62*, p. 6.

Box 8.2 Community organisations: Examples of challenges in the face of climate change

- Mental health support services. Good Shepherd noted that climate change is ‘causing particular types of trauma that are under-recognised and not always understood’. For example, stakeholders expressed concern about the impact climate change is having on the mental health of children and young people. The need for mental health support is increasing but there is a lack of funding, training and capacity to meet demand.
- Legal support services. Climate change is compounding existing legal needs, creating new legal needs and increasing demand for legal services. People can require support in a range of legal areas, such as, housing and tenancy law, insurance law, and social security law. However, the ability of community legal centres to meet demand may be undermined by a lack of capacity and financial constraints. This could risk entrenching existing inequalities and inhibit communities from enhancing long-term climate resilience.

Source: Centre for Excellence in Child and Family Welfare, *Submission 49*, p. 2; Community Health First, *Submission 62*, p. 4; South-East Monash Legal Service, *Submission 133*, pp. 22–23; Good Shepherd Australia New Zealand, *Submission 251*, p. 31; Dr Bronwyn Lay, Federation of Community Legal Centres Victoria, public hearing, Melbourne, *Transcript of evidence*, 20 November 2024, p. 14.

Stakeholders recommended an increase in reliable and sustainable funding for community organisations and the services they provide.¹⁰⁷ Such funding could enable community organisations to increase their capacity and:

- Support more people to better prepare for different types of climate events.¹⁰⁸
- Support more people during and after climate events, which may have lengthy recovery periods.¹⁰⁹
- Expand their service provision to include services that promote climate resilience. For example, climate change-focused and trauma-informed mental health support could be embedded in registered community health organisations.¹¹⁰
- Retain valuable skills, knowledge and experience in the workforce. This would ensure the long-term resilience of community organisations and, by extension, the communities they serve.¹¹¹

¹⁰⁷ Natural Hazards Research Australia, *Submission 113*, p. 2; South-East Monash Legal Service, *Submission 133*, p. 22; Victorian Council Social Service, *Submission 237*, p. 15; Good Shepherd Australia New Zealand, *Submission 251*, p. 31.

¹⁰⁸ Yarra City Council, *Submission 25*, p. 4; Victorian Council Social Service, *Submission 237*, p. 15.

¹⁰⁹ Good Shepherd Australia New Zealand, *Submission 251*, p. 31.

¹¹⁰ Karen Eller, *Submission 1*, p. 1; Community Health First, *Submission 62*, p. 1.

¹¹¹ Victorian Council Social Service, *Submission 237*, p. 15.

FINDING 74: Community organisations play an important role in supporting communities – particularly the most vulnerable and disadvantaged – to prepare, respond and adapt to climate change. As climate events increase, demand on the services they provide may also increase. However, financial constraints will limit the provision of services and, in turn, prevent communities enhancing their climate resilience.

RECOMMENDATION 59: That the Victorian Government continue to adequately support community organisations, particularly those offering mental health, homelessness and legal support services, to ensure people who are the most vulnerable to the effects of climate change are adequately supported.

8.4.2 Climate equity and inclusion

Climate resilience can also be enhanced through greater equity and inclusion. However, stakeholders expressed concern that climate change can have a disproportionate effect on, and perpetuate inequities experienced by, marginalised and disadvantaged groups. Such groups may include (but are not limited to) elderly people, people with disabilities, people from lower socioeconomic backgrounds, women, children, First Nations and culturally and linguistically diverse communities.¹¹²

Inquiry evidence highlighted several inequities including:

- A lack of equal access to climate resilient housing in Victoria.¹¹³ For example, people from lower socioeconomic backgrounds may be homeless or live in accommodation that does not provide adequate cooling. This may increase their risk of negative health effects during heat events.¹¹⁴
- A lack of accessible, adapted and suitably shaded public and green spaces may compound the above inequity.¹¹⁵ It is therefore important that public and green spaces are also adapted to provide refuge during climate events such as heatwaves – particularly in densely populated areas.¹¹⁶

¹¹² Merri-bek City Council, *Submission 186*, p. 2; Najat Abdalla, *Submission 36*, p. 1; David Robertson, *Submission 4*, p. 1; Rachel Davis, *Submission 7*, p. 1; Name withheld, *Submission 19*, p. 1; Yarra City Council, *Submission 25*, p. 3; City of Melbourne, *Submission 75*, p. 10; Carlton Neighbourhood Learning Centre Inc, *Submission 99*, p. 3; Victorian Greenhouse Alliance, *Submission 129*, p. 5; Geelong Sustainability Group, *Submission 202*, p. 2; Macedon Ranges Shire Council, *Submission 206*, p. 18; Vicky Ellmore, *Submission 139*, p. 3; Environment Victoria, *Submission 275*, p. 9; South-East Monash Legal Service, *Submission 133*, p. 7.

¹¹³ La Trobe University, *Submission 236*, p. 3; Yarra City Council, *Submission 25*, p. 3; City of Melbourne, *Submission 75*, p. 3.

¹¹⁴ Community Housing Industry Association Victoria, *Submission 180*, p. 6; Geelong Sustainability Group, *Submission 202*.

¹¹⁵ Friends of the Earth Melbourne, *Submission 192*, p. 5.

¹¹⁶ Cancer Council, *Submission 140*, pp. 7–8; Environment Victoria, *Submission 275*, p. 7.

Inquiry stakeholders argued that to enhance greater equity and social cohesion, action to enhance climate resilience must:

- prioritise the needs and best interests of marginalised and disadvantaged groups,
- include engagement and collaboration with communities, particularly marginalised and disadvantaged groups, and
- consider how intersectionality can impact a person's experience of marginalisation and disadvantage.¹¹⁷

Evidence to this Inquiry argued that the identification of people who could be vulnerable to climate change must be improved because 'understanding and acknowledging vulnerability is a critical part of reducing disaster risk and resilience-building'.¹¹⁸

The Case Study 8.1 provides an example of how local government have sought to identify vulnerable groups in their areas and subsequently engage with those groups to develop climate resilience responses. Some stakeholders supported a process of identifying vulnerable people through registers, which could be state-wide.¹¹⁹

Case Study 8.1 Enhancing Community Resilience Project

Between 2022 and 2024, The South East Councils Climate Change Alliance (the Alliance) conducted the Enhancing Community Resilience Project. The aim of the project was to prepare the region and identify the populations within the region vulnerable to climate change.

A consultation process with the Alliance member councils identified groups vulnerable to climate change. Of the 17 groups identified, 10 sub-groups were determined to have a particular need.

Following this, two pilot projects were conducted to address the vulnerability of two of the sub-groups:

- older people in Bayside City Council, and
- young people in Frankston City Council.

(Continued)

¹¹⁷ City of Melbourne, *Submission 75*, p. 10; Carlton Neighbourhood Learning Centre Inc, *Submission 99*, p. 3; Merri-bek City Council, *Submission 186*, p. 2; Victorian Council of Social Service, *Submission 237*, p. 27; Vicky Ellmore, *Submission 139*, p. 4; Cancer Council, *Submission 140*, p. 13; Najat Abdalla, *Submission 36*, p. 1; Labor Environment Action Network, *Submission 61*, p. 13; Environment Victoria, *Submission 275*, p. 13.

¹¹⁸ Emerald Village Association, *Submission 168*, p. 8; RMIT University, *Submission 222*, p. 6.

¹¹⁹ Vicky Ellmore, *Submission 139*, p. 11; Victorian Greenhouse Alliance, *Submission 129*, p. 5.

Case Study 8.1 Continued

The aim was for the councils to engage these groups in the co-design of resources that could help those groups better prepare for, and respond to, climate events.

Engagement with older people identified that print format communications were preferable to online communications because many did not use, or have access to, digital devices. Bayside City Council subsequently created pamphlets with information on how to prepare for extreme weather.

Engagement with young people identified that social media platforms could be utilised to enhance young peoples' understanding of climate events in the council area. Students then produced a video to be shared mostly through social media and at school assemblies.

The Alliance concluded the Enhancing Community Resilience Project by producing a toolkit to support climate resilience efforts, which included advice on how to co-design resilience responses with vulnerable groups.

Source: The Alliance, *The Alliance Enhancing Community Resilience to Climate Change: Vulnerable Populations Paper 2*, 2023; The Alliance, *Co-design pilot projects in the Enhancing Community Resilience Project*, 2024; The Alliance, *Enhancing Community Resilience Toolkit*, 2024; Helen Steel, CEO, South East Councils Climate Change Alliance, public hearing, Emerald, *Transcript of evidence*, p 10.

FINDING 75: People from disadvantaged and marginalised backgrounds are disproportionately impacted by climate change. Responses to climate change must prioritise these groups or risk entrenching and perpetuating their disadvantage and marginalisation.

RECOMMENDATION 60: That the Victorian Government conduct a state-level assessment to identify the groups in Victoria vulnerable to the varied effects of climate change. This knowledge would support climate preparedness and awareness responses at a local and state level.

RECOMMENDATION 61: That the Victorian Government undertake a review of climate legislation and policies to ensure inclusions of climate justice considerations.

RECOMMENDATION 62: That the Victorian Government and local government consult vulnerable and marginalised groups in climate resilience and adaptation efforts through co-design projects, such as those facilitated by The South East Councils Climate Change Alliance during its Enhancing Climate Resilience Project.

8.4.3 Raising public awareness

Community resilience in facing the repercussions of climate change can also be enhanced by increasing public awareness through the provision of information on risks, vulnerabilities and mitigation responses. The Victorian Government and local governments have taken steps to increase public awareness such as through the methods described in Box 8.3.¹²⁰

Box 8.3 Methods used to raise public awareness of climate change in Victoria

1. **Public consultation on climate change adaptation action plans.** For example, as discussed at Section 3.2.3 and Section 4.2.2, the Victorian government's Adaptation Plans and Strategies have been subject to public consultation.
2. **Community engagement for resilience projects.** For example, the Department for Energy, Environment and Climate Action has undertaken community engagement to support the development of a resilience plan for the coastal area stretching from Cape Paterson to Cape Liptrap ('the Cape to Cape Resilience Project').
3. **Communication on social media and online platforms.** For example, the Department of Health has developed a suite of communications - including videos, posters and brochures - to help councils raise awareness of the public health impacts of extreme heat. The Department has published these in a range of languages.
4. **Workshops and education programs.** For example, Wellington Shire Council provides a Sustainable Living Education Program for children and the community. The aim of the Program is to educate and change behaviour on waste generation. In 2022/23, the Program engaged over 5240 people in the council area.

Source: Engage Victoria, Cape to Cape Resilience Project, 2024 <<https://engage.vic.gov.au/cape-cape-resilience-project>> accessed 13 March 2025; Department of Health, Extreme heat - community resources, 2025 <<https://www.health.vic.gov.au/environmental-health/extreme-heat-community-resources>> accessed 13 March 2025; Wellington Shire Council, Our Sustainability Impact 2020–2024, 2022 <<https://storymaps.arcgis.com/stories/8928427901094a23b98976c83b2745ce>> accessed 13 March 2025; Wellington Shire Council, Sustainable Living Education Program <<https://www.wellington.vic.gov.au/environment/sustainable-living-education-program>> accessed 13 March 2025; Wellington Climate Action Network, *Submission 182*, p. 3.

¹²⁰ Engage Victoria, Cape to Cape Resilience Project, 2024 <<https://engage.vic.gov.au/cape-cape-resilience-project>> accessed 13 March 2025; Department of Health, Extreme heat - community resources, 2025 <<https://www.health.vic.gov.au/environmental-health/extreme-heat-community-resources>> accessed 13 March 2025; Wellington Shire Council, Our Sustainability Impact 2020–2024, 2022 <<https://storymaps.arcgis.com/stories/8928427901094a23b98976c83b2745ce>> accessed 13 March 2025; Wellington Shire Council, Sustainable Living Education Program <<https://www.wellington.vic.gov.au/environment/sustainable-living-education-program>> accessed 13 March 2025; Wellington Climate Action Network, *Submission 182*, p. 3.

Community-based organisations (alongside government) can also play a role in raising public awareness.¹²¹ For example, public health organisations can support the dissemination of information on the risks associated with heatwave events.¹²²

The role of public awareness in building community resilience

... the built environment will only be as resilient as people know how, and can afford, to make it.

Victorian Council of Social Services, *Submission 237*, p. 15.

Evidence to this Inquiry noted that a lack of public awareness can be a barrier to increasing climate resilience.¹²³ The Victorian Government has similarly acknowledged that a lack of appropriate information and knowledge is a barrier to adapting to climate change.¹²⁴

Public awareness can be an important tool for increasing climate resilience within communities.¹²⁵ It can also foster greater public participation in decision-making processes and in turn foster a greater sense of ownership and collaboration.¹²⁶ Research conducted in 2023 by the City of Port Philip found that 78% of respondents ranked information on climate risks and climate preparedness as the second-best way for that council to support the community to address climate change.¹²⁷

Gaps in raising public awareness

Despite the important role public awareness can play in building community resilience to climate change, stakeholders argued there is a gap in communicating risks, vulnerabilities and mitigation responses to climate change with the public.¹²⁸ Some argued that a key reason for this is a lack of funding.¹²⁹ The City of Port Philip argued that ‘significant government leadership and resourcing’ was required to increase public awareness.¹³⁰

¹²¹ Centre for Excellence in Child and Family Welfare, *Submission 49*, p. 1.

¹²² Community Health First, *Submission 62*, p. 3.

¹²³ Dr Kimberley Reid, Research Fellow, School of Earth Atmosphere and Environment, Faculty of Science, Monash University, public hearing, Melbourne, *Transcript of evidence*, p. 13.

¹²⁴ Department of Energy, Environment and Climate Change, *Victoria's Climate Change Strategy*, 2021, p. 43.

¹²⁵ Dr Kimberley Reid, Research Fellow, School of Earth Atmosphere and Environment, Faculty of Science, Monash University, public hearing, Melbourne, *Transcript of evidence*, p. 13; Labor Environment Action Network, *Submission 61*, p. 13; Environment Victoria, *Submission 275*, p. 13; Rachel Davis, *Submission 7*, p. 1; Ande Bunbury, *Submission 9*, p. 2; Environment Victoria, *Submission 275*, p. 7.

¹²⁶ RMIT, *Submission 222*, p. 19; Yarra Ranges Council, *Submission 281*, p. 9.

¹²⁷ City of Port Philip, *Submission 155*, p. 7.

¹²⁸ Community Health First, *Submission 62*, p. 4; City of Port Philip, *Submission 155*, p. 7.

¹²⁹ Community Health First, *Submission 62*, p. 4; City of Port Philip, *Submission 155*, p. 7; Association of Bayside Municipalities, *Submission 219*, p. 4.

¹³⁰ City of Port Philip, *Submission 155*, p. 7.

Evidence to this Inquiry identified several other issues that may contribute to the gap in communicating risks, vulnerabilities and mitigation responses to climate change:

- The complexity of climate change and climate science can be challenging to relay in an accessible way to people of all age groups and backgrounds.¹³¹
- The timeliness of public awareness can be an issue; there can be a focus on response and recovery from climate events as opposed to enhancing knowledge and preparedness before climate events occur.¹³²
- The scale of public awareness communications and campaigns can be limited.¹³³
- Access to information on climate change and risk can vary among communities, which can result in varying levels of awareness among the public. This can be particularly acute among vulnerable groups, migrant groups and refugee groups.¹³⁴
- Efforts to raise public awareness could be more holistic regarding climate risk facing Victorians. For example, public awareness about safe water supply and sanitation following flooding could be improved.¹³⁵
- Information on how to mitigate risks to finances, properties and assets could be improved. So too could information on ensuring adequate insurance coverage for climate risk. This would improve the financial resilience of individuals, businesses and communities, which in turn would support greater climate resilience overall.¹³⁶
- The role of the Victorian Government and local governments could be clarified regarding the communication of information about climate change and climate risk with the public.¹³⁷

Bridging the gap to enhance public awareness

Beyond increased funding, stakeholders identified several factors that could help bridge the communication gap and enhance public awareness on climate change. These factors are summarised in Box 8.4.¹³⁸

¹³¹ Professor Jon Barnett, *Submission 12*, p. 2; Community Health First, *Submission 62*, p. 4; Robyn Hermans, *Submission 80*, p. 1.

¹³² Labor Environment Action Network, *Submission 61*, p. 13.

¹³³ Community Housing Industry Association Victoria, *Submission 180*, p. 1.

¹³⁴ Emerald Village Association, *Submission 168*, p. 8; La Trobe University Climate Change Adaption Lab, *Submission 236*, p. 6.

¹³⁵ Bayside Climate Crisis Action Group, *Submission 227*, p. 3.

¹³⁶ Gippsland Climate Change Network, *Submission 68*, p. 5; Financial Counselling Australia, *Submission 147*, p. 23; Community Housing Industry Association Victoria, *Submission 180*, p. 3; Eastern Community Legal Centre, *Submission 260*, p. 14.

¹³⁷ Bayside Climate Crisis Action Group, *Submission 227*, p. 3.

¹³⁸ Gippsland Climate Change Network, *Submission 68*, p. 5; City of Melbourne, *Submission 75*, p. 12; Financial Counselling Australia, *Submission 147*, p. 23; City of Port Phillip, *Submission 155*, p. 7; Emerald Village Association, *Submission 168*, p. 10; ARC Centre of Excellence for Climate Extremes and Centre of Excellence for the Weather of the 21st Century, *Submission 187*, p. 14; Greater Melbourne Heat Alliance, *Submission 229*, p. 3; La Trobe University Climate Change Adaption Lab, *Submission 236*, p. 6; Federation of Community Legal Centres Victoria, *Submission 259*, p. 27; Youth Affairs Council Victoria, *Submission 142*, p. 10; Councillor Tom Crook, Mayor, East Gippsland Shire Council, public hearing, Traralgon, *Transcript of evidence*, 3 September 2024, pp. 8–9.

Box 8.4 Raising public awareness: Factors to consider

Information aimed at increasing public awareness on climate change should be:

- accurate, and consistent across communities and areas,
- developed in a place-focused manner that is led by First Nations practices and knowledge, local community groups and residents,
- tailored to provide specific advice for vulnerable groups who may be disproportionately impacted by climate change,
- accessible and age-appropriate,
- disseminated digitally and in prominent, trusted places within the community,
- communicated in ways that are inclusive of community demographics. For example, in culturally and linguistically diverse communities, information should be provided in the languages spoken,
- communicated in advance of evolving climate risk,
- disseminated in a coordinated manner between all levels of government, and
- subject to regular review to ensure the information communicated is capable of building community resilience and preparedness.

Source: Legislative Council Environment and Planning Committee.

FINDING 76: Public awareness is an important tool for building community resilience against climate change and its effects. Local government and community-based organisations have a key role in communicating information to raise public awareness on climate change and its effects.

FINDING 77: The Victorian Government and local government have taken steps to increase public awareness of climate change and its effects. However, a lack of funding and gaps in how information is communicated prevents greater public awareness.

RECOMMENDATION 63: That the Victorian Government provide adequate funding to local government and community-based organisations to raise public awareness and build climate resilience.

RECOMMENDATION 64: That the Victorian Government review its practices for raising public awareness and address the communication gaps identified in this Report.

8.5 Partnership and collaboration

Evidence to the Inquiry emphasises the importance of collaboration, between governments, with the community and in partnership with private sector entities.

8.5.1 Between local government, the state, and federal government

Delivering resilience to climate change is not the sole responsibility of a single entity, but will be dependent on strong partnerships and collaboration between individuals, households, communities, asset owners and operators, and local, state and federal governments.

Erne Energy, *Submission 204*, p. 2.

Local government and other stakeholders called on the Victorian Government to collaborate with and advocate to the Federal Government to fund climate resilience measures.

In its submission, Yarra City Council emphasised the need for coordinated action from the state and federal governments, for example to:

- finance mechanisms for large climate-adapted infrastructure grants backed by sound business cases
- attract private finance to invest in adaptation infrastructure and improve public infrastructure
- improve housing conditions, which is more economically efficient than local government programs to fund thermal improvements for low-income households.¹³⁹

The City of Melbourne likewise recommended that the Victorian Government lead, as a ‘bridge between local government and the federal government to ensure access to secure long-term funding for climate resilience reaches communities’.¹⁴⁰

The Victorian Greenhouse Alliance called on the Victorian Government to ‘[a]dvocate to the Federal Government to significantly increase funding available for local and regional projects with a focus on risk mitigation and adaptation through the National Disaster Ready Fund’.¹⁴¹

Noting that ‘[a]daptation works best if the solutions are designed and implemented as close as possible to where the impacts are being felt’, the Alliance also recommended use of ‘[a] multilevel governance approach that includes local, state, and federal

¹³⁹ Yarra City Council, *Submission 25*, pp. 1–2.

¹⁴⁰ City of Melbourne, *Submission 75*, p. 10.

¹⁴¹ Victorian Greenhouse Alliance, *Submission 129*, p. 3.

governments' for 'more cohesive, unified work between governments, with less duplication'.¹⁴² In particular, it recommended that the Victorian Government:

Work with the federal and local governments to re-set roles and responsibilities through establishing a multilevel governance approach to climate adaptation.¹⁴³

Other Councils' submissions also made this recommendation.¹⁴⁴

Bass Coast Shire Council said:

With a certain degree of climate change 'baked in,' if Victoria is to avoid what are now inevitable climate impacts becoming avoidable disasters, a stronger partnership with local, State, and Federal government is required to ensure the right infrastructure is upgraded, at the right time, to protect communities from the worst impacts.¹⁴⁵

The importance of funding mitigation at a local level—which involves working closely with local government—is explored in greater detail at Section 8.3 above. The Committee notes that the Victorian Government has a role to play in bridging the gap between the different levels of government and advocating for greater funding from the Federal Government.

Beyond the issue of funding, the Committee heard from various stakeholders about how the Victorian Government could better collaborate with the Federal Government to improve data collection for its use at the local level.

The Committee heard from various Council stakeholders, for example, who explained, from a council's perspective, the value of centralising data. To understand why centralisation of data is a useful thing to occur:

Annika KEARTON: At the moment a lot of councils are approaching this individually. It is costly, and we have already heard the extreme cost pressures that councils are under to respond to climate change, both emergency shocks and stresses, so there is an efficiency to be gained there. Consistency in the data as well – there is certainly value in having consistent data and consistent risk assessment methodologies. Again, at the moment, there are a number of risk assessments being undertaken by individual councils or by clusters of practice risk assessments would add value and rigour to that data as well. But I might hand over to Bernie to comment on.

Bernie O'SULLIVAN... it is a partnership approach. From a local council point of view, we certainly would not say to the state government, 'That is your responsibility.' We are saying it is a responsibility where we work together, that we fund it and resource it and get the flood planning and modelling done, and do not let it just sit there, because if it sits there, it is not in the planning scheme. So when developments come through and town planners are looking at, 'What are the permit triggers here?' – there might not be any permit triggers, because the work has not been done to get into the planning

¹⁴² Ibid., p. 10.

¹⁴³ Ibid.

¹⁴⁴ See, for example, Merri-bek City Council, *Submission 186*, p. 6.

¹⁴⁵ Bass Coast Shire Council, *Submission 181*, p. 5.

scheme. When we think about a planning scheme amendment, it takes a couple of years, and councils already have a lot in the queue, so that is one of the greatest things I see.¹⁴⁶

Camille White told the Committee about set guidelines for practitioners, something that the state government could lead:

It has to be at a statewide level to say, 'We've got our current data. Do we continue to base our assessment on our current data, or do we look at 2100 and consider egress then?' That is the decision to be made. I think it is still reasonable to look at the current risk, because we know the risk is the risk now, but we are sort of gazing into the future –

...

That is what I was saying: we need set guidelines for the practitioners, CMAs and councils about what shared socio-economic pathways should be. And what time period are we planning for? Are we planning for 2050 or 2100? There need to be the two decisions, one from a planning perspective and one from an implementation perspective, egress in particular. There needs to be that decision-making at the state level, not individual CMAs. There has to be consistency across the state.¹⁴⁷

The Municipal Association of Victoria highlighted work the Australian Climate Service is doing to 'deliver a nationally aligned and integrated approach to Australia's future climate projections':

As a signatory to the Coalition for High Ambition Multilevel Partnerships (CHAMP), the Federal Government should work with the states and territories to ensure climate information and data is well-aligned and accessible to local government decision makers. A fragmented approach to data collection risks confusion and inertia as decision makers need reliable information.¹⁴⁸

Regarding the centralisation of climate data, the ARC Centres of Excellence for Climate Extremes and 21st Century Weather called for the Victorian Government to work to support the National Partnership for Climate Projects:

[T]his federally led initiative brings together key stakeholders responsible for all aspects of climate projections from technical experts involved in the production of projections, to the operational staff and communication experts that are sharing this information. The partnership facilitates knowledge sharing across states to maximise progress and bring together a coordinated response. Providing more opportunities for different agencies to come together in a collaborative environment is essential to leverage progress made by various groups.¹⁴⁹

Noting the importance of using up-to-date climate projection data in the planning system, Victorian Council of Social Services recommended that the Victorian

¹⁴⁶ Annika Kearlton, *Transcript of evidence*, p. 11; Bernie O'Sullivan, *Transcript of evidence*, p. 12.

¹⁴⁷ Camille White, *Transcript of evidence*, p. 66.

¹⁴⁸ Municipal Association of Victoria, *Submission 232*, p. 6.

¹⁴⁹ ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century, *Submission 187*, p. 14.

Government also '[a]dvocate to the Federal Government to require the use of up-to-date climate projection data in the National Construction Code'.¹⁵⁰

Drawing on her extensive experience, Jacquie White outlined how other jurisdictions are tackling climate change impacts on coastal and marine areas. Jacquie highlighted several frameworks that Victoria could adopt to strengthen its approach to marine and coastal management in the face of climate challenges, explaining:

I think that has led to our marine and coastal policies, that we have really drawn on those examples from around Australia to build on what they have learned and put that into our policy. So a lot of the work came from QCoast, Queensland's work around climate adaptation, but also in New South Wales and Western Australia particularly as well. So there is plenty to learn from what the other states are doing. I think the challenge is we have not necessarily connected across all the states to bring that together. So, I think there is some opportunity at a federal level to look at how we bring the expertise and learning from across the country into Victoria. In Western Australia the state government funded modelling around looking at climate hazard risk and did that at a state level so that councils, committees of management and others could invest where the priorities were using the best available science, but you had a whole-of-state evidence base, whereas at the moment a lot of that we do piece by piece.¹⁵¹

Rohan Hogan from the North Central Catchment Management Authority told the Committee about collaboration measures that the Authority is undertaking:

Land managers and the wider community in the North Central region are well acquainted with the effects of climate change and climate variability. Observed impacts include extended dry periods and altered flood patterns. In recent years the North Central region has endured significant climate events such as the millennium drought and severe flood events in 2010–11, 2016, 2022 and 2024.

In addressing the committee, the CMA offers the following information and some recommendations. The CMA will continue to work with partners, traditional owners and community in dealing with challenges of climate change through implementation of the North Central Regional Catchment Strategy and sub-strategies like the flood plain management and waterways management strategies. To better prepare for the future challenges posed by climate change, the CMA also collaborated with partner organisations, TOs and community in 2015 to develop a comprehensive regional climate change adaptation mitigation plan. The North Central CMA is currently in the process of renewing the climate change plan to provide clear direction around challenges of climate change and natural resources.¹⁵²

¹⁵⁰ VCOSS, *Submission 237*, p. 28.

¹⁵¹ Jacquie White, *Transcript of evidence*, pp. 16–17.

¹⁵² Rohan Hogan, *Transcript of evidence*, p. 57.

8.5.2 Private-sector involvement and collaboration with community organisations

In its Built Environment Climate Change Adaptation Action Plan 2022–2026, the Victorian Government acknowledges that ‘[a]chieving climate resilience across our cities and towns will require concerted action across multiple areas of government and the private sector’.¹⁵³ Many stakeholders to the Inquiry likewise highlighted the importance of involving the private sector in preparing for and mitigating the impact of climate change on Victoria’s built environment and infrastructure.

Regarding how Victoria can better prepare its built environment and infrastructure for future climate disasters, the ARC Centres of Excellence for Climate Extremes and 21st Century Weather recommended that the Government ‘[p]romote and fund public-private partnerships’.¹⁵⁴ Its submission stated:

[E]ncouraging collaborations between the government, private sector, and non-profit organisation is important to leverage resources and expertise for climate resilience projects.¹⁵⁵

Una Causevic likewise recommended that the Government ‘[p]artner with non-governmental organizations and private companies to leverage additional resources and expertise in disaster preparedness and response’.¹⁵⁶

In an attachment to its submission, Infrastructure Victoria highlighted the fact that the Victorian Government has significant power to influence emissions in the infrastructure supply chain.¹⁵⁷ Noting that ‘[e]very stage of the infrastructure design and delivery process can potentially reduce energy and materials use, and carbon emissions’, it explained that:

Collaboration from the public and private sectors can consider carbon emissions at each decision point and during the life of an asset. Reducing embodied emissions in a systematic way considers avoiding and reducing material use by using innovative upfront design solutions, re-using and recycling materials and reducing waste at the end of an asset’s life. This includes embodied emissions generated in processing and transporting minerals, materials, and other goods.¹⁵⁸

Despite the important role the private sector plays in enhancing climate preparedness, stakeholders identified the need for greater coordination between the public, private and community sectors.

¹⁵³ Victorian Government, *Built Environment Climate Change Adaptation Action Plan 2022–2026*, p. 5.

¹⁵⁴ ARC Centres of Excellence for Climate Extremes and 21st Century Weather, *Submission 187*, p. 14.

¹⁵⁵ Ibid.

¹⁵⁶ Una Causevic, *Submission 208*.

¹⁵⁷ Infrastructure Victoria, *Submission 126, Attachment 2*, p. 19.

¹⁵⁸ Ibid.

The Emerald Village Association explained that a lack of coordination between public and private entities acts as a barrier to greater climate resilience in Victoria, stating there are:

too many different agencies and private entities involved with no clear apparent coordinating and accountability mechanism.¹⁵⁹

Value Advisory Partners similarly noted existing governance arrangements as a potential barrier to more climate resilient infrastructure, highlighting the need for:

Governance structures to facilitate, co-operate and co-ordinate in the process of enabling investments in resilient infrastructure, including within and between public and private sectors.¹⁶⁰

Its submission contended that preparing for and mitigating the impact of climate change requires, among other things:

Having clear lines of sight to funding and financing pathways, not limited to governments but overtly inclusive of the private sector (financial institutions, superannuation, impact investment, commercial enterprises).¹⁶¹

Moreover, it emphasised the importance of '[g]rowing the ability to govern a coordinated change process across levels of government and between public and private stakeholders',¹⁶² and stressed:

Partnerships between the public and private sectors require appropriate governance structures to facilitate, co-operate and co-ordinate in the process of enabling investments in resilient infrastructure. Governance processes are needed at multiple scales that are sufficiently flexible to facilitate change and attract the levels of investment required. There needs to be a level of policy certainty and consistency and the right incentives and distribution of risks if the power of the private sector is to be harnessed.¹⁶³

David Blore, President of Benalla Sustainable Future Group, also highlighted the importance of cohesion between the work of government, the private sector, and community:

The issue is that there are different agencies involved – local government, of course, and various other state government bodies and the private sector as well. So being able to work across all of those and bring together a cohesive strategy also with the community – we must bring the community along, because if we do not do that, then we will encounter resistance. We have talked about that before. Some form of overarching

¹⁵⁹ Emerald Village Association, *Submission 168*, p. 2.

¹⁶⁰ Value Advisory Partners, *Submission 218*, p. 11.

¹⁶¹ *Ibid.*, p. 8.

¹⁶² *Ibid.*, p. 13.

¹⁶³ *Ibid.*

strategy that brought those elements together I think would be very useful to progress improving housing stock.¹⁶⁴

The specific role of communities in enhancing climate preparedness is explored in Chapter 9.

As noted in the Built Environment Climate Change Adaptation Action Plan, the Victorian Government's Critical Infrastructure Resilience Strategy anticipates the need for the Government to work with the private sector to enhance critical infrastructure resilience and provides clear governance arrangements for doing so.¹⁶⁵ However, this strategy only relates to critical infrastructure, i.e., 'infrastructure that delivers services that are essential to maintain the social and/or economic well-being of the state'.¹⁶⁶ It does not extend to Victoria's built environment and infrastructure as a whole.

The Adaptation Action Plan explains further that the Department of Energy, Environment and Climate Action will work with the private sector to help deliver the Plan.¹⁶⁷ It elaborates that the Government is responsible for 'establishing legislation and programs to support industry and communities' and outlines key private sector participants in the built environment system.¹⁶⁸

Councils that gave evidence to the Committee highlighted the interaction between the work of local government and the private sector in enhancing climate preparedness. Tiffany Crawford, Co-Director of Climate Change and City Resilience at Melbourne City Council, noted the 'innovative work' the council is doing:

around how to work with the private sector to maximise places so that we can deliver that ambition of tree canopy, knowing that will significantly cool the city and provide shading and other ecosystem services.¹⁶⁹

Stephen Swart, Director of Sustainability and Culture at Wangaratta Rural City Council, pointed out that while the council:

might be able to rezone land and we might be able to put in some provisions to make sure that the design of those subdivisions are of a certain standard, but actually doing the subdivisions and delivering the lots on the ground is up to the private sector. A large part of that we do not control.¹⁷⁰

¹⁶⁴ David Blore, President, Benalla Sustainable Future Group, public hearing, Wangaratta, 4 December 2024, *Transcript of evidence*, p. 70.

¹⁶⁵ Victorian Government, *Critical Infrastructure Resilience Strategy*, 2015, p. 12.

¹⁶⁶ Ibid.

¹⁶⁷ Victorian Government, *Built Environment Climate Change Adaptation Action Plan 2022–2026*, p. 16.

¹⁶⁸ Ibid., p. 17.

¹⁶⁹ Tiffany Crawford, Co-Director, Climate Change and City Resilience, Melbourne City Council, public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 7.

¹⁷⁰ Stephen Swart, Director, Sustainability and Culture, Wangaratta Rural City Council, public hearing, Wangaratta, 4 December 2024, *Transcript of evidence*, p. 8.

To help fund councils to implement climate change Adaptation Action Plans, the Municipal Association of Victoria contended that:

Both State and Federal Governments have a role to play in incentivising private sector investment in adaptation and resilience. An investment fund with co-contributions from the private sector could be a model worth exploring in this instance.¹⁷¹

Yarra City Council's submission also noted that state and federal government action is necessary 'to establish frameworks that mobilise public and private capital into the adaptation financing gap'.¹⁷²

Dr Michael Spencer, Adjunct Senior Research Fellow at Monash University's Green Lab, likewise noted the importance of involving the private sector in funding adaptation projects:

This comes back to that issue of if we can understand risk and we can make that bankable, then there is the opportunity of bringing in private finance, and we need to involve the private sector as well, because they are the ones who are going to get knocked around a lot by this. It is not just individuals and governments that are going to get knocked around by adaptation.¹⁷³

Evidently, the private sector has significant influence over Victoria's built environment and infrastructure. Working alongside communities and different levels of government, the private sector can help enhance the state's climate preparedness, for example by funding climate adaptation projects. Considering this important role, the Victorian Government should continue to collaborate with the private sector and ensure that appropriate governance structures are in place to help coordinate these collaborations.

As well as the private sector, it is important that the Victorian Government continue to collaborate with the community sector to enhance the state's climate preparedness.

Case Study 8.2 highlights how the Government has partnered with Geelong Sustainability to retrofit homes for low-income households in the Geelong region, leading to stronger climate resilience outcomes.

¹⁷¹ Municipal Association of Victoria, *Submission 232*, p. 8.

¹⁷² Yarra City Council, *Submission 25*, p. 1.

¹⁷³ Dr Michael Spencer, Adjunct Senior Research Fellow, Green Lab, public hearing, Wangaratta, 4 December 2024, *Transcript of evidence*, pp. 54–55.

Case Study 8.2 Climate Safe Rooms

In 2018, Geelong Sustainability launched a pilot to retrofit one room in 16 low-income households in the Geelong region. The aim of the pilot was to provide people most vulnerable to the health impacts of extreme hot and cold weather with a place of refuge in their home. The retrofit could include (among other things) increased insulation and the installation of a reverse cycle air-conditioner. Some homes were also fitted with solar panels to power air-conditioning units.

The pilot was funded by a Victorian Government Climate Change Innovation Grant. It was facilitated by Geelong Sustainability in collaboration with the City of Greater Geelong, CSIRO, Uniting and ecoMaster.

As discussed at Section 7.2.2, Geelong Sustainability have applied a hierarchy-of-needs approach to Climate Safe Rooms. To qualify, a person had to be 18 or over, be from a low-income background, and have an existing chronic health condition that could be aggravated by heatwaves and extreme cold.

Once participants were recruited, their homes were assessed to determine the appropriate type of retrofit. Once retrofitted, homes were monitored for 18 months to collect temperature data. Participants were also surveyed on the impact the retrofit had on their thermal comfort, finances and their health and wellbeing.

Assessment of the pilot found that participants experienced reduced exposure to extreme temperatures and improved health and wellbeing. It also found that their energy consumption and energy bills had reduced. Geelong Sustainability has argued that by retrofitting one room per household, the program provides a cost-effective approach that can be replicated state-wide.

Source: Geelong Sustainability, *Climate Safe Rooms Findings and Final Report*, 2023; Rachel Clayton, 'Climate retrofitting project a refuge in low-income households during heatwaves and extreme cold', *ABC News*, 2 April 2023 <<https://www.abc.net.au/news/2023-04-02/project-makes-houses-safer-during-heatwaves-and-extreme-cold/102164200>> accessed 16 April 2025.

FINDING 78: Collaboration between government and the private and community sectors is fundamental to enhancing Victoria's climate resilience.

FINDING 79: The Geelong Sustainability Climate Safe Rooms program was successful in improving the health and wellbeing of vulnerable people and people from low-income backgrounds. It provides an evidence-based and cost-effective retrofitting scheme that can provide appropriate refuge in extreme weather whilst having additional benefits, such as saving participants money on energy bills.

RECOMMENDATION 65: That the Victorian Government expand access to the Climate Safe Rooms program to provide vulnerable people and people from low-income backgrounds with appropriate refuge from extreme hot and cold weather.

8.6 Addressing emerging risks

As highlighted in Chapter 6, climate change is intensifying risks to Victoria's essential services and infrastructure. The state's critical networks—including telecommunications, electricity, roads, and water systems—are becoming increasingly vulnerable to rising temperatures, extreme weather events, coastal inundation, and bushfire. These growing threats have raised significant concerns among local government, industry leaders, and emergency management stakeholders about the resilience of Victoria's infrastructure.

In response to these challenges, this Section discusses how the government can bolster resilience, with particular focus on telecommunications, transport and roads, and essential services such as energy and water.

8.6.1 Telecommunications

The Committee consistently heard from stakeholders regarding the need to build the resilience of telecommunications infrastructure along with energy, water and transport as a matter of increasing priority. Michael Nolan expressed:

we are seeing significant impacts in the energy, water and transport space, but also telecommunications. How that is built in is sometimes hit and miss for whether it is on the radar for new investments such as a lot of the new energy, renewables and transmission investments. The transmission standards are not necessarily built for future climate. They have been upgrading, but some of our modelling indicates that it is beyond coping range for extreme wind events, and we have had a recent one of those in western Victoria.

So there are things that we see and understand in the engineering and the climate science interface. Dealing with the existing assets is probably the biggest issue because the majority of those assets already exist and were designed for past climate, and the effort to maintain these assets under more extreme, regular events – variability degrades the asset, and the maintenance to prop them up may not be as effective or may require more funding in order to do so.¹⁷⁴

¹⁷⁴ Michael Nolan, *Transcript of evidence*, pp. 21–22.

Rosemary Sinclair AM, Chair of the Network Outage Review Panel, observed that current regulatory models for telecommunications do not align with current climate change scenarios:

there is some mind to service reliability, but it is backward looking. It all depends on what happened in the last five years. It is not forward looking, taking account of risks such as the increased effects of climate change. It excludes major event days because the whole ethos of the framework is steady state. It is a framework that was built up over the last 20 years when things were much steadier than they are going to be.¹⁷⁵

Rosemary indicated that ‘the networks are businesses that are driven by the regulatory arrangements.’ She emphasised that:

they are very heavily regulated, and their revenue depends on a decision every five years made by the Australian Energy Regulator, which in turn depends on very significant engagement with communities and customers.¹⁷⁶

Rosemary expressed the view that accountability mechanisms are inadequate and called for a significant reform explaining that ‘the process of attesting to the minister each year... needs to be progressed to looking at the outcomes of those plans and processes, and the accountability for making that attestation should be at the board level of these companies, not at the level of a senior officer.’¹⁷⁷ She explained that this shift would reflect Commonwealth critical infrastructure legislation, where ‘it is a board responsibility.’¹⁷⁸

While acknowledging the need to balance resilience with affordability, Rosemary highlights the urgency of reform. She emphasised that the current system fails to adequately address climate threats, as ‘it was not really putting or enabling or supporting the focus by network businesses on these severe weather events and their response to them.’¹⁷⁹

Other Stakeholders called for the development of more resilient regional telecommunications infrastructure, including better mobile coverage, back-up systems and power supply, and emergency mobile roaming. They expressed that telecommunications towers need longer back-up battery support in the event of a loss of mains power.

Stakeholders noted that the Victorian Government’s \$500 million Connecting Victoria program is a step in the right direction, but more action is needed at all levels of government. Stakeholders also encouraged the governments work with distribution businesses on a 5-year Network Resilience Plan. Yet, many submissions argued that more ambitious action and funding is needed to ensure that essential services are resilient to current and future climate change risk.

¹⁷⁵ Rosemary Sinclair, *Transcript of evidence*, p. 4.

¹⁷⁶ Ibid.

¹⁷⁷ Ibid.

¹⁷⁸ Ibid.

¹⁷⁹ Ibid.

The Committee heard from Dr Dan Jeyaseelan, Member, Monbulk and District Community Working Group, Rachelle Mechielsen, Team Leader, Emerald and Cockatoo Emergency Support Team and Peter Edyvane, Member, Monbulk Emergency Management Group who spoke about the resilience of telecommunications to extreme weather events.

The Committee heard from these community representatives and emergency managers about the systemic failures in telecommunications resilience, with repeated outages during extreme weather events exposing inadequate backup power arrangements. Peter Edyvane observed that ‘the first storm we had was terrible ... we had another one a couple of years later and things had not changed at all. We lost comms again.’¹⁸⁰ Dan Jeyaseelan observed that ‘there are multiple steps ... there are insurance issues ... there are other layers that complicate our communication dilemma’, emphasising the absence of timely solutions.¹⁸¹ Dr Jeyaseelan concluded, ‘if something can be done about communication sooner rather than later, it will be lifesaving.’¹⁸²

FINDING 80: Communities continue to experience systemic failures in telecommunications when extreme weather events and climate hazards affect infrastructure

FINDING 81: Regulatory frameworks for telecommunications need to be modernised to incorporate forward-looking climate risk assessments.

FINDING 82: Legislating board-level accountability, like Commonwealth Government arrangements for telecommunications, would shift accountability for climate resilience outcomes away from consumers and onto telecommunications providers.

RECOMMENDATION 66: That the Victorian Government advocate to the Commonwealth Government that it explores avenues to strengthen accountability for climate resilience outcomes in the telecommunications industry.

8.6.2 Transport infrastructure and roads

The Committee heard from stakeholders who explained that road resilience to climate change could be strengthened through investment in robust designs such as raising bridges to prevent flood damage. Stakeholders emphasised that preventative maintenance, including techniques like foam bitumen stabilisation, offers strong returns by making flood-prone roads more durable. Other stakeholders suggested increased maintenance on bushfire-affected roads, such as clearing drains,

¹⁸⁰ Peter Edyvane, *Transcript of evidence*, p. 40.

¹⁸¹ Ibid.

¹⁸² Dan Jeyaseelan, *Transcript of evidence*, p. 40.

helps prevent erosion. They also emphasised the benefits of upgrading drainage, constructing raised viaducts, and applying water-sensitive urban design. All these measures can further strengthen roads against extreme weather. The Committee heard that proactive bridge and culvert upgrades are critical to avoiding community isolation during extreme weather events and strengthen the resilience of roads to climate risk. Many stakeholders emphasised that more funding for maintenance and infrastructure assessments is needed.

Stakeholders emphasised that addressing road vulnerabilities requires:

- identifying at-risk routes
- prioritising evacuation-critical roads for funding
- improving levee and drain maintenance.

Some witnesses suggested that councils must keep drains clear to reduce flood risks. The Committee heard that policy reforms should focus on resilience, with updated multi-hazard data and revised local road funding to account for heavier vehicles and climate impacts. While other stakeholders suggested that planning frameworks must enforce resilient development, sustainable transport, and green infrastructure.

RECOMMENDATION 67: That the Victorian Government increase investment in road and bridge infrastructure upgrades and ongoing maintenance to strengthen the resilience of roads to climate risk.

8.6.3 Essential services: energy and water

Regarding essential services such as energy, stakeholders told the committee that there should be a committed focus on the acceleration of decarbonising electricity generation and electrification, along with increased effort in adapting to current climate change and supporting further adaptation as severe weather events increase.

Stakeholders emphasised that ensuring the right energy infrastructure is in the right place at the right time to support the energy transition is a key priority. Stakeholders emphasised that installing solar panels and providing access to backup energy generation can help provide backup electricity capacity. Some stakeholders highlighted that local micro-grids with battery backup play a critical role during extreme weather events as they allow critical infrastructure to continue functioning until foundational services can be restored.

John Bradley, Secretary of the Department of Energy, Environment and Climate Action, outlined the Department's key concerns regarding climate impacts on Victoria's energy networks with specific regard to recent storms in Victoria, stating that 'the network remains vulnerable ... there is probably no way you can operate a distribution network of the scale that we operate in Victoria and ensure that there is perfect reliability and

there is no impact in times of these storms'.¹⁸³ John acknowledged the inherent tension between achieving full resilience and maintaining affordability, noting 'the cost of undertaking measures to remove all risk would be prohibitive to the community'.¹⁸⁴

John identified that the Department has pursued targeted reforms following major weather events. After the 2021 storms, rule changes required the Australian Energy Regulator to consider 'the value of resilience' in its assessments.¹⁸⁵ John reported measurable progress, observing that during the 2024 storms, 'we did see some of the improvements in AusNet's practice that had occurred from the 2021 learnings',¹⁸⁶ including the deployment of emergency mobile assets. However, bushfire risk remains a primary concern, Bradley emphasised that the Department's 'most significant concern is that we are prepared for extreme events like storms but also prepared for the increasing prevalence of bushfire and bushfire risk'.¹⁸⁷

Bradley highlighted that Victoria has implemented significant bushfire mitigation measures since 2009, including:

- replacing 734 km of bare-wire powerlines with underground or standalone systems
- installing rapid earth fault current limiters across 61,000 km of powerlines
- deploying backup generation in 343 care facilities.¹⁸⁸

Current initiatives like the \$42 million neighbourhood batteries program and community microgrid projects (for example, in Mallacoota, Omeo, and Corryong) demonstrate an evolving approach to resilience. The Corryong microgrid, designed to provide 'up to five days of town-wide backup' when islanded, represents a significant advancement.¹⁸⁹

Regarding regulatory effectiveness, Bradley identified limitations in the Australian Energy Regulator's 'focus on probabilistic performance... based on averages across the network'. He endorsed a recommendation made by Rosemary Sinclair to address the 'worst performing tail of the network,' particularly through monitoring the '10 worst performing feeders'.¹⁹⁰ The proposed rule change to formally incorporate resilience valuation aims to correct the current imbalance where 'the average performance for the majority of customers... ignores the regional and worst performing feeders.'

In effect, current approaches to climate resilience in Victoria are progressive but reactive and regulatory frameworks are evolving through iterative improvements following extreme events. Stakeholders emphasised that the challenge remains to

¹⁸³ John Bradley, *Transcript of evidence*, pp. 76–77.

¹⁸⁴ Ibid.

¹⁸⁵ Ibid.

¹⁸⁶ Ibid.

¹⁸⁷ Ibid.

¹⁸⁸ Ibid.

¹⁸⁹ Ibid.

¹⁹⁰ Ibid.

institutionalise forward-looking planning that anticipates rather than responds to climate impacts.

The Committee also received evidence highlighting the emerging risks surrounding the resilience of essential services such as water. Luke Austin, Operational Delivery Manager, Wimmera Catchment Management Authority, told the Committee:

We also feel that broadening the water grid will help the region as we experience these significant dry periods. Take, for example, the Wartook storage, which is Horsham's main water supply. It actually only has two years of capacity. When we have a long period of dry followed by flood, the infrastructure there overtops and fills; then we go back into a cycle of four-year drying. We have actually only got two years worth of water supply in that catchment and that is Horsham's primary water supply, which is our biggest regional city in the Wimmera. So we think, yes, broadening the water grid with some opportunities there would be recommended as well.¹⁹¹

Infrastructure Victoria has highlighted the need to enhance the climate resilience of the state's water infrastructure to the same standard as current improvements to electricity networks.¹⁹² Key risks such as sea-level rise and saltwater intrusion require urgent attention through coordinated long-term planning and strategic infrastructure investment. Stakeholders emphasised the need for an integrated approach to water management, stating that an integrated water management approach is critical, both for the protection of assets and for downstream uses.

Stakeholders also called for upgrades to drainage systems, identifying it as a key expense for improving climate resilience, which is often beyond the current budget of local government, and needs State Government funding and support. Stakeholders emphasised that assets such as drainage are expected to be impacted by climate risks.

FINDING 83: There is a need to maintain a balance between affordability and preparedness in Australian Energy Regulator determinations.

FINDING 84: The delivery of resilience-focused regulatory reforms for energy infrastructure needs to be accelerated.

FINDING 85: Requirements for worst-performing network segments in relation to energy infrastructure need to be strengthened

RECOMMENDATION 68: That the Victorian Government expand targeted investment in high-risk areas for energy and water infrastructure.

¹⁹¹ Luke Austin, *Transcript of evidence*, 3 December 2024, p. 58.

¹⁹² Infrastructure Victoria, *Submission 126*.

RECOMMENDATION 69: That the Victorian Government strengthen requirements for worst-performing network segments in relation to energy infrastructure.

8.7 Statewide climate risk assessment methodology

Accurate climate risk assessments are essential for informed decision-making and infrastructure resilience. However, inconsistent methodologies and data gaps across Victorian councils and agencies hinder effective planning. Many stakeholders considered the need for Victoria to develop a standardised statewide approach to climate risk assessments, addressing challenges in data accessibility, methodology inconsistencies, and resource constraints.

8.7.1 Data inconsistencies across agencies and governments

Effective climate risk assessment is crucial for informed decision-making and the development of climate-resilient infrastructure. However, Victorian councils and other agencies face significant challenges due to inconsistencies and gaps in available climate data. The Committee heard that inconsistent methodologies for conducting climate risk assessments is a significant challenge for ensuring thorough and comparable assessments.

The Victorian Greenhouse Alliances highlighted the need for proactive risk assessments of assets in climate-exposed areas to allow councils to plan and implement infrastructure upgrades as part of their regular asset management. However, resource and funding constraints limit the ability of councils to maintain existing infrastructure:

Proactive risk assessment of assets in areas exposed to climate hazards is needed to enable councils to consider, plan, budget for, and implement infrastructure upgrades for climate resilience as part of their regular asset management operations. But the ability of Victorian councils to keep up with regular asset maintenance and renewal, and to invest in upgrades for climate resilience, is severely hampered by resource and funding constraints.¹⁹³

Compounding this issue is the lack of consistent and localised data to guide decision-making. The Alliances emphasised that improving methods for collecting local data is ‘critical to supporting local government to assess risk and mainstream adaptation action’.¹⁹⁴ It suggested that Victoria’s Future Climate tool ‘could be used to house and access useful data’. However, the data would need to be ‘kept up to date, data gaps need to be filled, and stakeholders including councils need assistance from the Victorian Government to access and use the data’.¹⁹⁵ Box 8.5 below outlines the Future Climate tool.

¹⁹³ Victorian Greenhouse Alliances, *Submission 129*, p. 2.

¹⁹⁴ *Ibid.*, p. 4.

¹⁹⁵ *Ibid.*

Box 8.5 Victoria's Future Climate Tool

Victoria's Future Climate Tool, developed by the Department of Energy, Environment and Climate Action, provides access to the 'most recent' climate model simulations for future climate and climate-related hazards (across high and medium emissions scenarios).

The tool is interactive allowing users to see data for local regions and export information. The tool is intended for:

- risk practitioners
- environmental/sustainability officers
- strategic planners
- Geospatial Information System users
- specialists.

The tool can provide climate hazard information on the following:

Projected climate change	Projected climate values
Past climate baseline (1986–2005)	Temperature extremes
Rainfall extremes	Extreme value analysis
Heatwaves	Extreme dry/wet
Heat health	

At the time of writing, Engage Victoria was undertaking a *Victoria's Future Climate Tool Update* review.

In January 2025, it published its summary report which outlined feedback received by stakeholders on the tool. The consultation gathered feedback from 41 respondents across government agencies, local councils, researchers, consultants, and community members. Key findings indicated that the tool is valued for its accessibility to climate data, particularly for risk assessment and planning. However, challenges were noted, including difficulties in understanding the data, usability issues, and the need for clearer guidance. Respondents suggested improvements such as better data exporting functions, enhanced user support (including video tutorials and case studies), and the inclusion of additional climate hazard data (e.g., bushfire and flood risk).

Overall, while the tool was considered an essential resource, there is significant scope for refinement to improve usability, functionality, and support materials to better meet user needs.

Source: Department of Energy, Environment and Climate Action, *Victoria's Future Climate Tool*, <<https://vicfutureclimatetool.indraweb.io>> accessed 5 March 2025; Engage Victoria, *VFCT Feedback summary*, January 2025.

In recommending that *Victoria's Future Climate Tool* be updated and adopted as a central tool for collecting climate risk data, the Victorian Greenhouse Alliances explained that changes would be required to ensure it collected 'granular' data:

Datasets such as surface temperatures and flood mapping based on a range of climate change projection scenarios and timelines, will be particularly useful for local planning. Councils, in both metropolitan and regional areas, need more granular risk data than what is currently provided in *Victoria's Future Climate* to make accurate decisions about climate impacts, for example on community assets such as roads. In response, many councils are looking to undertake their own more detailed risk assessments but need funding to support this along with consistent methodologies for risk assessment.¹⁹⁶

The need for standardised risk assessment methodologies was highlighted by several stakeholders. As Tiffany Harrison from the Gippsland Alliance for Climate Action noted, many councils are only just beginning their climate risk assessments, and inconsistencies in methodologies present a major barrier.¹⁹⁷ Harrison told the Committee that councils are looking for more guidance on methodology and how to conduct assessments 'consistently across councils':

They are looking for more guidelines on how to do that, so things like what sort of scenario do they use, what sort of RCP, what timelines. That sort of consistent methodology could be really a big benefit for the councils across the state I think. A lot of the councils are starting their journey. Some of them have undertaken risk assessments with a quite different methodology, and then there are only a few councils who have done risk assessments and have actually done something with that data to be able to go forward and plan how do we respond to resilience and how do we mitigate those risks to those sort of assets and doing the economic modelling to look at what is the cost-benefit analysis of the different types of actions you can take to respond to that and make sure our assets are protected.¹⁹⁸

The high cost of conducting risk assessments presents another significant barrier. Stuart McConnell from East Gippsland Shire Council highlighted the substantial investment required, stating East Gippsland:

secured \$1.2 million out of the Disaster Ready Fund. That is covering off a number of things, but one part of that, so about a third of that, is contributing to this risk assessment across our assets across the whole of the shire. So you can see it is starting to be some significant levels of investment just to undertake the risk assessment, and in the meantime we still need to get on with – for example, there are some roads that we know are vulnerable already, so we are already designing upgrades to those roads to embed climate resilience.¹⁹⁹

¹⁹⁶ Victorian Greenhouse Alliances, *Submission 129*, p. 4.

¹⁹⁷ Tiffany Harrison, *Transcript of evidence*, p. 5.

¹⁹⁸ Ibid.

¹⁹⁹ Stuart McConnell, *Transcript of evidence*, p. 9.

Other stakeholders also noted the resource challenge councils face when undertaking their own climate risk assessments.²⁰⁰ This underscores the challenge of balancing immediate infrastructure needs with the long-term goal of comprehensive climate risk assessment.

Addressing these data inconsistencies and methodological gaps is critical for improving climate resilience across Victoria. Ensuring that risk assessments are based on up-to-date, detailed, and locally relevant data will allow councils and other decision-makers to make informed decisions and allocate resources effectively. Additionally, the development of a standardised approach to climate risk assessments, supported by consistent funding and government assistance, would enhance the capacity of decision-makers to plan for and mitigate climate risks in a coordinated and effective manner.

8.7.2 Impact of disparate data

Accurate and comprehensive data is essential for understanding and addressing climate risks in Victoria. However, inconsistencies in data availability, quality, and accessibility hinder effective decision-making and climate adaptation efforts. One of the primary challenges facing local governments and stakeholders is the lack of sufficient granular or localised spatial data on climate risks. Many councils have resorted to conducting their own detailed risk assessments to fill these gaps. However, the Committee was told that without consistent methodologies and adequate funding from the State Government, these assessments often vary in quality and scope.

Annika Kearton, Chief Executive Officer of the Central Victorian Greenhouse Alliances, noted that:

Currently there is a lack of sufficient granular or localised spatial data on climate risks. Councils are seeking to fill this gap individually by undertaking their own detailed risk assessments, but they would benefit from greater funding from the state government and guidance on consistent methodologies for risk assessment.²⁰¹

This fragmented approach leads to inefficiencies and difficulties in comparing data across municipalities, further complicating statewide climate resilience planning. The issue of disparate and inconsistent climate risk data is largely the consequence of the absence of a uniform framework for assessing climate risk, vulnerability, and economic impact. Local governments, businesses, and community organisations struggle to make informed decisions without a consistent methodology. This issue was discussed by Melissa Burrage from Mornington Peninsula Shire Council who explained that risk assessments are ‘fundamentally ... quite different’ across Victoria and ‘there is not a standard approach to actually look at the risk’.²⁰² Burrage highlighted that the south east councils have adopted a standardised approach within their area but

²⁰⁰ See, for example: Municipal Association of Victoria, *Submission 232*; Tiffany Harrison, *Transcript of evidence*, p. 8.

²⁰¹ Annika Kearton, *Transcript of evidence*, p. 6.

²⁰² Melissa Burrage, *Transcript of evidence*, p. 5.

acknowledged 'other areas of the state and other greenhouse alliances may choose a very different approach and different criteria to assess':

If the state were to actually develop a standardised approach, then we could see some consistency for actually comparing data and providing some ability to actually prioritise and assess the need associated with that in a very equitable fashion.²⁰³

Calls for a standardised methodology for assessing climate risk was also raised by other stakeholders. For example, Renae Littlejohn also from Mornington Peninsula Shire called on the Victorian Government to:

develop a standardised, government-endorsed methodology for assessing risk, vulnerability and economic and financial impacts that councils can use and also community and other entities can use to inform their decision-making.²⁰⁴

Without such a standard, decision-makers are left to rely on ad hoc methods, leading to inconsistencies in policy implementation and climate adaptation strategies. The need for a statewide baseline methodology for assessing climate risk is discussed further in Section 8.7.3 below.

Whilst stakeholders generally agreed there was a need for standardised methodology for risk assessment, they also emphasised that climate risks are not one-size-fits-all. Different communities and regions are exposed to different climate risks. A standardised methodology should not seek to be overly prescriptive but provide a strong baseline for assessing risks across Victoria and across sectors facing similar risk scenarios to ensure evidence-based planning and decision-making.

Poor resilience of critical public infrastructure, including hospitals, can complicate and even prolong disaster response and recovery. Not all facilities face the same risks, but all can be shut down abruptly by disaster. Threats are various and include sea level rise, higher winds, direct/indirect storm damage, flooding, drought, heatwave, wildfire.

Australian Nursing and Midwifery Federation (Victorian branch), *Submission 256*, p. 12.

The disconnect between available climate risk data and real-world planning decisions is another significant issue. While high-level climate policies exist at the state and local government levels, they often fail to translate into practical decision-making within the planning system. Annika Kearton from the Central Victorian Greenhouse Alliances told the Committee that:

The adequacy of the current Victorian planning system as it relates to adaptation to and the mitigation of climate change impacts is also a significant ongoing challenge for councils. In 2021 the Victorian Greenhouse Alliances partnered with the Council Alliance for a Sustainable Built Environment, or CASBE, to commission a research report on climate change and planning in Victoria, which we have recommended to the committee in our submission. This report identifies a disconnect between high-level

²⁰³ Ibid.

²⁰⁴ Renae Littlejohn, *Transcript of evidence*, p. 2.

policy positions on climate change at the state and local government levels and the day-to-day decisions that are being made within our planning system. The report outlines a raft of reform opportunities directly relevant to this inquiry.²⁰⁵

This misalignment can result in infrastructure projects that do not adequately account for climate risks, increasing long-term costs and vulnerabilities. Further, the Committee was advised that environmental and climate considerations are not prioritised. Environmental Justice Australia emphasised that the capacity of Victoria to build resilience and manage extreme weather events is ‘dependent on information being readily available’. It argued that environmental and climate risk assessments are not prioritised in decision-making, stating:

While community services agencies and government departments undertake risk assessments across a range of domains related to individual and community needs, climate and environmental considerations and data does not tend to be considered. In addition, data resources used by government to inform policy and investment decisions, such as the datasets available through the Victorian Agency for Health Information and the Victorian Centre for Data Linkage do not include climate and environmental data so that it can be easily linked to health, social and community services data.²⁰⁶

Beyond standardisation, improved data integration is necessary to create a more accessible and actionable climate risk framework. Currently, data from different sources remains siloed, making it difficult for stakeholders to interpret and apply effectively. A case study from Greater Bendigo highlights how combining different datasets can enhance decision-making:

The only thing I would add is it is about bringing together different datasets so that people can make sense of it without needing to be ‘data nerds’. So, one example is Greening Greater Bendigo, which... overlaid canopy cover data with social-economic data to prioritise areas for green infrastructure investment.²⁰⁷

The lack of standardised, accessible, and integrated climate risk data in Victoria presents a significant challenge to effective climate adaptation and resilience planning. Addressing this issue requires a coordinated effort from the State Government to develop standard methodologies, provide consistent funding for local assessments, and create integrated data-sharing platforms. Without these improvements, Victoria risks continued inefficiencies, costly reactive spending, and inadequate preparation for future climate risks.

FINDING 86: The lack of standardised, accessible, and integrated climate risk data in Victoria presents a significant challenge to effective climate adaptation and resilience planning. Addressing this issue requires a coordinated effort from the State Government to develop standard methodologies, provide consistent funding for local assessments, and create integrated data-sharing platforms.

²⁰⁵ Annika Kearton, *Transcript of evidence*, p. 6.

²⁰⁶ Environmental Justice Australia, *Submission 243*, p. 6.

²⁰⁷ Frances Ford, *Transcript of evidence*, p. 12.

Tiffany Harrison from Gippsland Alliance for Climate Action advised the Committee that a lot of Councils are experiencing guideline and methodology issues:

There are also guidelines and methodology issues ... a lot of the councils are only just starting those climate risk assessments. A consistent methodology could be really a big benefit.²⁰⁸

FINDING 87: Many Councils lack the tools, guidelines, and funding to undertake consistent comparable climate risk assessments, leading to uneven adaption planning across the state.

RECOMMENDATION 70: That the Victorian Government develop and distribute a standardised framework and methodology for local government climate risk assessments, including hazard mapping, timeframes, and cost-benefit analysis templates.

8.7.3 Adopting a statewide baseline methodology for assessing climate risk

To address the ongoing challenges posed by disparate climate risk data, stakeholders strongly advocated for the adoption of a statewide methodology for conducting climate risk assessments. Such an approach would enable uniform data collection, facilitate equitable resource allocation, and support evidence-based policy and planning decisions. Tiffany Harrison, Coordinator of the Gippsland Alliance for Climate Action, highlighted the importance of consistency in risk assessments across different regions:

Councils approaching this quite differently is quite true, but I think what is really important is that there is a consistent approach, which could be state led, in terms of what that looks like for infrastructure. Obviously, as you say, each different area will have their different impacts, but I think it is really important to look at all of them and look at the cumulative impacts as well.²⁰⁹

While standardised methodologies provide a crucial framework for assessing climate risks, they must be flexible enough to account for the unique challenges faced by different regions and sectors. Climate vulnerabilities vary depending on factors such as geography, industry, and community needs, meaning that a one-size-fits-all approach may overlook critical risks or lead to ineffective adaptation strategies. Infrastructure Victoria underscored the importance of tailored, localised assessments, stating:

Adaptation is not one-size-fits-all. Infrastructure managers should identify assets and locations that might be particularly vulnerable and assess their climate risks. Conducting

²⁰⁸ Tiffany Harrison, *Transcript of evidence*, p. 5.

²⁰⁹ *Ibid.*, p. 9.

climate risk assessments allows infrastructure managers to make informed decisions about adaptation investments that get the best returns. Local area analysis can also be used to avoid unintended negative consequences.²¹⁰

Rather than enforcing a rigid, prescriptive statewide methodology, the focus should be on establishing a strong baseline of data that allows for consistent comparison, recording, and tracking over time. A standardised baseline ensures that local assessments remain flexible while still contributing to a broader understanding of climate risks across different regions and sectors. By prioritising comprehensive data collection, policymakers and infrastructure managers can make more informed decisions, adapting strategies to specific vulnerabilities while maintaining a cohesive statewide approach to climate resilience.

Further, a standardised baseline methodology for conducting climate risk assessments can ensure these assessments become business-as-usual. Dr Jonathan Spear, Chief Executive Officer of Infrastructure Victoria, further stressed the role of existing agencies in embedding best practices:

For risk assessment we have the Victorian Managed Insurance Authority, so they provide guidance. There are a number of existing organisations, departments and portfolios that have roles where they can make specific changes to guidelines, and we do not think that needs a new agency to do. It is the embedding of it, the prominence of it and the making of it business as usual that is really important for climate change adaptation and for decarbonisation of our infrastructure as well.²¹¹

Additionally, Infrastructure Victoria's 2024 *Weathering the Storm* report warned of the risks of maladaptation due to inadequate localised analysis:

If infrastructure managers do not undertake localised analysis, they risk investing in measures that might not be effective for decades or might be ineffective or maladaptive. Maladaptation refers to negative consequences following the implementation of an adaptation measure. This occurs when an adaptation measure, meant to protect the community from climate change, inadvertently increases the vulnerability of a system, sector or social group. Researchers have found that maladaptation is often caused by information gaps, where an adaptation measure has been introduced without fully assessing all the risks and impacts.²¹²

Several individuals suggested that the Flemington Racecourse flood wall and associated engineering offsets contributed to residential flooding in some areas during the Maribyrnong River flooding event. Those individuals cited this as an example of maladaptation.

Some other jurisdictions have adopted standardised climate risk assessment methodologies or guidance. For example, the New South Wales Government has

²¹⁰ Infrastructure Victoria, *Submission 126*, p. 2.

²¹¹ Dr Jonathan Spear, *Transcript of evidence*, p. 33.

²¹² Infrastructure Victoria, *Submission 126*, p. 17.

established the Climate Risk Assessment Tool. The tool, as outlined in the NSW *Climate Risk Ready Guide*, provides a structured methodology for assessing and managing climate-related risks for government agencies, infrastructure providers, and other organisations. This tool is designed to integrate with existing risk management frameworks and is aligned with Australian and international standards, including *ISO 31000:2018 (Risk Management)* and *AS 5334:2023 (Climate Change Adaptation for Settlements and Infrastructure – A Risk-Based Approach)*. Box 8.6 below outlines the key features of the Climate Risk Assessment Tool.

Box 8.6 Climate Risk Assessment Tool (NSW)

The NSW Government's Climate Risk Assessment Tool serves as a decision-support mechanism to help organisations systematically assess, prioritise, and respond to climate risks. It aligns with broader climate adaptation and resilience planning efforts, ensuring that climate risks are managed proactively rather than reactively.

Its key features are:

Risk identification: assisting users to identify climate-related hazards relevant to their organisation, including extreme heat, bushfires, storms, sea-level rise, flooding and drought. It considers historical data, climate projections, and scenario analysis to highlight emerging risks.

1. **Risk analysis:** assesses the likelihood and consequence of climate risks on different assets, operations, and stakeholders.
 - Uses qualitative and quantitative approaches to estimate risk severity.
 - Considers direct and indirect impacts, such as financial costs, service disruptions, and reputational damage.
2. **Risk evaluation:** ranks based on their significance and determines which require urgent intervention.
 - Uses a risk matrix to prioritise adaptation actions.
 - Supports decision-making by aligning risks with organisational objectives and strategic plans.
3. **Treatment and Adaptation Planning:** helps organisations develop adaptation strategies and determine cost-effective solutions.
 - Provides guidance on reducing exposure, increasing resilience, and incorporating adaptation into policy and planning.
 - Encourages proactive measures, such as infrastructure upgrades, land-use changes, and emergency preparedness.

(Continued)

Box 8.6 Continued

4. **Monitoring and Review:** establishes a framework for ongoing monitoring, reporting, and updating risk assessments. The aim is to integrate climate risk considerations into long-term planning and investment cycles. It also ensures adaptability by incorporating new climate data and stakeholder feedback over time.

The Tool is used by a variety of stakeholders, including government agencies, councils, utilities (e.g., Sydney Water), and infrastructure providers to assess vulnerabilities. It supports decision-making in areas such as urban planning, asset management, emergency response, and financial risk management. The Tool also encourages collaboration across sectors to build climate resilience at regional and state levels.

Risk ID	Risk description	Business area/Risk owner	Date last assessed DD/MM/YY	Risk category	Natural hazards (climate related)						
					Sea level rise & coastal floodin	Mean temperature	Heatwaves/extreme heat days	Relative humidity	Bushfires	Extreme rainfall and flooding	Extreme storms (incl wind & h
Unique identifier	Refer to Guidance for advice on developing a climate risk statement, or refer to the Example Risks tab	Who is responsible for managing the risk		e.g. financial, service delivery, work health and safety	e.g. map against natural hazards to help understand how many risks relate to specific natural hazards and/or identify any gaps						
1	EXAMPLE Increased number of health issues related to heat stress in the workplace due to higher temperatures and increased severity of heatwaves.	Operations	20/09/19			✓	✓	✓			
2	User input	User input	DD/MM/YY								
3	User input	User input	DD/MM/YY								
4	User input	User input	DD/MM/YY								

Source: NSW Government, *Climate Risk Ready NSW Guide*, 2020.

The *Weathering the Storm* report highlighted the need for systematic and standardised climate risk assessments as a foundational step in adapting infrastructure to climate change. It identified significant gaps in Victoria's approach to climate risk assessments for infrastructure:

- Many asset owners and operators lack consistent methodologies, resulting in uneven preparedness across sectors.
 - Some industries conduct thorough risk evaluations, others fail to integrate climate considerations into their planning, leading to increased vulnerability.

- A major issue is the reliance on historical climate data rather than updated projections that account for the growing frequency and intensity of extreme weather events.
- Climate risk assessments are often treated as optional rather than essential components of asset management and investment decisions, fostering a reactive approach that increases long-term costs.
- Without standardised, forward-looking risk assessment models, Victoria's infrastructure remains exposed to escalating climate threats.²¹³

Infrastructure Victoria recommended integrating climate risks into Victoria's risk management framework by developing clear guidance for departments and agencies. This should align with international standards and provide methodologies for assessing site-specific risks, comparing climate scenarios, and prioritising adaptation measures. It also suggested expanding the Victorian Managed Insurance Authority's Climate Change Risk Management service and updating the Victorian Government Risk Management Framework to explicitly include climate risks. By embedding climate considerations into standard processes, this recommendation aims to enhance infrastructure resilience and ensure proactive adaptation planning.

Box 8.7 below outlines Infrastructure Victoria's recommendations for improving climate risk assessments in Victoria.

Box 8.7 Infrastructure Victoria's recommendations on conducting risk assessments: *Weathering the Storm* report

- Develop and mandate a standard Climate Risk Assessment Framework:
 - The Victorian Government should create a consistent framework for assessing climate risks across all infrastructure sectors.
 - This framework should be mandatory for all publicly funded projects and should be updated regularly to reflect the latest climate science.
- Ensure risk assessments are integrated into Asset Management Plans:
 - All government agencies and infrastructure owners should be required to incorporate climate risk assessments into their asset management and maintenance plans.
 - This includes identifying vulnerabilities, estimating potential damages, and planning adaptive measures.

(Continued)

²¹³ Infrastructure Victoria, *Submission 126*.

Box 8.7 Continued

- Expand the use of scenario planning in risk assessments:
 - Infrastructure owners should model different climate change scenarios (e.g., extreme heat, flooding, bushfires) to assess potential risks and stress-test infrastructure resilience.
 - Long-term risk assessments (30–50 years) should be used to guide investment and decision-making.
- Make climate risk assessment a requirement for funding approvals:
 - New infrastructure projects should be required to undergo rigorous climate risk assessments before receiving government funding. This ensures that projects are designed with future climate impacts in mind and are resilient from the outset.
- Improve climate data and risk assessment tools:
 - Access to up-to-date climate risk data should be improved, with investment in tools that help infrastructure owners assess their vulnerabilities.
 - Establish and use centralised climate risk data platforms to support evidence-based decision-making.

Source: Infrastructure Victoria, *Weathering the Storm: Adapting Victoria's infrastructure to Climate Change*, 2024.

The Committee believes that climate risk assessments are essential for identifying vulnerabilities, informing adaptation strategies, and ensuring that infrastructure, communities, and economies can withstand and respond to the increasing impacts of climate change. The lack of a standardised methodology in Victoria for conducting these assessments means that essential data is lacking and inconsistent making state planning more difficult. Ultimately, establishing a statewide baseline methodology is a crucial step towards improving climate resilience in Victoria. By providing clear guidelines, reducing inconsistencies, and fostering collaboration, such an approach would enhance preparedness for future climate challenges and support long-term sustainable development. Such an approach would enable uniform data collection, facilitate equitable resource allocation, and support evidence-based policy and planning decisions.

This framework should be flexible enough to accommodate regional differences while providing a robust foundation for long-term adaptation planning. The Victorian Government should also consider integrating climate risk assessments into existing governance structures, such as the Victorian Government Risk Management Framework and Victorian Managed Insurance Authority's Climate Change Risk Management service, to embed best practices across all infrastructure sectors.

Mandating climate risk assessments for publicly funded projects and aligning them with international standards will improve resilience and reduce long-term costs. Further

investment in climate data and scenario planning tools will ensure infrastructure managers have the necessary resources to make informed, proactive adaptation decisions. By establishing a cohesive, forward-looking climate risk assessment framework, Victoria can strengthen its infrastructure's resilience against escalating climate threats and enhance sustainable development for future generations.

RECOMMENDATION 71: To enhance climate resilience and infrastructure adaptation, that the Victorian Government establish a statewide baseline methodology for climate risk assessments. This standardised approach will:

- ensure consistency in climate risk assessments across sectors and regions
- facilitate equitable resource allocation by enabling uniform data collection and analysis
- support evidence-based decision-making by integrating up-to-date climate projections into asset management and planning
- prevent maladaptation by ensuring localised, scenario-based assessments that reflect unique regional vulnerabilities.

Chapter 9

Enhancing climate preparedness – what can individuals and communities do?

9.1 Introduction

This chapter explores strategies for enhancing climate preparedness at both individual and community levels. It highlights opportunities for home preparedness to mitigate the impacts of climate change, including discussing the associated costs.

The Inquiry heard a range of evidence on building design and community preparedness that provides valuable insights for coping with a world in which climate events are becoming more frequent, severe and less predictable.

Individuals can work to make their homes better able to cope with temperature extremes or withstand climate events, including fires and floods. Measures are available to improve thermal comfort and energy use, and the Inquiry heard examples of methods for disaster-proofing homes and property. Some relatively low-cost measures exist as well as options for measures with high upfront costs. Regardless there are many long-term benefits, and the Committee heard that some measures could reduce ongoing costs of living.

In relation to communities, the Committee hear that some are working to improve their climate resilience through local level electrification programs.

9.2 The role of individuals in climate preparedness

The Inquiry heard that the threat posed by climate change means it is prudent for individuals to take action to mitigate their own exposure to more unpredictable weather extremes. Climate change is unpredictable, and measuring the risks and effects in advance is not a precise science. Nevertheless, as Monash University's Dr Kimberly Reid told the Committee '... it is really important that people understand that, although there are uncertainties, we can still prepare and we can still undertake a lot of mitigative action even if we do not have the precision that we might want'.¹

Brett Franke, of Better Building Design, told the Committee that "We need to get smarter in the way we build houses – using the materials, siting, orientation of the house, makes a big difference. We are talking about solar passive design and lower

¹ Dr Kimberley Reid, Monash University, 9 October 2024, *Transcript of evidence*, p. 15.

energy houses – efficient, sustainable and not just square boxes placed in a built environment that do nothing but consume energy.”

Global warming – we cannot stop it, we can only try to live with it. The way to do that would be to build a comfortable home that is energy efficient, that does not need a lot of heating and does not need a lot of cooling. And it does not stop at the home, it also goes outside the home, the way we landscape the areas, because it has equal effect on providing comfort to the home by way of natural cooling.²

9.3 Personal risk assessments

Personal risk assessments involve evaluating the potential risks individuals face, particularly in the context of increasing temperatures, natural disasters, sea level rise or extreme weather events. These assessments aim to identify vulnerabilities and recommend measures to mitigate risk. Personal risk assessments help individuals understand their exposure to risk, such as floods, bushfires, or other natural hazards. This understanding is crucial for preparedness and decision-making.

Consumer advocacy group Choice has highlighted the fact that governments, in some state jurisdictions, provide free property assessments to homeowners to recommend mitigation measures. For example, the NSW Resilient Homes Program offered free, detailed assessment reports for homes damaged by the 2022 floods. These reports include a comprehensive scope of repair works and cost estimates.³

In Victoria free assessments have also been provided following some natural disasters. For example, after the floods of October 2022 and those of December 2023 – January 2024 the government provided free structural assessments by independent contractors for eligible properties that included identifying hazards like asbestos or mould and advising property owners if they were eligible for support to have hazards removed for free, or the structure demolished if needed.⁴

Following the 2019–2020 bushfires the government provided a planning and building assistance rebate program that offered rebates for professional services and property-based assessments including advice property owners needed to support a planning or building permit application to rebuild or repair a dwelling. This rebate provides up to \$5,000 per affected property, for, among other things, services such as: preparation of a concept plan, preparation of a planning, permit application report and any related supporting technical reports, including those related to bushfire planning or hazard assessments and other environmental considerations, land surveying, building set out, civil or structural engineering reports or equivalent arborist reports.⁵

² Brett Franke, 3 December 2024, Better Building Design, *Transcript of evidence*, p. 33.

³ Choice: *Weathering the Storm: Insurance in a Changing Climate*, 2023, p. 29.

⁴ Victorian Government, *October 2022 Victorian floods*, 2025, <<https://www.vic.gov.au/2022-flood-recovery>> accessed 2025; Victorian Government, *December 2023–January 2024 Victorian storms and floods*, 2025, <<https://www.vic.gov.au/2023-24-victorian-storms-and-floods>> accessed 2025.

⁵ Victorian Government, *Financial support for rebuilding after the 2019–20 bushfires*, 2025, <<https://www.vic.gov.au/financial-support-rebuilding-after-2019-20-bushfires>> accessed 2025.

A range of tools (discussed below) are currently available to help homeowners conduct assessments to inform building or retrofitting climate resilient homes.

RECOMMENDATION 72: The Victorian government should examine ways to provide greater access to individual property assessments to homeowners in areas vulnerable to natural disasters and to assist homeowners develop appropriate mitigation measures.

9.4 Designing and retrofitting for climate resilient homes

Box 9.1 Nationwide House Energy Rating Scheme (NatHERS)

Under rules which came into effect in May 2024 all new homes in Victoria are required to meet a minimum of 7-star rating under the Nationwide House Energy Rating Scheme (NatHERS).

NatHERS is primarily an accreditation and compliance system used at the end of the building process to ensure that homes meet specific energy efficiency standards. The system uses a star rating scale, ranging from 1 to 10 stars, to measure how well a home maintains a comfortable indoor temperature with minimal artificial heating or cooling. A higher star rating indicates better thermal performance and energy efficiency.

NatHERS has been expanded to include a “whole-of-home” compliance pathway. This approach considers not only the thermal performance of the building but also the energy usage of appliances such as heating, cooling, hot water, lighting, and cooking.

This holistic view ensures that the overall energy efficiency of the home is optimised. A new feature of the NatHERS certificate is the “energy passport,” which is currently optional.

This document includes a checklist of assumptions and inputs used by assessors during the design phase. It serves as a tool for builders and building surveyors to ensure compliance with the specified energy efficiency standards. The cost of meeting NatHERS requirements, including formal certification and consultancy fees, can be substantial, particularly for smaller-scale projects.

The NatHERS rating system evaluates various aspects of a home’s design and construction, including insulation, lights and power, building orientation, window glazing and shading, subfloor finish, water heating and air conditioning.

Source: Department of Climate Change, Energy, the Environment and Water, *Welcome to NatHERS*, <<https://www.nathers.gov.au>> accessed 22 May 2025.

The Inquiry learned that existing housing stock in Victoria is generally built to low standards of thermal efficiency, achieving an average Nationwide House Energy Rating Scheme (NatHERS) rating of only 1.8 stars.⁶

However, a number of low-cost measures are available to both renters and homeowners to improve the thermal comfort of existing homes. Dan Cowdell, Chief Executive Officer, Geelong Sustainability told the Inquiry the most economical way of improving the thermal comfort of a home was through draft proofing.

It seems really simple and it might be back to basics, but draft proofing in terms of putting in some door seals and window seals, sealing up gaps and cracks and putting draft covers on top of exhaust fans – very simple retrofitting – can be done by relatively unskilled trades.

That is very cost-efficient to do. You can put a draft seal on a door for about a hundred dollars, and that is a good-quality one that will last a long time.⁷

Other cost effective and relatively low-cost measure include to upgrade ceiling insulation and to add underfloor insulation where possible.⁸

The Affiliated Insulation Industry Coalition (AIIC) in its submission to the Inquiry noted that buildings with high thermal performance provide a set of ancillary benefits including lowering demand on the grid by reducing the energy required to maintain comfortable internal temperatures.

This represents a significant opportunity to moderate demand on Victoria's electricity grid.

Victoria's poorest housing stock offers the biggest opportunity for improvement. For example, it is possible to take a Melbourne home from a 1 to 4 star NatHERS home energy rating through insulation alone and deliver an energy reduction of about 65 per cent.⁹

9.4.1 Renters

A number of submitters to the Inquiry noted the particular disadvantages faced by those in the rental market and the absence of strong regulation and/or incentives for landlords to improve the thermal efficiency of their tenanted properties. This issue is also discussed in Chapter 8.

The AIIC notes that “Many householders, particularly renters, do not have control over the thermal performance of their homes and have minimal capacity to make upgrades.

⁶ Energy Efficiency Council, *Submission 38*, p. 2.

⁷ Dan Cowdell, 20 November 2024, *Transcript of evidence*, p. 38.

⁸ *Ibid.*, p. 24.

⁹ Energy Efficiency Council (EEC), *Submission 38*, p. 2.

These people are at risk of suffering disproportionately from the effects of climate change.”¹⁰

The Committee heard from South-East Monash Legal Service quoted the ‘2022 Summer Survey Report’ Sweltering Cities and their concerns with the lack of explicit requirements in Australia surrounding cooling in rental properties.¹¹

Sweltering Cities reports that:

- 38% of renter respondents are living without air conditioning, compared to 19% of non-renter respondents.
- 47.3% of renter respondents left their homes to find a cooler location compared to just 14.5% of people who said they own their home.
- 72% of renters reported that concerns about costs stop them from turning on their air conditioner compared to 55% of non-renters.¹²

9.4.2 New construction

The Inquiry learned that homes built under the National Construction Code would have the capacity to deal with the changing climate conditions predicted for this century. Andrew McKeegan, Deputy Secretary, Planning and Land Services, told the inquiry that:

Modelling undertaken by Renew for the Future Climate Impacts on Home Energy Standards 2024 report indicated that homes in Melbourne built to 7-star standard continue to perform effectively through a range of model climate scenarios right through to 2090.¹³

Jeremy Spencer, Director, Sustainable Builders Alliance told the Inquiry that in new construction high standards of efficiency can simply be achieved through the application of good design without necessarily incorporating expensive materials.

The most cost-effective way to achieve 7 stars is through good design. The most expensive way to achieve 7 stars is to think of it as a material substitution and take an old 6-star design and just put in more insulation or triple-glazed windows.¹⁴

He outlined five steps to building a net-zero home:

1. Good Design – Designing homes to require minimal mechanical heating and cooling by leveraging climate-responsive architecture. This ensures comfort even in power outages and enhances long-term performance amid climate change.

¹⁰ Affiliated Insurance Industry Coalition, *Submission 39*, p. 2.

¹¹ South-East Monash Legal Service, *Submission 133*, p. 11.

¹² Ibid.

¹³ Andrew McKeegan, 20 November, *Transcript of evidence*, p. 75.

¹⁴ Jeremy Spencer, Director Sustainable Builders Alliance, 6 November 2024, *Transcript of evidence*, p. 52.

2. Low-Impact Materials – Selecting construction materials with low embodied carbon to reduce the environmental footprint of the home.
3. Performance Construction – Ensuring homes are built to meet thermal performance expectations set by NatHERS and building codes. Proper construction prevents performance failures and ensures energy efficiency.
4. Efficient Appliances – Choosing energy-efficient appliances for heating, cooling, hot water, lighting, cooking, and general power use. NatHERS Whole of Home assessment helps optimise appliance selection for efficiency.
5. Energy generation and offsetting – Installing solar panels to offset energy use, potentially generating enough power to achieve net zero energy consumption. With additional capacity, homes can also compensate for their embodied carbon footprint.¹⁵

Jeremy Spencer also argued that better outcomes could be achieved by utilising the NatHERS tool earlier in the building process.

At the moment the NatHERS system is an accreditation system – a compliance system at the end of the building process. But it has great design power. If an assessor comes in early and works with a designer at design concept stage, you can get energy-efficient outcomes. This was also suggested by James Legge, as reflected in the exchange with the Committee below at Box 9.2.

A number of stakeholders told the Inquiry that they would support the introduction of mandatory disclosure of energy efficiency ratings at the point of sale and lease for residential buildings.¹⁶ Stakeholders believe this would ameliorate some of the disadvantage that renters face in relation to living in efficient and comfortable homes.

FINDING 88: Victoria's existing housing stock is generally built to low energy efficiency standards and raising these standards would improve householders comfort and energy costs, and reduce pressure on the electricity grid.

FINDING 89: Engaging in good climate aware design is the most cost effective means of building homes that are resilient to fluctuations in climate.

RECOMMENDATION 73: The Victorian Government should promote the education of designers, builders and assessors to leverage the NatHERS whole-of-home scheme to generate high performance outcomes.

¹⁵ Ibid

¹⁶ Energy Efficiency Council, *Submission 38*, p. 2; The Affiliated Insulation Industry Coalition, *Submission 39*, p. 3; The United Workers Union, *Submission 220*, p. 15; Victorian Trades Hall Council, *Submission 233*, p. 5; The City of Port Phillip, *Submission 155*, p. 5; Merri-bek City Council, *Submission 186*, p. 8; Brotherhood of St Laurence, *Submission 276*, p. 2.

RECOMMENDATION 74: That the Victorian Government should introduce mandatory disclosure of energy efficiency ratings at the point of sale and lease for residential buildings.

Box 9.2 Evidence given by James Legge, Founding Director, Six Degrees Architects

The CHAIR: What do you think the barriers are to achieving some of those goals for people living in their homes now, as our summers are getting hotter or as our springs are getting windier?

James LEGGE: I think government have in place some levers they can pull. Homes require NatHERS ratings, and the industry will tend to tell you that it is more expensive if you raise those requirements for those homes to build. I doubt that that is the case. The payback period for them is quite rapid in terms of the ongoing cost to heat and cool those homes.

The CHAIR: So homes with higher NatHERS ratings end up being –

James LEGGE: Better insulated.

The CHAIR: Better insulated, but also cheaper to live in over the –

James LEGGE: Way cheaper to live in, yes. The classic example is if you look at some of our existing stock for social housing, it has a NatHERS rating of 2, 2½. They are freezing.

The CHAIR: Two?

James LEGGE: Yes, they are very low. They are concrete boxes without heating – well, they have heating, but they do not perform well, so they lose heat when you put it in or they lose ‘coolth’, if there is such a thing, when you are trying to cool them down. So they are not well built from that point of view, whereas these days the NatHERS rating, the minimum now I think is 7. It was 6.5, but I think it is now 7, and it could be 7.5. We often achieve something closer to 8 or 9. That is not hard to do. It is more difficult, and you will –

The CHAIR: What is the difference living in a 2 or 2½ NatHERS home to a 7 NatHERS home?

James LEGGE: The oscillation of temperature will be huge. It will heat up very quickly or it will cool down very quickly and you will have to put the heater on.

The CHAIR: You have to use more heating and use more cooling.

James LEGGE: If you have a well-insulated home, then the temperature oscillation looks a bit like that (makes straight line motion with hand) basically. It will be flattened out, and ideally you do not need to put anything on. I mean, the prime example is you can use a ceiling fan in a well-insulated home if you have some hot weather outside at least for a few days. A ceiling fan will cope with the shoulder seasons and times of increased temperature before anyone is putting the air conditioner on.

Source: James Legge, Founding Director, Six Degrees Architects, public hearing, Melbourne, 6 November 2024, *Transcript of evidence*, p. 32.

9.5 Home electrification

Victorian Government research suggests a typical all-electric home can save \$1,000 per year in energy bills and reduce household emissions.¹⁷

From 1 January 2024, new dwellings, apartment buildings, and residential subdivisions requiring planning permits in Victoria have been required to be all-electric.

In addition to being cheaper and more efficient to run, electrified homes are better able to cope with climate extremes, according to Geelong Sustainability's submission to the Inquiry.

Electric homes are far more prepared for heatwaves, with efficient reverse-cycle systems which cool as well as heat, and renewable energy to power the cooling when it is required.

However, upfront costs of electrification technologies, such as solar PV, battery energy storage systems (BESS), and electric vehicle (EV) batteries, remain a significant barrier for many households, particularly those with low incomes.¹⁸

The Victorian Council of Social Services submission highlighted the risk of leaving low-income households stranded in homes that rely on gas for heating, hot water and cooking.

Enabling people experiencing disadvantage to access electrification at home also helps avoid leaving people stranded on the gas network. As greater numbers of wealthier people electrify their homes and stop paying gas bills, a smaller number of less well-off people will be left paying disproportionate costs to maintain the gas network. If not assisted to switch to electricity, this will further entrench disadvantage by increasing costs for those unable to switch on their own.¹⁹

Case Study 9.1 below discusses a project that aims to circumvent the situation where disadvantaged individuals are not able to improve the livability of their homes and who rely on increasingly expensive power supply.

RECOMMENDATION 75: That the Victorian Government expand funding for home electrification, particularly targeting those on lower incomes and renters.

¹⁷ Council Alliance for a Sustainable Built Environment (CASBE), *Submission 111*, p. 6.

¹⁸ Master Electricians Australia, *Submission 184*, p. 6.

¹⁹ Victorian Council of Social Services, *Submission 237*, p 13.

9.6 Community electrification

The Inquiry learned of a wide range of community initiatives to promote electrification across Victoria, and that that electrification provides greater resilience to households and communities during extreme weather events.

The Committee heard evidence of initiatives such as the Bendigo Sustainability Group, which uses crowd funding to install solar panels on low-income homes and provide community education on the benefits of rooftop solar.

John Naylor of the North East Regional Sustainability Alliance outlined a series of projects undertaken in cooperation with government and community groups to a December 4 Committee hearing:

We worked with Mondo energy on Project EDGE, which was an ARENA-funded project to prove up the sorts of technologies that are being used now to run the Mallacoota microgrid, which was installed as a response to the climate disaster there back in 2019–20 when the bushfires went through. Mallacoota is now in a position of having a lot better chance of maintaining a resilient energy system and maintaining an energy supply through an event like those bushfires, which unfortunately we can probably say when that repeats. Tony pointed out our work with Electrify Wangaratta. That is a project we have created there, and we are working with Rewiring Australia on that. They are helping us with information, and we have also got support from our local Glenrowan solar farm through their community benefit fund to help us with the work that we do. We could not do that without them. We have also done some work with Beyond Housing, one of the local community housing providers, to help them on the journey towards electrifying their housing stock and getting that powered with rooftop solar, and I would like to think we can get that with batteries to give those people affordable power and also resilient power supplies, because they are the people least able to look after themselves in our society, and to help them to get through the sorts of events which are likely to come strikes me as being a pretty reasonable way to go about doing some things.²⁰

²⁰ John Naylor, 4 December 2024, *Transcript of evidence*, pp. 68–69.

Case Study 9.1 Geelong Sustainability's Electric Homes Program

- The Electric Homes Program, delivered since 2023 supports residents in the G21 region to transition to efficient all-electric homes powered by renewable energy.
- The program has seen an investment of over \$2 million in renewable energy and efficient electric appliances, resulting in significant cost savings and environmental benefits.

Key Achievements:

- Participants save an estimated \$214,366 annually on energy bills, translating to over \$5.3 million in savings over 25 years.
- The program reduces 770 tonnes of CO2 emissions annually, equivalent to substantial environmental impact reductions.
- During the pilot program, participants' average number of annual doctors' visits dropped from 26 to 19, resulting in \$887 saved in the healthcare system per person over one winter period.
- It won two awards at the 2023 Premier's Sustainability Awards: the Premier's Regional Recognition Award and the Industry Leader Award in the Healthy and Fair Society category.

Source: Geelong Sustainability, *Submission 202*, pp. 2–3.

Box 9.3 Evidence given by Ben McGowan, Managing Director, Indigo Power, Wednesday 4 December 2024

Jacinta ERMACORA: Good afternoon. Thanks for taking the time to come along and share with us your experiences. I just want to ask you sort of a broad question. We have got this massive transition underway around energy across the whole state of Victoria at a large-scale level. What role do you see community projects fitting into in that bigger picture in the statewide transformation?

Ben McGOWAN: It is a good question. There are two things to say about that. One is that the public documents from the integrated system plan and all those sorts of electricity-related national documents have a space for I think what used to be called distributed energy resources and now is called consumer energy resources or something like that. They have this role for the community in an aggregated form to play a role in the transition, and that was optimistic four or five years ago and is less optimistic now. There are definitely the difficulties of integrating lots of small people as well as their equipment. But that is there, that opportunity is there, and that is really the space that we would like to work in as a trust thing as much as a technology thing. So there is that. This conversation

(Continued)

Box 9.3 Continued

in terms of the transition is all about these distributed energy resources and how they can (1) yes, deliver this resilience objective but (2) also play that role in delivering that 30 per cent required for the transition, say. So that is the first thing.

The second thing is more of a community engagement and community participation piece. Just to give an example, a lot of what we are talking about today is a really neat way of giving back to the community. We are starting to have some early conversations with some of the utility-scale developers to say, 'You've got this community benefit fund. It might have \$500,000, it might have \$1 million in it. There are only so many sets of basketball jerseys you can give to the local team. What about if we were to provide backup power to the local emergency relief centre?' I think there are ways of meaningfully integrating the community with these larger players in a way that is more meaningful than what currently happens and has a genuine community impact.

Source: Ben McGowan, 4 December 2024, *Transcript of evidence*, p. 65.

9.7 Designing and retrofitting for bushfire resilient homes

The Bushfire Attack Level (BAL) rating measures the potential for a building to be exposed to bushfires, determining the necessary construction requirements for bushfire-prone areas.

According to the Resilient Building Council (RBC) there are 72 possible household mitigation actions for bushfire, outlined in their Retrofit Handbook.²¹

The RBC has also developed the FORTIS House, five house designs and set of principles for building modular homes suitable to resist the effects of bushfire, flood and tropical cyclone and adaptable to the highest BAL rating.²²

²¹ Resilient Building Council, *Take action today*, <<https://resiliencerating.org/take-action>> accessed 27 May 2025.

²² Fortis, *Fortis*, <<https://fortishouse.org>> accessed 27 May 2025.

Figure 9.1 FORTIS Tomerong, one of five free bushfire resilient home designs



Source: Fortis Tomerong, *Fortis Design*, <<https://fortishouse.org/fortis-design>> accessed 27 May 2025.

According to the FORTIS House website:

FORTIS House minimises costs by providing free designs and specifications to reduce consultant fees and fast-track the design process.

FORTIS reduces building costs by using simple design forms, using readily available materials and construction methods. FORTIS has been designed for both prefabrication and on-site building. Prefabrication speeds up build times and can alleviate local trades and materials shortages.

FORTIS Houses cost between \$400,000 and \$700,000 to build, depending on the selected design, size and site requirements.²³

The cost of building a bushfire-resistant home can vary significantly depending on the BAL rating of the property and the specific requirements for compliance. For homes in high-risk areas, such as those with a BAL 40 rating or flame zone designation, the cost of fire-resistant features can be substantial.

Brett Franke, Registered Building Designer at Better Building Design, told a committee hearing that around 60–70 per cent of his work was in properties affected by bushfire. He said a high BAL rating adds around 40 per cent to the cost of a building and described one renovation he'd recently carried out in a BAL 40 rated zone.

With those windows, we had two choices. We could get a bushfire window made that would withstand a flame zone, and the cost came in at \$150,000 just for four windows

²³ Fortis, *Fortis*, <<https://fortishouse.org>> accessed 27 May 2025.

– four large windows. Sliding doors, they were. And then we opted with costs and went with fire shutters that came in at about \$84,000 for four big fire shutters.²⁴

This additional expense is among the reasons provided by Gippsland Community Foundation for the low rate of rebuilding following the East Gippsland Bushfires of 2019–20.

Of 400 buildings destroyed by the fires only 66 had been rebuilt by 2024 for a range of reasons, including the cost of rebuilding or the inability to achieve compliance.²⁵

The cost of building a bushfire-resistant home is further compounded by the potential for underinsurance. Many homeowners find that their insurance coverage is insufficient to cover the full cost of rebuilding to higher standards after a bushfire, leaving them responsible for the gap between an insurance payout and the actual rebuilding costs.

Analysis conducted by the Financial Rights Legal Centre identified that 18.3% of their clients affected by bushfires were underinsured.²⁶

FINDING 90: It is considerably more expensive to build a home in a high fire risk area. Using free resources, such as the FORTIS House which includes plans for a sustainable building and measures for mitigating risk, can alleviate some of this cost.

9.8 Tools and resources for individuals and communities

Some tools are publicly available, or being developed, to help households undertake mitigative action and understand and adapt to risks.

The Victorian Government has developed the Residential Efficiency Scorecard that rates a home's energy use and comfort and provides tailored recommendations for improvements.

For existing homes, landlords can obtain a Residential Efficiency Scorecard assessment for the cost of \$250 to \$500, with rebates provided by some local councils and community organisations.²⁷

The Council Alliance for a Sustainable Built Environment (CASBE) manages the Built Environment Sustainability Scorecard (BESS) tool, which assesses sustainable design at the planning permit stage.

The Resilient Building Council has developed an app that provides households with an understanding of their climate and disaster risk, measuring the performance and

²⁴ Brett Franke, 3 December 2024, *Transcript of evidence*, p 40.

²⁵ Gippsland Community Foundation, *Submission 230*, p. 2.

²⁶ Choice: *Weathering the Storm: Insurance in a Changing Climate*, p. 11.

²⁷ Eastern Community Legal Centre, *Submission 260*, p. 20.

vulnerability of their homes through a Resilience Rating, and providing an indicative rating of where their home could improve with bespoke adaptation recommendations.

There are two current projects within the Resilience Ratings Scheme: the Bushfire Resilience Ratings Free Home Self-Assessment App and the the Multi-Hazard Resilience and Energy Efficiency Ratings Scheme covering bushfire, flood, storm, cyclone & heatwave, combined with energy efficiency, using the Victorian developed Residential Efficiency Scorecard.

The Bushfire Resilience Rating assesses how well a home can withstand a bushfire, considering both local environmental risks and the home's resistance to fire. It supports:

- Custom adaptation plans and certification for improved resilience.
- Insurance and mortgage pricing adjustments based on mitigation measures.
- Resilience disclosure for planning, building codes, and transactions.
- Certification of government programs (e.g., NSW and QLD Resilient Homes) to enable insurance and finance discounts.
- Data for risk assessment & pricing in insurance, finance, and government investment.
- Flood risk assessment & mitigation incentives for broader resilience efforts.²⁸

RECOMMENDATION 76: That the Victorian Government examine how to assist the roll-out of the Multi-Hazard Resilience Ratings Scheme across the state.

9.9 Government resources

The Victorian Government has a range of existing policies in place which specify funding and rebates that can be provided to support households to become more climate resilient.

These include:

- **Solar for Apartments** – Successful applicants receive rebates of up to \$2 800 per apartment, or up to \$140 000 per building for up to 50 apartments to install solar panels on their rooftop.
- **Residential Electrification Grants Program** – program offering \$10 million which will remove the need to apply for individual rebates, and enable new home buyers to install solar during the initial construction.

²⁸ Resilient Building Council, *Submission 238*, pp 7–8.

- **Solar Panel (PV) Rebates** – Solar panel rebates of up to \$1,400 plus the option of an interest-free loan are available for existing homes and homes under construction.
- **Solar Battery Loans** – Interest-free loans of up to \$8,800 are available to help eligible Victorian households reduce the upfront costs of installing a solar battery.
- **Solar Rebates for Rental Properties** – Solar panel rebates are available of up to \$1,400 plus the option of an interest-free loan.
- **Victorian Energy Upgrades (VEU) Program:** Offers access to discounted energy-efficient products such as heating, water heating, lighting, draft sealing products and discounted ceiling insulation (from early 2026).
- **Energy Efficiency in Social Housing Program:** Funds upgrades for social housing residents including: thermal shell upgrades such as shading and insulation, installation of energy efficient appliances and installing solar systems such as solar panels and batteries.

9.9.1 Barriers to Effective Climate Preparedness

Insurance and financial preparedness

Box 9.4 Catastrophe 223: The insurance impact of a single climate event

The most recent, and severe of these extreme weather events was the major flood event in late 2022. Known within the insurance industry as Insurance Catastrophe 223 (CAT223), this extreme weather resulted in significant damage to regional communities across three states. As of February 2024, the floods have incurred \$830 million in damage to property insured by ICA members, spread across 22,800 claims. Of this total, nearly \$700m (84%) was incurred in Victoria across over 15,000 claims, with an average cost per claim of over \$40k. Since the start of 2022, almost 90% of claims in Victoria during declared insurance events have been due to flooding, with hail and storm damage making up the remainder.

Source: Insurance Council of Australia, *Submission 46*, p. 2.

The Insurance Council of Australia, in its submission to the Inquiry, warned of the ‘insurance protection gap’, which it defined as “the extent to which potential economic losses are not covered by private insurance”.

More than 1.24 million Australian households are experiencing home insurance affordability stress, according to the Australian Actuaries Home Insurance Affordability (AAHIA) Index (as quoted in the Eastern Communities Legal Centre’s submission to the Inquiry.²⁹

²⁹ Eastern Community Legal Centre, *Submission 260*, p. 9 (quoting data from the The Australian Actuaries Home Insurance Affordability Index).

This number is expected to double under high emissions scenarios and is particularly pronounced in areas with high risk of cyclones and floods. Those underinsured, according to consumer group Choice “are likely to be older, retired and renting, have lower insurance literacy, live in socioeconomically disadvantaged areas and have lower current savings balances”.

The Insurance Council of Australia notes that as the climate continues to change the challenges associated with insurance affordability and availability in vulnerable areas will continue to grow.

And while most believe themselves to be adequately insured around one-third of those surveyed by Choice following a bushfire found their insurance was inadequate.

It is not unusual for people to find themselves uninsured after an event that destroys their home. This means that they are then responsible for the gap between the cost of repairing the damage and the payout they can expect from their insurer. 78% of people say they are confident that their home insurance covers the cost of rebuilding their home. Yet, 32% of people that have settled an insurance claim for a bushfire, said that their home insurance was not enough to cover the costs.³⁰

FINDING 91: The number of underinsured and uninsured households is predicted to continue to grow in Victoria, with socioeconomically disadvantaged households and households built in areas of high risk to flood and fire, the most vulnerable.

9.9.2 Social and economic inequities

Social and economic inequities pose significant barriers to climate preparedness. Vulnerable groups, such as low-income households and renters, often lack the resources to implement resilience measures.

The Inquiry heard a wide range of evidence that vulnerable socioeconomic groups were especially limited in their ability to respond to the challenges inherent to a changing climate. This was discussed by the Victorian Council of Social Services in their submission to the Inquiry. They described a ‘cycle of precarity’:

For people experiencing disadvantage, the effects of climate change will be felt first and worst. People with fewer financial resources tend to live in areas with greater exposure to climate impacts. For example, it’s cheaper to rent a home in rural Victoria or the far outskirts of Melbourne than closer to the city, but people in these areas are more exposed to impacts of climate change such as flooding, bushfire and extreme heat. The same people also have fewer financial resources to adapt to a more dangerous climate. This can lead to a vicious cycle of precarity, especially for people who can’t afford sufficient – or any – insurance, and for the increasing number of Victorians whose homes will be uninsurable in the coming years, particularly in the state’s north.³¹

³⁰ CHOICE, *Weathering the Storm: Insurance in a changing climate*, August 2023, p. 13.

³¹ Victorian Council of Social Services, *Submission 237*, p. 6.

Several submitters to the Inquiry called for landlords to be required to provide cooling as well as heating in Victorian rental properties.

South-East Monash Legal Service noted in its submission that there is a lack of explicit requirements surrounding cooling in rental properties and the City of Yarra suggested recent reforms could go much further.

Recent changes to rental laws are welcome but do not go far enough in meeting residents' needs, e.g., the requirement that landlords provide heating in the main living area, but not cooling, does not align with evidence of increasing morbidity and mortality during progressively hotter summers.³²

As Victoria's biggest landlord – to many of the lowest income and most marginalised tenants – the State Government has a particular responsibility to ensure that the social housing provided to tenants is resilient to the effects of a changing climate. While not directly canvassed during this inquiry, the Legislative Council standing committee on Legal and Social Issues has completed an inquiry into the redevelopment of Melbourne's 44 high rise public housing towers. The Victorian Public Tenant's Association submission to that inquiry has testimony from residents on the environmental conditions many experience in those high-rise towers:

The buildings are so badly built, solid concrete, they are freezing in winter and take days to cool off when its hot. I have a new air con but haven't tried it yet. My heating is rubbish it doesn't work well

Victorian Public Tenants Association, *Submission 586*, p. 10.

We can't get aircon's as the electricity needs upgrading.

Victorian Public Tenants Association, *Submission 586*, p. 12.

[we need] Better insulation so we don't freeze and bake. Better heating.

Victorian Public Tenants Association, *Submission 586*, p. 12.

The Homes Victoria engagement with tenants at the decommissioned towers on Elgin St, Carlton heard a range of issues, including "People want liveable, well-designed homes with good natural light, ventilation, heating and cooling.

Department of Families, Fairness and Housing, *Submission 623, Attachment 2*.

A review and report by Approval Systems on the public housing towers at 259 Malvern Road, Prahran/South Yarra noted a range of non-compliance with building regulations, including 'fire safety, waste, and a lack of insulation'.³³

³² Yarra City Council, *Submission 25*, p. 2.

³³ Department of Families, Fairness and Housing, *Submission 623*, p. 17.

In their submission to the Legal and Social Issues committee, Homes Victoria said that the first two towers being redeveloped at Elgin St, Carlton will include “environmentally sustainable and all electric homes with a 5-star Green Star⁸ rating and 7-star Nationwide House Energy Rating Scheme (NatHERS) 9 average rating”.³⁴

The issues of liveability and environmentally sustainable design in Victoria’s social housing are critically important, and should be further canvassed in by the Legal and Social Issues committee in their current inquiry.

RECOMMENDATION 77: That the Victorian Government introduce minimum energy efficiency standards that ensure that minimum levels of insulation are in place in rental properties, including social housing.

RECOMMENDATION 78: That the Victorian Government undertake to assess the uptake of the Victorian Energy Upgrades program by landlords and explore ways to encourage landlords to make their properties more energy efficient and improve their thermal comfort.

RECOMMENDATION 79: That the Legislative Council Legal and Social Issues Committee consider issues about climate resilience of public and community housing as part of its Inquiry into the redevelopment of Melbourne’s public housing towers, in line with its terms of reference.

9.9.3 Skills shortages

Submissions to this Inquiry from the Victorian Trades Hall Council (VTAC) and the Master Electricians Australia (MEA) identified a shortage of skilled trades as an impediment to building and retrofitting climate resilient homes.

According to Trades Hall “competition for electrical workers is high and there are three withdrawals for every apprenticeship completion”.³⁵

They argue that “Victorian TAFEs and RTOs need to better support new careers and industry in retrofitting, energy management, energy efficiency, electrification and local manufacturing of energy efficient appliances and building materials”.

Similarly MEA advocates for Victoria to have a sustainable skilled electrical workforce to install Consumer Energy Resources.

VIC’s electrical industry is currently facing a skills shortage crisis which will only worsen without immediate intervention. MEA urgently stresses the importance of investing in our future workforce today through our younger generations. To ensure

³⁴ Department of Families, Fairness and Housing, *Submission 623*, p. 12.

³⁵ Victorian Trades Hall Council, *Submission 233*, p. 6.

there is a pipeline of skilled workers in the future to support the implementation and maintenance of CER, we strongly recommend the VIC Government integrates and streamlines VETSS [Vocational Education and Training in Secondary Schools] with an equal weighting to ATAR. This will expose STEM trades to a wider cohort, inherently increasing diversity in trades, enhancing apprentice commencement and retention rates and allow for greater aptitude and competency screening to better match the right skills with the right trade.

FINDING 92: That skills shortages in the building and electrical trades will increase the cost and hamper the transition to more climate resilient homes.

RECOMMENDATION 80: The Victorian Government explore ways to increase attraction and retention in the electrical trades and create pathways for careers in retrofitting, energy management and energy efficiency.

Chapter 10

Further areas of inquiry into climate resilience and adaptation

The Committee notes that there are far reaching implications arising from climate change for Victoria and many of these implications are outside the scope of a single parliamentary inquiry.

Some of the many and varied areas of potential inquiry are listed in the terms of reference for the Inquiry. Section (f) called for the Committee to determine the need for further investigation of relevant areas of concern such as biodiversity, human health, primary production, industry, emergency services. Further, the survey responses provided by submitters to the inquiry, as discussed in Chapter One, raised additional areas of concern.

The term ‘climate resilience’ is seen as relevant to many aspects of modern life in addition to those mentioned above: infrastructure and the built environment, which this report primarily deals with, the economy and business, public health and wellbeing, the natural environment and biodiversity, governance, community resilience, social equity and vulnerable populations, technology and innovation and the list goes on.

This Chapter discusses the evidence that the Committee received in submissions and heard during hearings that relates range of aspects of life in Victoria affected by climate change.

It was impossible for the Committee to investigate in detail all of these features of climate change. The Committee believes that there may be scope for further investigation or inquiry into many of the issues raised during this inquiry. The *State of the Environment 2023 Report* highlights significant gaps in understanding and would provide a good starting point for further areas of exploration by government.

RECOMMENDATION 81: That the Victorian Government consider further investigation or inquiry into the impacts of climate change on biodiversity, human health, primary production, and industry in Victoria.

Some of the subjects that were raised with the Committee during this Inquiry, but which were not investigated in detail are outlined below.

10.1 Impacts on biodiversity

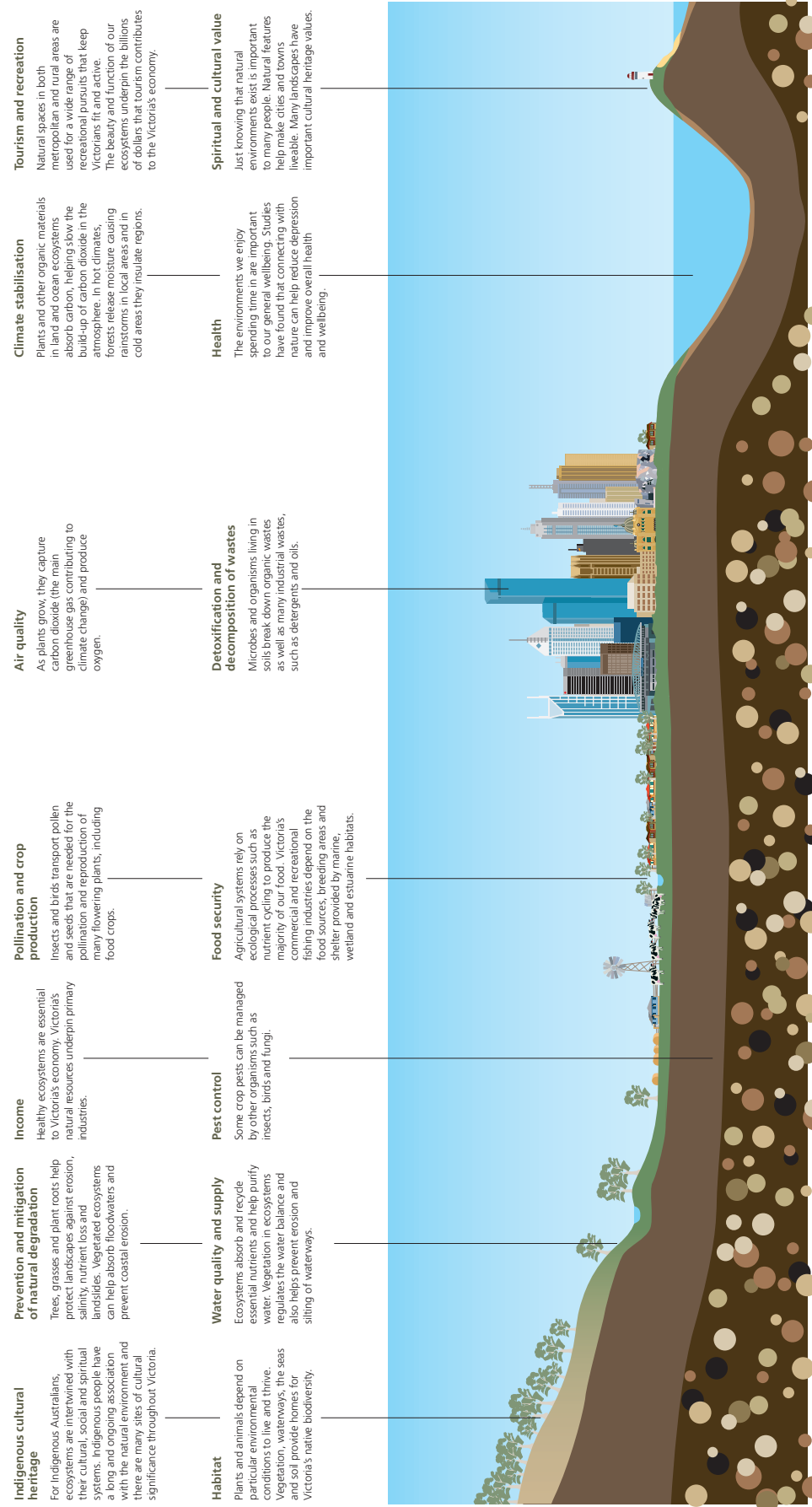
Climate change poses a profound threat to biodiversity in Victoria, and globally, with the documented potential to disrupt ecosystems, species habitats, and ecological processes. The Committee also heard that robust biodiversity can help mitigate the impacts of climate change by enhancing ecosystem resilience and adaptability.

Stakeholders discussed the benefits of healthy ecosystems on climate resilience and the ability for the natural environments to withstand adverse climate events. For example, the Labor Environment Action Network noted that ecosystems with higher biodiversity are better equipped to withstand external shocks:

Healthy ecosystems provide a diverse range of goods and services. Resilience is the key to an ecosystem's capacity to adapt and respond to disturbances such as fire, disease, and extreme weather without losing their fundamental structure and function. Biodiversity brings resilience to ecosystems by spreading risk and making them more able to cope with shocks and disturbances.¹

¹ Labor Environment Action Network, *Submission 61*, p. 3.

Figure 10.1 Goods and services provided by healthy land, water and biodiversity



Source: Labor Environment Action Network, *Submission 61*, p. 4.

The Committee received some evidence on the varying climate change and land use planning can have on ecosystem resilience. A number of these issues are outlined below, the Committee notes this is not an exhaustive list of the risks to biodiversity.

- **Habitat Loss and Fragmentation:** Urban development continues to encroach on natural habitats, threatening native flora and fauna.
- **Invasive Species:** Changing climate conditions increase the spread of invasive plants, animals, and pathogens, further straining native species. Warmer temperatures and altered precipitation patterns create new opportunities for invasive species to thrive, outcompeting indigenous biodiversity.²
- **Fire and Water Regime Changes:** Climate change exacerbates the frequency and intensity of bushfires, which can devastate ecosystems and lead to long-term biodiversity loss. Similarly, altered water cycles, including more severe droughts and floods, disrupt aquatic ecosystems and threaten species dependent on stable water regimes.³

The Committee was also made aware of strategies in place for biodiversity conservation and protection in place by at varying levels of government. At the federal level, the Commonwealth Government, as part of the United Nations Convention on Biological Diversity's *Kunming-Montreal Global Biodiversity Framework*, has committed to protecting 30% of land, freshwater and marine ecosystems by 2030.⁴

At the state level, the Victorian Government is implementing its *Biodiversity 2037* plan, which aims to halt the decline of native plants and animals while improving the natural environment. At a public hearing, John Bradley, Secretary of the Department of Energy Environment and Climate Action, told the Committee the plan includes actions to protect biodiversity and to predict the effects of climate change on the natural environment:

This framework includes 20 targeted adaptation actions focused on enhancing biodiversity resilience in the face of climate change we have got 20 adaptation actions within the natural environment, and they include the way we are using things like our strategic management prospects tool and the Arthur Rylah Institute to assess the potential risks to biodiversity as we see the changing climate and what might happen then in terms of the migration of species and what might happen in terms of the increased incursion of invasives and other threats in the natural environment.⁵

In its submission, the Nature Conservancy argued that there 'are a range of natural climate solutions that could be employed to better prepare Victoria's built environment and infrastructure, and therefore the community, for future climate disaster events'.⁶ These include protecting:

² Ibid.

³ Ibid.

⁴ Convention on Biological Diversity, *The Kunming-Montreal Global Biodiversity Framework*, <<https://www.cbd.int/gbf>> accessed April 3 2025.

⁵ John Bradley, 20 November 2024, *Transcript of evidence*, p. 80.

⁶ Nature Conservancy, *Submission 48*, p. 3.

- native forests, wetlands and grasslands which trap and slowly release water, reducing the impact of heavy rainfall events
- coastal ecosystems such as seagrasses and mangroves which slow and reduce the impact of coastal erosion
- urban vegetation which reduces temperatures in cities
- repairing lost and degraded ecosystems which can be an effective way to deliver nature-based solutions that increase resilience to climate change impacts.⁷

10.2 Human health implications

The effects of climate change, which has been described by the World Health Organisation as the ‘greatest threat to global health this century’,⁸ have wide ranging impacts on physical and mental health. The Committee also heard this during the *Inquiry into the 2022 flood event in Victoria*, and that subject was discussed extensively in that Report. Box 10.1 below shows the Committee’s Findings from the 2022 flood event inquiry report related to the health effects of extreme weather events such as flooding.

Box 10.1 Findings from the Final Report on the *Inquiry into the 2022 flood event in Victoria*: health effects

FINDING 66: Maribyrnong residents affected by the evacuation reported significant trauma associated with the process, further exacerbated by the overall impact of the major flooding event. The timing of the evacuation warnings led to some residents receiving insufficient notice, leaving them unprepared to evacuate promptly.

FINDING 86: There is a pressing demand for comprehensive community support, including practical measures, and a critical necessity for increasing support mechanisms addressing emotional and mental impacts for an effective emergency response.

FINDING 87: The 2022 flood event caused significant and enduring trauma to many of those affected, manifesting mental health challenges that require comprehensive support and intervention.

Source: Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into the 2022 flood event in Victoria*, July 2024.

⁷ Infrastructure Victoria, *Submission 126*, p. 21.

⁸ Community Health First, *Submission 62*, p. 2.

According to a recent RMIT study of 1,165 Australian workers in Victoria, 75% indicated physical health impacts, and 43% indicated mental health impacts from climate change.⁹

These impacts are also acknowledged and addressed in part in the *National Health and Climate Strategy* and in the *Health and Human Services Climate Change Adaptation Action Plan 2022–2026*. This plan, which is one of seven prepared by the Victorian Government, are discussed further in Chapter 4 of this Report.

Further, the Department of Health established Climate Health Victoria in 2024 to promote climate change and sustainability action in Victoria's public health system and support emissions reductions.

The Committee heard compelling evidence on the need to invest in preventative measures to mitigate the negative effects of climate change on the physical and psychological health of Victorians. The following sections raise some of the key physical and mental health concerns raised by stakeholders in relation to climate risks.

10.2.1 Heatwaves

Heatwaves were raised by stakeholders as one of the most pressing health-related risks from climate change, which are disproportionately affecting vulnerable populations such as the elderly, young children, individuals with underlying health conditions, and those in socioeconomically disadvantaged communities.

According to a 2019 report from the Department of Environment, Land, Water and Planning, 'heatwave events already cost Victoria on average \$87 million each year. By 2030, they are predicted to cost the Victorian economy \$179 million per year'.¹⁰

Dr Ailie Gallant Associate Professor in the Monash University School of Earth, Atmosphere and Environment in the Faculty of Science told the Committee that 'heatwaves are actually the largest killers in Victoria'. She further explained that:

Particularly during heatwaves we find urban heat islands are worse than they normally are, by around 3°C or so. Let us just say you have a normal urban heat island of around 2°C; that would mean that you have an urban heatwave of 5°C during a heatwave instead of 2°C. What that can mean is that increases people's vulnerability to those heat extremes. There are certainly cities around the world right now who are actively incorporating that planning for what we call heat-sensitive cities into urban design and planning to reduce temperatures, because if we do not, we will continue to see urban areas likely warm at a faster rate than non-urban areas.¹¹

⁹ Todd Denham and Lauren Rickards, *Climate Impacts at Work*, Climate Resilience Living Lab, RMIT University, Melbourne, 2022, p. 9.

¹⁰ Department of Environment, Land, Water and Planning, *The Economic Impacts of Heatwaves on Victoria*, 2019, p. 1.

¹¹ Dr Ailie Gallant, Chief Investigator, School of Earth Atmosphere and Environment, Faculty of Science, Monash University, public hearing, Melbourne, 9 October 2024, *Transcript of evidence*, p. 15.

In urban areas, the heat island effect exacerbates these events, with studies showing that temperatures in urban areas can rise an additional 3°C during heatwaves. This phenomenon increases risks of heat stroke, dehydration, cardiovascular stress, and mortality. The 2019–20 Black Summer heatwaves, for instance, led to 417 fatalities across Australia. Heatwaves also lead to secondary health effects such as degraded air quality, which contributes to respiratory and cardiovascular diseases.

The heat island effect and associated health concerns is also discussed in Chapter 2 of the Report.

10.2.2 Air pollution

Extreme heat and bushfires can exacerbate air pollution due the prevalence of increased levels of ozone and particulate matter (Footnote Centre for Safe Air submission). Poor air quality, especially during stagnant weather conditions, intensifies health risks for individuals with asthma, chronic obstructive pulmonary disease (COPD), and other respiratory illnesses. Further, hotter air temperatures are also predicted to ‘increase the concentration of aeroallergens (i.e., pollens), particulate matter air pollution, and other air pollutants such as fungi, mould, and windblown dust, with associated increased health burden’. These effects are felt widely across communities, affecting workplace productivity and economic stability, particularly in industries reliant on outdoor labour.¹²

The Committee also learned that changes in temperature and rainfall have allowed mosquitoes and ticks to spread to new areas, leading to more cases of diseases like dengue fever, Ross River virus, and Lyme disease. Warmer winters and wetter summers create perfect conditions for these insects to breed, which poses serious health risks in Victoria and other regions.

10.2.3 Cancer risk

Another health-related risk raised by stakeholders was heightened cancer risks due to exposure to heat, in particular skin cancer. Skin cancer remains a significant health concern in Victoria, exacerbated by climate change’s intensification of ultraviolet (UV) radiation exposure. According to the Cancer Council Victoria’s submission:

More than two in three Australians will be diagnosed with skin cancer in their lifetime. Melanoma is the 5th most common cancer in Victoria. In 2022, there were 2885 Victorians newly diagnosed with melanoma. Regional Victorians are 47% more likely to be diagnosed with melanoma than those living in major cities. Additionally, each year there are more than 150,000 treatments for nonmelanoma skin cancers in Victoria.¹³

¹² ARC Centres of Excellence for Climate Extremes, *Submission 187*, p. 4.

¹³ Cancer Council Victoria, *Submission 140*, p. 4.

However, the Cancer Council contended that with good sun protection, skin cancer is largely preventable. It also provided some figures on the economic burden of skin cancer diagnoses in Victoria and potential savings from investing in prevention:

It is estimated that costs of newly diagnosed persons with melanoma in Victoria in 2021 were \$80.2 million and \$57.4 million for non-melanoma skin cancer – a total of \$137.6 million.¹⁰ Modelling shows an investment in skin cancer prevention in Australia could achieve a \$3.20 return for every dollar invested.¹⁴

10.2.4 Mental health

Mental health was another significant health-related risk emphasised by stakeholders to the Inquiry. For example, Psychology for a Safe Climate argued that:

Climate change is having significant emotional and mental health impacts on people due to factors like extreme weather events, mass extinction, and the systemic cultural causes of extraction and exploitation. As awareness grows about our ecological/social reality and lack of preparedness for disruption and disasters, the community distress, trauma, and associated mental health issues will escalate dramatically.¹⁵

A 2021 report from Doctors for the Environment Australia argued that climate change has both direct and indirect impacts on the mental health of Australians. Direct impacts include those caused by extreme weather events (e.g., bushfires, floods, and heatwaves) that cause psychological distress, including PTSD, anxiety, depression, and increased rates of suicide, as well as the increased aggression, domestic violence, and mental health emergency presentations that are associated with rising temperatures. Indirect impacts include those caused by chronic climate events, like drought and sea-level rise, that disrupt livelihoods, intensify social inequalities and lead to issues like displacement and food insecurity.¹⁶

The Committee was also informed some communities are at risk of acute mental health challenges. In particular, rural and regional communities, especially farmers, face elevated suicide risks due to prolonged droughts and adverse weather events which can affect the economic viability of their properties and cause long-term damage.¹⁷

Evidence was also received on different programs and work being undertaken in communities to address the mental health risks associated with climate change and extreme weather. For example, Natalie Egleton from FRRR told the Committee the organisation's In a Good Place Program. This program is 'focused on early intervention' and has adopted 'non-clinical approaches' to support regional communities. Natalie advised the Committee that that undertaking preventative health measures in regional areas is effective.

¹⁴ Cancer Council Victoria, *Submission 140*, p. 4.

¹⁵ Psychology for a Safe Climate, *Submission 203*, p. 3.

¹⁶ Doctors for the Environment Australia, *How Climate Change Affects Mental Health in Australia*, July 2025, p. 6.

¹⁷ South-East Monash Legal Service, *Submission 133*, p. 14.

The Committee heard that there is an emotional and economic toll on landowners in areas facing future inundation (eg. Bass Coast).

The reality at Bass Coast is we are dealing with the most strategic land use planning issue that we will face one planning permit application at a time.

Donna Taylor, General Manager, Future Places Division, Bass Coast Shire Council, public hearing, Traralgon, 3 September 2024, *Transcript of evidence*, p. 4.

FINDING 93: There is an emotional toll that some landowners feel due to uncertainty in coastal and flood-prone areas which has left them in limbo, facing property devaluation and complex regulatory barriers with limited state support for navigating this issue.

RECOMMENDATION 82: That the Victorian Government provide clear guidelines and a communication strategy for councils to engage with communities affected by climate-related rezoning or managed retreat, including access to planning advice, hardship assistance, and mental health support.

10.3 Primary production and food security

Stakeholders also highlighted that primary production and agricultural sectors are vulnerable to climate risks. The Victorian Farmers Federation discussed the vulnerability of farm communities to climate risks, both in terms of its impact on natural and on built environments:

Farms have built elements such as dwellings, sheds, and fences, and infrastructure like drains, levees, roadways, pumps, irrigation systems, power infrastructure, and communications facilities. Existing on-farm infrastructure faces direct risks from the effects of climate change (drought, storm, flood, fire) and indirect risks (increased risk of plant and animal diseases, pest management issues), which may necessitate new or improved infrastructure to be provided. The challenge in responding to these risks come from the broader community lacking understanding of the actions farmers need to take to manage the risks. This results in inflexible government policy responses which in turn constrain farmers' ability to respond.¹⁸

The Federation highlighted several specific vulnerabilities these communities are facing, namely:

- **Sea Level Rise:** Inundation affects coastal and estuarine infrastructure critical for agriculture, including ports, roads, and bridges. Disruptions in port access hinder imports (machinery, chemicals) and exports (food, fibre).
- **Extreme Weather Events and Transport Disruptions:** More frequent and severe floods, fires, and storms damage farm infrastructure (i.e., buildings, roads, fences,

¹⁸ Victorian Farmers Federation, *Submission 252*, p. 1.

irrigation, energy). Long-term production losses result from delays in repairs. Extended fire and storm seasons increase risks to farms and hinder emergency access.

- **Increased Temperatures and Heat Stress:** Rising temperatures damage roads, railways, and farm structures, increasing repair costs. Heat stress impacts human and animal health, necessitating more energy use and farm shelter improvements.
- **Changing Precipitation Patterns:** Droughts, intense rains, and shifting seasons damage infrastructure and require more storage (fodder, water) and covered facilities. Regulatory hurdles complicate building essential farm structures.
- **Ecosystem Changes:** Loss of vegetation increases risks of erosion, landslips, and intense fires, damaging farms and infrastructure. Poor vegetation management heightens these risks.
- **Water Supply:** Altered precipitation damages reservoirs, channels, and drains, disrupting water availability and increasing flood risks.
- **Energy Infrastructure Vulnerability:** Climate events cause power outages, blackouts, and infrastructure damage (wind turbines, solar panels, transmission lines). Reliable, affordable energy is crucial for farms.
- **Financial Impacts:** Significant costs for repairing, replacing, or upgrading infrastructure. Decreased property values, disrupted supply chains, and rising insurance premiums. Fence damage leads to stock losses, with replacement responsibilities falling on landholders, often without insurance coverage.

John Bradley, Secretary of the Department of Energy Environment and Climate Action, explained the Department was working to address the challenge of a hotter drier climate:

In the agriculture portfolio we are trying to leverage world-class research expertise and works in partnership with farmers to address a secure future for agriculture, and we are working through the primary production adaptation action plan, the drought preparedness and response framework, the farm business resilience and regional drought resilience planning programs, the carbon farming outreach programs and the on-farm emissions action pilot program.¹⁹

10.4 Implications for industry and economy

Risks from climate change and extreme weather events carry implications for a range of Victorian industries and the economy as a whole. Along with agricultural industries (see Section 10.3 above), other industries such as tourism, energy, construction and manufacturing are all vulnerable to the impact of changing weather patterns.

¹⁹ John Bradley, Secretary, Department of Energy, Environment and Climate Action (DEECA), public hearing, Melbourne, 20 November 2024, *Transcript of evidence*, p. 74.

The Youth Affairs Council Victoria outlined some of the costs associated with accelerating climate change:

Extreme heat events already cost the Victorian economy on average \$87 million per year; this cost is expected to rise as heatwaves become more frequent. And, more broadly in Australia on current trends, loss of wealth due to reduced agricultural productivity and labour productivity because of climate change is projected to exceed \$19 billion by 2030, \$211 billion by 2050 and \$4 trillion by 2100.²⁰

10.4.1 Tourism economies

The Committee was informed that tourism economies, particularly in coastal and alpine areas, are vulnerable to unique risks from climate change.

Victoria's coastline is a vital economic asset but coastal erosion and adverse weather risks these assets and their capacity to contribute to Victoria's economy.

For example, the City of Port Phillip provided the Committee information in the economic contribution of its coastal region and the impact climate risks have on its ongoing viability. The Port Phillip council advised the area attracts more than 50 million visitors annually and generated millions of dollars in revenue. However, Port Phillip provided an overview of findings of a report into the *Economic Impact of Sea Level Rise and Storm Surge in Victoria, Australia over the 21st Century* (the Kompas report) which modelled impacts on the region if no climate mitigation and adaptation is undertaken. The report projected that by 2100, without adaptive measures, the City of Port Phillip could face \$40 billion in economic damages due to sea-level rise and storm surges. These impacts are expected to disproportionately affect residential communities.²¹

As another example, Bass Coast, a region with a growing population and tourism-driven economy, demonstrates the challenge of climate resilience in growing regions where infrastructure demand (particularly residential) is growing. The Bass Coast region, which support 3.4 million visitors annually, is deeply reliant on tourism and agriculture. As the population grows and ages, infrastructure development for climate adaptation and community resilience will be crucial.²²

Similarly to coastal areas, alpine resorts represent a vital component of Victoria's tourism economy, contributing 8% of the State's tourism sector. These resorts attract a diverse demographic of visitors constituting an essential part of Victoria's tourism economy. However, risks posed through a warming climate and increasing frequency of adverse weather puts resorts at risk. Building the climate resilience of alpine regions will be essential for sustaining their economic contributions amid changing snow conditions.

²⁰ Youth Affairs Council Victoria, *Submission 142*, p. 11.

²¹ City of Port Phillip, *Submission 155*, p. 3.

²² Bass Coast Shire Council, *Submission 181*, p. 1.

10.4.2 Broader Economic Risks

There are also broad economic risks associated with climate change and extreme weather. Infrastructure Victoria highlighted that there is a risk of reduced labour productivity due to climate impacts. The Committee was informed that other state governments, such as those in New South Wales, have addressed these risks through adopted longer term climate projects to better assess potential economic and budgetary impacts. However, Victoria currently lacks a similar long-term financial risk assessment mechanism, underscoring the need for comprehensive planning to mitigate climate-related economic vulnerabilities.²³

10.5 Emergency services and infrastructure

The increasing frequency and intensity of extreme weather events are also likely to dramatically increase the demand faced by Victoria's emergency services. For example, South-East Monash Legal Service highlighted the huge surge in demand for emergency services following the storm event in the summer of 2024:

In February 2024, around 620,000 homes and businesses, mostly in Victoria's Eastern suburbs, experienced power outages. This resulted in strains on emergency services, receiving more than 3,000 calls for assistance and response times taking longer than usual. Many train lines could not run, further overloading buses with stranded passengers and traffic lights were shut down, increasing the risk of motor vehicle accidents on the road.²⁴

A number of submissions to the Inquiry identified the importance of strengthening emergency services in anticipation of growing demand. For instance, the Port Phillip Emergency Climate Action Network discussed that a key part of its climate resilience strategy is 'strengthening emergency services', explaining that:

By enhancing training, resources, and support across these cohorts, we can ensure a coordinated and effective response to emergencies, thereby protecting lives and property.²⁵

The Victorian Government has taken action to improve the State's preparedness to respond to the increasing risk of extreme weather. Emergency Management Victoria has developed the *Victorian Preparedness Framework* that considers emerging threats not only from climate change but also from 'demographic changes and transitions, increased population density in high-risk areas and advances in technology'.²⁶

The Committee notes the introduction of the Emergency Services and Volunteers Fund (ESVF) on 1 July 2025 (replacing the Fire Services Property Levy) Money raised by this new fund will support our emergency services. More than \$250 million from the

²³ Infrastructure Victoria, *Submission 126*, p. 2.

²⁴ South-East Monash Legal Service, *Submission 133*, p. 18.

²⁵ Port Phillip Emergency Climate Action Network, *Submission 242*, p. 1.

²⁶ Emergency Management Victoria, *Victorian Preparedness Framework*, 2022, p. 22.

Emergency Services and Volunteers Fund will support CFA and VICSES volunteers across the state. The former Fire Services Property Levy did not support the operations of the VICSES, the primary emergency response organisation for floods and storms. Given that the submissions deadline closed before the levy was announced in December 2024, the Committee did not consider this issue.

Furthermore, the Victorian Government's response to the *Inquiry into the 2022 flood event in Victoria*, tabled in Parliament on 6 February 2025, extensively supported the Committee's recommendations in relation to emergency services.

**Adopted by the Legislative Council Environment and Planning Committee
Parliament of Victoria, East Melbourne
Monday 23 June 2025**

Appendix A

About the Inquiry

A.1 Submissions

1	Mr Paul Murray	28	Benjamin McCash
2	Mrs Karen Eller	29	Ms Gail O'Brien
3	Mr Subramaniam Sivasubramaniam	30	Name withheld
4	Mr David Robertson	31	Mr Manny Vassal
6	Mr Michael Mardel	32	Confidential
7	Miss Rachel Davis	33	Confidential
8	Mr Mischa Herman	34	Ms Ke Liu
8A	Mr Mischa Herman	35	Confidential
9	Ms Ande Bunbury	36	Ms Najat Abdalla
10	Dr Gary Saunders	37	Confidential
10A	Dr Gary Saunders	38	Energy Efficiency Council
11	Professor Jamie Pittock	39	Affiliated Insulation Industry Coalition
12	Professor Jon Barnett	40	Miss Kerstin Gervais
13	Mr Paul Corrigan	41	Ms Don Stokes
14	Mrs Nola Kelly	42	City of Stonnington
15	Mr Raymond W Stephens	44	Mrs Jane Sultana
16	Mr Robert McLean	45	Ms Mary-K Kennedy
17	Ms Nicola Philp	46	Insurance Council of Australia
18	Mr Royal Carrington	47	Transurban
19	Name withheld	48	The Nature Conservancy
20	Ms Deborah Sykes	49	The Centre for Excellency in Child and Family Welfare
21	Mr Gabriel Waldron	50	Dallas Kinnear
21A	Mr Gabriel Waldron	51	Dr Timothy Erik Strom
22	The Friends of Melbourne General Cemetery	51A	Dr Timothy Erik Strom
23	Victorian Forest Products Association (VFPA)	52	Heinz L Dahl
24	Name withheld	53	Maxwell Fitzsimmons
25	Yarra City Council	54	Phillipa Hibberd
26	Housing Industry Association	55	Fran Smitherman
27	Mr Remy Pilot	56	Virginia Ruchel
		57	Felicity Jefferson

58	Timothy Mullen	94	Danny Ellis
59	Colin Apelt	95	Cheryl Duffin
60	Dylan Farquhar	96	Matthew Fraser
61	Labor Environment Action Network	97	Peter Bosland
62	Community Health First	98	Logan Shield
63	Chris Robinson	99	Carlton Neighbourhood Learning Centre Inc
64	Kristine Phillip	100	Mr Adam Clarke
65	Mr Gary Ellett	101	Name withheld
66	Name withheld	102	Eden Smith
67	Hamish Macrae	103	Confidential
68	Gippsland Climate Change Network	104	Dr Rachel Nowak
69	An	105	Raymond Mcneil
70	Dale Curtis	106	Name withheld
71	Nicola Coles	107	Melinda Radcliffe
72	Andrew Fletcher	108	Rachel Abela
73	Caitlin Bull	109	Benedict Lawrence
74	Robert Hart	110	Robin Johnson
75	City of Melbourne	111	Council Alliance for a Sustainable Built Environment
76	Jan Lacey	112	Anne Jacques
77	Pat Nesbitt	113	Natural Hazards Research Australia
78	Keri James	114	Nick Pearce
79	Sylvia Carr	115	Chloe-Nicole Bignoux
80	Robyn Hermans	116	Ros Chandler
81	Rose Ovenden	117	Tash Hughes
82	Elizabeth Wendy Cox	117A	Tash Hughes
83	Robert Hart	118	John Blogg
84	Marcia Lewis	119	Heather Collins
84A	Marcia Lewis	120	Joseph Philippa
85	Rupert Veitch	121	Judith Adams
86	Elizabeth Shield	122	Doctors for the Environment Australia
87	John Neve	123	Enya Venn
88	Kate Born	124	Carolyn Hanna
89	Hugh Venables	125	Headspace National
90	Philip Ball	126	Infrastructure Victoria
91	David Meadway	127	Shakila Hydari
92	Sarah Powers	128	Nina Bishop
93	Supriya P	129	Victorian Greenhouse Alliances

130	Grow Green Community Garden
131	Polar Environ
132	Mathew Nelson
133	South-East Monash Legal Service
134	Nick Dawson
135	Australian Business Volunteers
136	Kerri Slaven
137	Darebin Climate Action Now
138	YIMBY Melbourne
139	Vicky Ellmore
140	Cancer Council Victoria
141	Peter Epi
142	Youth Affairs Council Victoria
143	Marie Brennan
144	Jordan Perryman
145	Franziska Degenhardt
146	Richard Polmear
147	Financial Counselling Australia
148	Jules Jay
150	Marco Setiawan
151	Financial Counselling Victoria
152	The Climate Risk Group
153	Baw Baw Sustainability Network
154	South Gippsland Conservation Society Inc.
155	City of Port Phillip
156	Name withheld
157	Bruce Cutts
158	City of Greater Bendigo
159	Gordo Wilson
160	Marguerite Marshall
161	Margaret Lothian
162	Carolyn Jeffrey
163	Helen Bowman
164	Great Latrobe Park
165	Christine Morris
166	David Tomkins
167	Warren Chapman

168	Emerald Village Association
168a	Emerald Village Association
169	Dr Vishnu Unnikrishnan
170	Jay Iwasaki
171	Hugh Twycross
172	Name withheld
173	Linda Senhenn
174	Robert Manhal
175	Farmers for Climate Action
176	Anne Jovaras
177	Lung Foundation Australia
178	Uncle Anthony Egan
179	Sanja Van Huet
180	Community Housing Industry Association Victoria
181	Bass Coast Shire Council
182	Wellington Climate Action Network
183	CERES EARTH Ltd
184	Master Electricians Australia
185	Darebin Neighbourhood House Network
186	Merri-bek City Council
187	ARC Centres of Excellence for Climate Extremes and the Weather of the 21st Century
188	M9
189	Benalla Sustainable Future Group
190	Name withheld
191	TM McG
192	Friends of the Earth Melbourne
193	Not Used
194	Victorian Marine and Coastal Council
195	Confidential
196	Protectors of Public Lands
197	Climate Action Merribek
198	Baw Baw Shire Council
199	Kenneth MacMahon
200	Bayside City Council
201	Dr Miroslav Kapuscinski
202	Geelong Sustainability

203	Psychology for a Safe Climate	239	CROWAG, BDTPS and BVRG
204	Erne Energy	240	Jennie Epstein
205	Confidential	241	Robyn Erwin
206	Macedon Ranges Shire Council	242	PECAN (Port Phillip Emergency Climate Action Network)
207	Shannyn Warren	243	Environmental Justice Australia
208	Una Causevic	244	Yuen Yan Li
209	Shawn Whelan	245	Alan Rothacker
210	Angela Crunden	246	Helen Thompson
211	Name withheld	247	Kingston Residents Association
212	Foundation for Rural & Regional Renewal	248	Port Phillip EcoCentre
213	Asthma Australia	249	Howard Bartlett
214	Tony Peck	250	Cate Stirling
215	Mornington Peninsula Shire	251	Good Shepherd Australia New Zealand
216	Yarra Climate Action Now	252	Victorian Farmers Federation
217	Jack Brady	253	Centre for Safe Air
218	Value Advisory Partners	254	Sarah Rickard
219	Association of Bayside Municipalities	255	Callum Morrison
220	United Workers Union	256	ANMF (Vic Branch)
221	Nation Partners	257	Sweltering Cities
222	RMIT University - Urban Futures	258	Planning Institute of Australia (PIA) Victoria
223	Sustain: The Australian Food Network	259	Federation of Community Legal Centres Vic
224	HIP V. HYPE	260	Eastern Community Legal Centre (ECLC)
225	Michael Spencer	261	Latrobe Valley Sustainability Group
226	Greater Dandenong Environment Group Inc.	262	Christine Power
227	Bayside Climate Crisis Action Group	263	David Neat
228	Architects Declare Australia	264	Ruth Hudson
229	Greater Melbourne Heat Alliance	265	Nicole Elliott
230	Gippsland Community Foundation	266	Deborah McLean
231	Liz Reen	267	Confidential
232	Municipal Association of Victoria	268	Victor Komarovskiy
233	Victorian Trades Hall Council	269	Jess Kapuscinski-Evans
234	Name withheld	270	Peter Boddenberg
235	National Trust of Australia (Victoria)	271	Hayley Sestokas
236	La Trobe University Climate Change Adaptation Lab	272	Jenny Stephens
237	Victorian Council of Social Service	273	Will Hone
238	Resilient Building Council	274	Renew

275	Environment Victoria	281	Yarra Ranges Council
276	Brotherhood of St Laurence	282	Emerald Fire Brigade
277	Tenants Victoria	283	Speciality Trees
278	Confidential	284	Maureen Blair
279	DAVIESWAY	285	Riddells Creek Planning Group
280	Natural Turf Alliance	286	Concerned Waterways Alliance

A.2 Public hearings

4 December 2024

Wangaratta Performing Arts and Convention Centre (WPACC), Conference Room, Wangaratta, Victoria

Witness	Position and Organisation
Stephen Swart	Director, Sustainability & Culture, Rural City of Wangaratta
Bryan Sword	Director, Sustainable Development, Moira Shire Council
Ian Ellett	Director Infrastructure Services, Indigo Shire Council
Sam Niedra	Council's Coordinator Environment and Sustainability, Indigo Shire Council
Carl Walters	Interim Chief Executive Officer, Goulburn Broken CMA
Joel Leister	Manager Flood Plain Implementation, Goulburn Broken CMA
David Brian	Business owner, Southern Hemp
Sherri Smith-Hoyer	Southern Hemp
Annie Volkering	Assets, Land Management and Strategic Development General Manager, Alpine Resorts Victoria
Louise Perrin	Head of Environmental Sustainability, Alpine Resorts Victoria
Ailsa McMillan	Unit Controller, Benalla Unit
David Coates	Myrtleford Unit
Michael Spencer	Adjunct Senior Research Fellow, Green Lab, Monash Business School
Ben McGowan	Managing Director, Indigo Power
Heath Shakespeare	Project Manager, Indigo Power
David Blore	President, Benalla Sustainable Future Group
John Naylor	Representative, North East Region Sustainability Alliance
Tony Lane	Representative, North East Region Sustainability Alliance

3 December 2024

Victorian Emergency Management Institute, G1 & G2, Mount Macedon, Victoria

Witness	Position and Organisation
Bernie O'Sullivan	Chief Executive Officer, Macedon Ranges Shire Council
Tania MacLeod	Acting Manager Strategic Planning and Environment, Macedon Ranges Shire Council
Ashley Fletcher	Climate Change Resilience Officer, City of Greater Bendigo
Frances Ford	Coordinator Emergency Management and Resilience, City of Greater Bendigo
Annika Kearton	Chief Executive Officer, Central Victorian Greenhouse Alliance
Shamir Varma	Ordinary Director, Bendigo Sustainability Group
Maureen Blair	Secretary, Barmah Community Group
John Jackson	Barmah Community Group Member, Barmah Community Group
Murray Blair	Barmah Community Group Member and First Lieutenant Barmah Rural Fire Brigade, Barmah Community Group
Brett Franke	Registered Building Designer, Better Building Design
Natalie Egleton	Chief Executive Officer, Foundation for Rural & Regional Renewal
Sarah Matthee	Climate Solutions Portfolio Lead, Foundation for Rural & Regional Renewal
Camille White	Manager floodplain, North Central CMA
Rohan Hogan	Water & Environment Specialist, North Central CMA
Luke Austin	Operational Delivery Manager, Wimmera CMA

20 November 2024

Davui Room, G1 & G2, East Melbourne, Victoria

Witness	Position and Organisation
Tiffany Crawford	Co-Director, Climate Change and City Resilience, City of Melbourne
Renae Littlejohn	Director, Planning and Environment, Mornington Peninsula Shire
Melissa Burrage	Manager, Climate Change and Sustainability, Mornington Peninsula Shire
Andrew Joseph	Team Leader, Community Resilience and Emergency Management, Mornington Peninsula Shire
Bronwyn Lay	Strategic Lead, Climate Justice Unit, Federation of Community Legal Centres Vic
Dan Cowdell	Chief Executive Officer, Geelong Sustainability
Zoe Roloff	Acting Director, Sustainability Partnerships, Sustainability Team, Deakin University
Andrew Linnie	Executive General Manager Distribution, AusNet
Charlotte Eddy	General Manager Strategy and Regulation (Distribution), AusNet
Renate Vogt	General Manager, Regulation, Powercor
Adam Gellie	General Manager, Network Services, Powercor
Natasha Palich	Executive Officer, Council Alliance for a Sustainable Built Environment

Witness	Position and Organisation
Mr Keith Ryan	Executive Director, Victoria, Housing Industry Association
Jane Keddie	Vice President, Planning Institute of Australia (PIA) Victoria
John Bradley	Secretary, Department of Energy, Environment and Climate Action (DEECA)
Carolyn Jackson	Deputy Secretary, Regions, Environment, Climate Action and First Peoples Group, Department of Energy, Environment and Climate Action (DEECA)
Natalie Reiter	Deputy Secretary, Strategy and Precincts, Department of Transport and Planning
Andrew McKeegan	Deputy Secretary, Planning and Land Services, Department of Transport and Planning
Stuart Menzies	Acting Executive Director, State Planning Services, Department of Transport and Planning

6 November 2024

Davui Room, G1 & G2, East Melbourne, Victoria

Witness	Position and Organisation
Andrew White	Chief Executive Officer, Victorian Forest Products Association (VFPA)
Garnet Brownbill	Natural Turf Alliance
John Englart	Natural Turf Alliance
Michael Nolan	Director, Climate Physical Risk and Resilience, Aurecon
Hugh Ong	Portfolio Director, Smartcrete CRC
David Wagner	President Victorian Chapter of the Australian Institute of Architects, Australian Institute of Architects
James Legge	Founding Director, Six Degrees Architects, Australian Institute of Architects
Xavier Cadorel	Lecturer, Melbourne School of Design, University of Melbourne, Australian Institute of Architects
Chris Jensen	Lecturer in Construction Management, University of Melbourne, Australian Institute of Architects
Katie Skillington	PhD candidate, University of Melbourne, Australian Institute of Architects
Alex Trudzik	Policy Officer, Community Housing Industry Association Victoria
Jeremy Spencer	Director, Sustainable Builders Alliance
Dylan Broomfield	Principal Adviser, Polar Enviro
Dave Jones	Technical Advisor, Polar Enviro

23 October 2024

Aireys Inlet Community Centre, Lakeside Visitor Centre, Aireys Inlet, Victoria

Witness	Position and Organisation
Robyn Seymour	Chief Executive Officer, Surf Coast Shire
Chris Pike	Placemaking and Environment, Surf Coast Shire

Witness	Position and Organisation
Martin Gill	Chief Executive Officer, Borough of Queenscliffe
Pete Mercouriou	Senior Sustainability Officer (and Chair/President of Alliance), City of Greater Geelong
Sue Phillips	Executive Officer, Barwon South West Climate Alliance
Jacquie White	VMaCC Deputy Chair, Victorian Marine and Coastal Council
Tom Kompas	Director, Australian Centre for Biosecurity and Environmental Economics, ANU; Chief Investigator, Centre of Excellence for Biosecurity Risk Analysis, University of Melbourne, Victorian Marine and Coastal Council
David Bills-Thompson	Technical Officer, Port Fairy Coastal Group
Amber Clarke	Chief Executive Officer, Corangamite Catchment Management Authority
Chris Pitfield	Investigations and Program Development Manager, Corangamite Catchment Management Authority
Ian Laging	President, Aireys Inlet and District Association

10 October 2024

Puffing Billy Railway, Lakeside Visitor Centre, Emerald, Victoria

Witness	Position and Organisation
Warren Smith	Coordinator Climate Change and Heritage, Cardinia Shire Council
Kim O'Connor	Acting Director Built Environment and Infrastructure, Yarra Ranges Council
Helen Steel	Chief Executive Officer, South East Councils Climate Change Alliance
Daniel Pleiter	Operations Manager, South East Councils Climate Change Alliance
Trevor Budge	Chair, Planning, Tourism and Environment sub-committee, Emerald Village Association
Claude Cullino	Committee Member, Planning, Tourism and Environment sub-committee, Emerald Village Association
Kate Forster	Committee Member, Planning, Tourism and Environment sub-committee, Emerald Village Association
Mary Farrow	Resilience project, Emerald Community House Centre of Resilience
Rachelle Mechelsen	Team Leader, Emerald and Cockatoo Emergency Support Team
Dan Jeyaseelan	Member, Monbulk and District Community Working Group
Peter Edyvane	Member, Monbulk Emergency Management Group
Bill Robinson	Captain
Klaus Brodeck	Captain
Ben Selby-Hele	Director, Mountain Ash Developments Victoria Pty Ltd
Caroline Spencer	
Frank Archer	
Trevor Budge	
Kate Forster	

9 October 2024

Davui Room, G1 & G2, East Melbourne, Victoria

Witness	Position and Organisation
Rosemary Sinclair AM	Chair, The Network Outage Review Panel
Kevin Kehl	Panel Member, The Network Outage Review Panel
Ailie Gallant	Chief Investigator, School of Earth Atmosphere and Environment, Faculty of Science, Monash University
Kimberley Reid	Research Fellow, School of Earth Atmosphere and Environment, Faculty of Science, Monash University
Jonathan Spear	Chief Executive Officer, Infrastructure Victoria
Llewellyn Reynders	Director Research and Policy, Infrastructure Victoria
Caroline Evans	Principal Policy Officer, Infrastructure Victoria

3 September 2024

Century Inn Traralgon, Location Room, Traralgon, Victoria

Witness	Position and Organisation
Cr Tom Crook	Mayor, East Gippsland Shire Council
Stuart McConnell	General Manager, Assets and Environment, East Gippsland Shire Council
Donna Taylor	Acting General Manager, Place Making, Bass Coast Shire Council
Tiffany Harrison	Coordinator, Gippsland Alliance for Climate Action
Rakibuzzaman Shah	Smart Power Systems Engineering, Federation University
Jessica Reeves	Future Regions Research Centre, Federation University
Daniel Miller	Chief Executive Officer, Gunaikurnai Land and Water Aboriginal Corporation
Niels Olsen	Beef Farmer, Founder of Soilkee
Philip Mulvey	Chief Executive Officer, Ryzo
Tony Patchell	Secretary, Loch Sport Business and Tourism Association
Chris Waites	Chief Executive Officer, Gippsland Ports
Glenn Arnold	President, Inverloch Surf Life Saving Club
Stephen Duncan	Treasurer, Inverloch Surf Life Saving Club
Stephen Angus	Deputy Chair, Gippsland Climate Change Network Inc
Brian Burleigh	Member, Wellington Climate Action Network
Jillian Carroll	Vice President, Wellington Climate Action Network

Extract of proceedings

Legislative Council Standing Order 23.20(5) requires the Committee to include in its report all divisions on a question relating to the adoption of the draft report. All Members have a deliberative vote. In the event of an equality of votes, the Chair also has a casting vote.

The Committee divided on the following questions during consideration of this report. Questions agreed to without division are not recorded in these extracts.

Committee meeting – 23 June 2025

Ms Bath moved that, in Chapter 1, line 96–97, the words ‘geopolitical destabilisation, radicalisation and community division’ be omitted.

The question was put.

The Committee divided.

Ayes 4	Noes 5
Melina Bath	Ryan Batchelor
Gaelle Broad	Jacinta Ermacora
Anne-Marie Hermans	John Berger
Rikkie-Lee Tyrrell	Sarah Mansfield
	David Ettershank

Question negatived.

Ms Bath moved that, in Chapter 1, line 174, the words ‘Bushfire seasons are longer and hotter, drier conditions are leading to more frequent bushfires’ be omitted and replaced with ‘Bushfire conditions are hotter, drier and more frequent’.

The question was put.

The Committee divided.

Ayes 4	Noes 5
Melina Bath	Ryan Batchelor
Gaelle Broad	Jacinta Ermacora
Anne-Marie Hermans	John Berger
Rikkie-Lee Tyrrell	Sarah Mansfield
	David Ettershank

Question negatived.

Ms Bath moved that, in Chapter 1, line 172–173, the words ‘Sea level rise and increased coastal erosion are affecting Victoria’s coastline be omitted and replaced with ‘Increased coastal erosion is affecting Victoria’s coastline’.

The question was put.

The Committee divided.

Ayes 4	Noes 5
Melina Bath	Ryan Batchelor
Gaelle Broad	Jacinta Ermacora
Anne-Marie Hermans	John Berger
Rikkie-Lee Tyrrell	Sarah Mansfield
	David Ettershank

Question negatived.

Ms Hermans (for Ms Lovell) moved that, in Chapter 1, line 270, the recommendation ‘That the Government ensures stakeholders are informed of the cost versus benefit of implementing climate resilience initiatives by conducting a Regulatory Impact Statement for all recommendations it adopts from this report’ be inserted.

The question was put.

The Committee divided.

Ayes 4	Noes 5
Melina Bath	Ryan Batchelor
Gaelle Broad	Jacinta Ermacora
Anne-Marie Hermans	John Berger
Rikkie-Lee Tyrrell	Sarah Mansfield
	David Ettershank

Question negatived.

Ms Bath moved that, in Chapter 4, after line 1727, recommendation ‘That the Victorian Government evaluate, in the last year of funding, the effectiveness of non-recurrent budget initiatives as they relate to Climate Change Strategy and Adaptation Action Plans, against initiative outcomes as an assessment for cessation or continuity of funding.’ be inserted.

The question was put.

The Committee divided.

Ayes 3	Noes 6
Melina Bath	Ryan Batchelor
Gaelle Broad	Jacinta Ermacora
Anne-Marie Hermans	John Berger
	Sarah Mansfield
	David Ettershank
	Rikkie-Lee Tyrrell

Question negated.

Ms Bath moved that, in Chapter 4, after line 1811, the words ‘The Committee acknowledges submitters’ concerns in relation to the implementation of strategies and plans and therefore suggests an independent evaluation’ and recommendation ‘That this Committee invites the Victorian Auditor General to review the Government’s implementation of Adaptation Action Plans and Climate Change Strategies to assess whether they are achieving their aims and objectives’ be inserted.

The question was put.

The Committee divided.

Ayes 6	Noes 3
Melina Bath	Ryan Batchelor
Gaelle Broad	Jacinta Ermacora
Anne-Marie Hermans	John Berger
Rikkie-Lee Tyrrell	
Sarah Mansfield	
David Ettershank	

Question agreed to.

Dr Mansfield moved that, in Chapter 4, after line 1995, recommendation ‘That the Victorian Government adopt a ‘polluter-pays’ approach to raising revenue to fund climate resilience, including by redirecting any state subsidies provided to the fossil fuel industry, and by applying a levy to the fossil fuel industry (such as Victoria’s coal-fired power stations)’ be inserted.

The question was put.

The Committee divided.

Ayes 2	Noes 7
Sarah Mansfield	Ryan Batchelor
David Ettershank	Jacinta Ermacora
	John Berger
	Gaelle Broad
	Anne-Marie Hermans
	Melina Bath
	Rikkie-Lee Tyrell

Question negatived.

Dr Mansfield moved that, in Chapter 4, line 2435, the recommendation ‘That the Victorian Government review climate governance and oversight mechanisms, including consideration of establishing an independent oversight body, to ensure clear lines of responsibility and accountability for monitoring and implementation of climate resilience strategies’ be inserted.

The question was put.

The Committee divided.

Ayes 6	Noes 3
John Berger	Gaelle Broad
Sarah Mansfield	Melina Bath
Ryan Bachelor	Anne-Marie Hermans
Rikkie-Lee Tyrell	
David Ettershank	
Jacinta Ermacora	

Question agreed to.

Dr Mansfield moved that, in Chapter 5, line 3506, the recommendation ‘Recommendation X: That the Victorian Government ensure that Ministerial directions under the new Section 12A of the Planning and Environment Act are urgently issued so that planning decisions are clear on how they account for emissions reductions and climate impacts, including for planning scheme amendments to rezone for the next 50 activity centres identified in Plan for Victoria.’ be inserted.

The question was put.

The Committee divided.

Ayes 5	Noes 4
John Berger	Gaelle Broad
Sarah Mansfield	Melina Bath
Ryan Bachelor	Anne-Marie Hermans
David Ettershank	Rikkie-Lee Tyrrell
Jacinta Ermacora	

Question agreed to.

Ms Bath moved that, in Chapter 5, after line 3506, the recommendation ‘Recommendation XX: That the Victorian Government implement a temporary moratorium on introducing new planning and building regulations—including additional environmentally sustainable design (ESD) standards—until a comprehensive review is undertaken to streamline existing red and green tape. This review should aim to:

- Eliminate duplication between planning systems and the National Construction Code,
 - Ensure climate resilience measures are evidence-based and cost-effective,
 - Support the efficient delivery of new housing aligned with Victoria’s housing targets,
 - Maintain affordability for homebuyers while advancing climate adaptation goals.’
- be inserted.

The question was put.

The Committee divided.

Ayes 4	Noes 5
Gaelle Broad	John Berger
Melina Bath	Sarah Mansfield
Rikkie-Lee Tyrrell	Ryan Bachelor
Ann-Marie Hermans	David Ettershank
	Jacinta Ermacora

Question negatived.

Dr Mansfield moved that, in Chapter 5, line 3738, recommendation 14 be omitted and replaced with ‘That the Victorian Government promptly review and improve the environmentally sustainable development standards in clause 55 of the Victoria Planning Provisions with a view to ensuring the statewide standards meet the higher standards set by 28 CASBE councils in their local policies, as recommended in the report from the Select Committee Inquiry into Victoria Planning Provisions Amendments VC257, VC267 and VC274.’

The question was put.

The Committee divided.

Ayes 2	Noes 7
Sarah Mansfield	Gaelle Broad
David Ettershank	Melina Bath
	Anne-Marie Hermans
	Ryan Bachelor
	Rikkie-Lee Tyrrell
	John Berger
	Jacinta Ermacora

Question negatived.

Ms Bath moved that, in Chapter 5, after line 3769, the recommendation 'RECOMMENDATION XX: That the Victorian Government: a) reinstate the right of appeal to the Victorian Civil and Administrative Tribunal for planning decisions around renewable energy projects, ensuring that community voices are heard in the planning process; and ; b) that major transmission and large-scale wind and solar generation projects face a rigorous and independent planning panel assessment.' be inserted.

The Committee divided.

Ayes 4	Noes 4
Melina Bath	Ryan Bachelor
Gaelle Broad	John Berger
Rikkie-Lee Tyrrell	Sarah Mansfield
Ann-Marie Hermans	David Ettershank

There being an equality of votes, the Chair used his casting vote.

Question negatived.

Ms Broad moved that, in Chapter 6, line 5144, the recommendation 'That the Victorian Government commission independent research to consider the heat island effect of large-scale solar panel projects in regional areas and any associated microclimate effects on surrounding agricultural and horticultural activities.' be inserted.

The question was put.

The Committee divided.

Ayes 4	Noes 5
Gaelle Broad	John Berger
Melina Bath	Sarah Mansfield
Anne-Marie Hermans	Ryan Bachelor
Rikkie-Lee Tyrrell	David Ettershank
	Jacinta Ermacora

Question negatived.

Mr Berger moved that, in Chapter 6, line 5225, the recommendation ‘That the Victorian Government prepares a road, rail and port infrastructure strategy which A) assesses the resilience of this infrastructure to climate change. B) identifies actions to improve the function and climate resilience of this infrastructure. C) and includes an implementation plan to undertake works to improve the function and climate resilience of this infrastructure.’ be inserted.

The question was put.

The Committee divided.

Ayes 5	Noes 4
John Berger	Gaelle Broad
Sarah Mansfield	Melina Bath
Ryan Bachelor	Anne-Marie Hermans
David Ettershank	Rikkie-Lee Tyrrell
Jacinta Ermacora	

Question agreed to.

Ms Broad moved that, in Chapter 6, line 5333, the recommendation ‘That the Victorian Government ensure that levees on crown land be immediately restored where there is a community benefit and then maintained through a legislated inspection and maintenance program.’ be inserted.

The question was put.

The Committee divided.

Ayes 4	Noes 5
Gaelle Broad	John Berger
Melina Bath	Sarah Mansfield
Anne-Marie Hermans	Ryan Bachelor
Rikkie-Lee Tyrrell	David Ettershank
	Jacinta Ermacora

Question negated.

Ms Manfield moved that, in Chapter 7, line 6673, the recommendation ‘That the Victorian Government expand the Victorian Energy Upgrades program and offer rebates for Resilience Rating Assessments for households.’ be inserted before finding 55.

The question was put.

The Committee divided.

Ayes 5	Noes 4
John Berger	Gaelle Broad
Sarah Mansfield	Melina Bath
Ryan Bachelor	Anne-Marie Hermans
David Ettershank	Rikkie-Lee Tyrrell
Jacinta Ermacora	

Question agreed to.

Ms Bath moved that, in Chapter 8, line 6986, the words ‘Is nation leading and.’ be omitted.

The question was put.

The Committee divided.

Ayes 6	Noes 3
Gaelle Broad	Ryan Batchelor
Melina Bath	Jacinta Ermacora
Anne-Marie Hermans	John Berger
Rikkie-Lee Tyrrell	
David Ettershank	
Sarah Mansfield	

Question agreed to.

Dr Mansfield moved that, in Chapter 8, line 7278–7279, finding ‘Climate justice is not adequately considered across Victoria’s regulatory and legislation framework that informs adaptation on climate change and climate resilience.’ be inserted.

The question was put.

The Committee divided.

Ayes 5	Noes 4
John Berger	Gaelle Broad
Sarah Mansfield	Melina Bath
Ryan Bachelor	Anne-Marie Hermans
David Ettershank	Rikkie-Lee Tyrrell
Jacinta Ermacora	

Question agreed to.

Dr Mansfield moved that, in Chapter 8, line 7287, the recommendation ‘That the Victorian Government undertake a review of the Planning and Environment Act to strengthen and clarify climate considerations and compliance measures, and include provisions regarding climate justice.’ be inserted.

The question was put.

The Committee divided.

Ayes 5	Noes 4
John Berger	Gaelle Broad
Sarah Mansfield	Melina Bath
Ryan Bachelor	Anne-Marie Hermans
David Ettershank	Rikkie-Lee Tyrrell
Jacinta Ermacora	

Question agreed to.

Dr Mansfield moved that, in Chapter 8, line 7573, the recommendation ‘That the Victorian Government undertake a review of climate legislation and policies to ensure inclusions of climate justice considerations.’ be inserted.

The question was put.

The Committee divided.

Ayes 5	Noes 4
John Berger	Gaelle Broad
Sarah Mansfield	Melina Bath
Ryan Bachelor	Anne-Marie Hermans
David Ettershank	Rikkie-Lee Tyrrell
Jacinta Ermacora	

Question agreed to.

Dr Mansfield moved that, in Chapter 9, line 8604, the recommendation ‘That the Victorian Government expand funding for home electrification, particularly targeting those on lower incomes and renters.’ be inserted.

The question was put.

The Committee divided.

Ayes 5	Noes 4
John Berger	Gaelle Broad
Sarah Mansfield	Melina Bath
Ryan Bachelor	Anne-Marie Hermans
David Ettershank	Rikkie-Lee Tyrrell
Jacinta Ermacora	

Question agreed to.

Ms Bath moved that, in Chapter 10, line 9179–9185, the words ‘the introduction of the Emergency Services and Volunteers Fund (ESVF) on 1 July 2025 (replacing the Fire Services Property Levy). which will support a broader range of emergency services and disaster response and recovery efforts. Money raised by this new fund will support our emergency services. More than \$250 million from the Emergency Services and Volunteers Fund will support including CFA and VICSES volunteers across the state. The former Fire Services Property Levy did not support the operations of the VICSES, the primary emergency response organisation for floods and storms.’ be omitted.

The question was put.

The Committee divided.

Ayes 4	Noes 5
Gaelle Broad	John Berger
Melina Bath	Sarah Mansfield
Anne-Marie Hermans	Ryan Bachelor
Rikkie-Lee Tyrrell	David Ettershank
	Jacinta Ermacora

Question negatived.

Ms Hermans moved that, in Chapter 10, lines 9156–9188, section 10.5, all words be omitted.

The question was put.

The Committee divided.

Ayes 4	Noes 5
Gaelle Broad	John Berger
Melina Bath	Sarah Mansfield
Anne-Marie Hermans	Ryan Bachelor
Rikkie-Lee Tyrrell	David Ettershank
	Jacinta Ermacora

Question negatived.

Mr Berger moved that, in Chapter 10, lines 9156–9188, the text be amended and the words ‘The Committee notes the introduction of the Emergency Services and Volunteers Fund (ESVF on 1 July 2025 (replacing the Fire Services Property Levy). Money raised by this fund will support our emergency services including CFA and VICSES volunteers across the state. The former Fire Services Property Levy did not support the operations of the VICSES, the primary emergency response organisation for floods and storms. Given that the submission deadline closed before the levy was announced in December 2024, the Committee did not consider this issue’ be inserted.

The question was put.

The Committee divided.

Ayes 5	Noes 4
John Berger	Gaelle Broad
Sarah Mansfield	Melina Bath
Ryan Bachelor	Anne-Marie Hermans
David Ettershank	Rikkie-Lee Tyrrell
Jacinta Ermacora	

Question agreed to.

Dr Mansfield moved that, Chapter 10, as amended, be adopted and stand part of the report.

The question was put.

The Committee divided.

Ayes 5	Noes 4
John Berger	Gaelle Broad
Sarah Mansfield	Melina Bath
Ryan Bachelor	Anne-Marie Hermans
David Ettershank	Rikkie-Lee Tyrrell
Jacinta Ermacora	

Question agreed to.

Minority reports



Environment and Planning Committee Inquiry into Climate Resilience: Minority Report

Victorian Greens



Dr Sarah Mansfield MLC

21st July 2025

Foreword

The Victorian Greens commend the Legislative Council for supporting this substantial inquiry undertaken by the Environment and Planning Committee.

A key reason for establishing the inquiry was the widespread recognition that Victoria's built environment is not prepared for the impacts of climate change. Rolling extreme weather events are becoming the norm, wreaking havoc on the built environment - from private housing and farms, to community facilities and critical utilities. The costs, financial and otherwise, are immense and growing.

The highest priority of governments at all levels should be ensuring that communities are safe, with comfortable housing, energy and water security, reliable communications, and access to essentials like food and healthcare.

As the world continues to warm relentlessly due to the abject failure of governments to stop the burning of fossil fuels despite decades of warnings about the consequences, it is clear that business as usual approaches to planning, building, maintenance, and renewal of physical infrastructure cannot continue.

The inquiry identified that the Victorian government actually has many strategies that identify steps that need to be taken to prepare for and mitigate the impacts of climate change on the built environment. The problem is not a lack of plans - it is a lack of action.

The majority report makes clear that the scale of the changes required are immense, and will require strong leadership and coordination across government and communities. Crucially, climate resilience needs to be embedded as a high priority in every aspect of government activity and adequately funded.

This sort of change might ordinarily take governments many years. But climate change doesn't respect typical government timelines. People's homes and lives are already being impacted.

We cannot afford for this to be yet another inquiry report that is acted upon slowly or in a piecemeal fashion. Or worse, not at all.

Action needs to be immediate and comprehensive.

While we are largely supportive of the findings and recommendations of the majority report, it fails to recommend actions for the government in several key areas despite strong support in submissions and evidence presented at hearings. This minority report will make several further recommendations:

- 1. Make polluters pay**
- 2. Support access to safe housing**
- 3. Lift environmentally sustainable design standards**

1. Make polluters pay

There was strong and widespread support for the concept of establishing a climate adaptation fund and resilient homes scheme, reflected in the recommendations of the majority report.

However, despite a substantial proportion of submissions - over a third - arguing that climate adaptation funding should be sourced from those who contribute the most to climate change, particularly the fossil fuel industry, the majority report failed to recommend this.

For example, in their submission, Doctors for the Environment Australia suggest that funding climate resilience measures could be raised at the state level by revoking any financial support currently provided to fossil fuel industry, and instituting a tax on polluting industries, including the fossil fuel industry¹. (DEA submission 122, p2).

The financial burden on citizens as a result of climate change impacts is substantial and growing. Yet the most polluting industries reap immense profits, pay little or no tax, and take no responsibility for the consequences of their businesses. This is completely unjust.

Requiring the fossil fuel industry to contribute to funding climate adaptation not only acknowledges this injustice, it also creates a financial incentive to transition away from fossil fuels.

Recommendation: That the Victorian Government adopts a 'polluter-pays' approach to raising revenue to fund climate adaptation, including by applying a Climate Response Levy to the fossil fuel industry (such as Victoria's coal-fired power stations).

2. Support access to safe housing

Governments have failed to act meaningfully on climate change for decades - both in terms of emission reduction and adaptation. They must take responsibility for the consequences of this, including ensuring that people continue to have access to safe housing in a changing climate.

Submitters and witnesses argued for the establishment of a resilient homes scheme, akin to those in NSW and QLD, in order to help communities recovering from disasters. While the majority report recommended Victoria establish such a scheme, it stopped short of recommending the scheme also provide for governments purchasing homes at high risk.

¹ Submission 122, Doctors for the Environment Australia, p2

The Environment and Planning Committee's report into the 2022 Flood Event - while acknowledging evidence calling for a buyback scheme - also failed to make a specific recommendation with regard to this.

The 2009 Victorian Bushfire Royal Commission recommended a home buyback scheme be established by the Victorian Government, and there have been calls for this from a wide range of sources including the Climate Council, local government groups, and the Insurance Council of Australia.

The grim reality of climate change is that while some homes can be modified or moved, some areas will become effectively uninhabitable. This is already occurring. People should be able to access financial support to help them find safer housing so they are not left having to choose between living in an uninhabitable house or destitution due to government inaction on climate change.

Buying back homes is a contentious subject - it can be expensive and complex to administer. Successful schemes depend on a number of factors, including strong local community engagement and input to decisions, and adequate funding given the potentially substantial costs involved. But many contributors to this inquiry argued that it should be considered as part of a suite of responses available to assist communities to remain safe in the face of climate change.

Recommendation: That Victorian Government investigate buying back homes in high risk areas as part of a suite of climate adaptation policies.

3. Lift Environmentally Sustainable Design Standards

The majority report acknowledges the report of the Select Committee inquiry into Victoria Planning Provisions Amendments VC257, VC267 and VC274, however fails to support one of its key recommendations.

The Victorian Government is currently embarking on substantial planning reforms. This has included removing the capacity for councils to stipulate local environmentally sustainable design (ESD) requirements for some types of planning applications. While the government has argued that this is necessary to ensure standardisation across the state, in doing so, 28 councils that are part of the Council Alliance for a Sustainable Built Environment (who collectively cover around two thirds of the Victorian population) have had their ESD standards lowered.

As noted in their submission, the CASBE councils developed their higher standards based on sound evidence and had successfully applied them for years.

Poorly designed and inefficient housing is expensive to run and maintain, and leads to significant health consequences for residents. Once homes are constructed, they are typically there for many decades; extreme weather events are only going to become more

frequent and intense over the coming decades, even with the best emissions reduction efforts. Retrofitting is difficult and expensive. It is therefore essential that all new housing is required to provide thermal comfort and withstand damage in the weather conditions expected over the coming decades.

Recommendation: That the Victorian Government Promptly review and improve the environmentally sustainable development standards in clause 55 of the Victoria Planning Provisions with a view to ensuring the statewide standards meet the higher standards set by 28 CASBE councils in their local policies, as recommended in the report from the Select Committee Inquiry into Victoria Planning Provisions Amendments VC257, VC267 and VC274.



ENVIRONMENT AND PLANNING COMMITTEE
INQUIRY INTO CLIMATE RESILIENCE
MINORITY REPORT OF THE LIBERALS and NATIONALS



Prepared by Liberal and Nationals MPs

July 2025

Glenn Arnold, President, Inverloch Surf Lifesaving Club

"The layers of bureaucracy are ultimately just crippling any decision-making and paralysing any action moving forward."

3 September 2024 Transcript EPC Inquiry

Contents

Overview and Background	3
1. Coastal Erosion	4
2. Politicisation of Emergency Services	4
3. Cost vs Benefit: Resilience Without Transparency.....	5
4. Bushfire Risk: A Need for Proactive Fuel Management	5
5. Planning and Building System Reform	6
6. Agriculture and the impact of renewable energy	7
6.1 Landholder rights	7
6.2 Solar Developments	8
6.3 Renewable recycling in a circular economy	8
7. Infrastructure: Build Back Better.....	9
Conclusion.....	10

July 2025

Melina Bath

Melina Bath MP



Gaelle Broad

Gaelle Broad MP



Wendy Lovell

The Hon. Wendy Lovell MP



Overview and Background

The Liberal and Nationals support the majority of the Committee's recommendations and thank all those who contributed evidence to this important inquiry. We acknowledge the professional way members conducted deliberations and appreciate the invaluable support of the Environment and Planning Committee (EPC) secretariat staff.

The Liberal and Nationals recognise that building Victoria's climate resilience requires strong, coordinated action, and we acknowledge the constructive insights provided by communities, industries, councils and experts across the state.

The Liberal and Nationals EPC members fundamentally support efforts to strengthen Victoria's resilience in the face of continued climate change. The Allan Government talks a big game on climate resilience — but its delivery is riddled with bureaucracy, political spin, and buck-passing. Regional communities are being left behind, emergency services are being politicised, and councils in particular rural and region councils are being loaded with responsibilities without resources. This is not leadership — it is cost shifting dressed up as reform.

Across Victoria we heard a consistent theme: Government plans are outdated, its priorities are misplaced, and the people on the ground are being ignored.

In considering the recommendations of the Committee report, it is important that the Allan Government recognise the complex challenges towards building climate resilience, including limited financial resources, competing infrastructure needs, insufficient data to assist long term planning, and the unpredictable nature of extreme weather events. The introduction of increased regulation can block progress towards improved outcomes, by discouraging the innovation and development needed to build climate resilience and improve living standards.

This Minority Report identifies key areas where the Allan Labor Government has neglected and or mismanaged Victoria's climate adaptation response, particularly in rural and coastal areas. From outdated coastal erosion strategies to opaque renewable energy planning, the Government has failed to deliver timely, transparent, and effective solutions.

Emergency services funding has been politicised, and planning regulations lack coordination, inflating costs and stalling housing delivery. The government's renewable energy strategy neglects agricultural impacts and lacks end-of-life planning, risking new environmental burdens.

The recommendations included in this Minority Report are a summary reflecting those strongly supported by the Liberal and Nationals' members adopted in the Committee report. Those clearly boxed were either proposed by the Liberal and Nationals but rejected by the Labor, Greens, Cannabis members and or additional recommendations.

Our additional findings and evidence-based recommendations put communities, local knowledge and economic viability at the centre of building climate resilience.

1. Coastal Erosion

Coastal erosion poses a profound threat to communities, particularly when it undermines critical infrastructure and public safety. The case of the Inverloch Surf Life Saving Club is a stark illustration of this issue. Since 2013, the loss of over 60 metres of protective dune has exposed vital assets to the elements, jeopardizing not only the physical structures but also the lives of those who rely on them. In Victoria, hotspots already showing accelerated change include Bass Coast, Gippsland and along the Great Ocean Road.

This is having a cascading effect across Victorian coastal communities: damaging public and private infrastructure, threatening tourism and local businesses, and eroding community confidence. Coastal erosion requires a coordinated response supported by consistent funding and shared urgency. A balanced strategy combining appropriate engineered infrastructure with ecosystem-based adaptation (e.g. dune restoration, wetlands) to provide both immediate protection and long-term resilience.

Solutions must be site specific, adaptable and flexible to accommodate future climate scenarios, with collaboration between governments, communities, and experts using best practice.

FINDINGS:

- Government coastal risk classifications are no longer valid.
- No single authority is accountable for action.
- Temporary works have not been deployed quickly enough.

RECOMMENDATIONS:

- Urgently revise the Cape-to-Cape Resilience Plan using updated data.
- Deliver interim protection works at high-risk sites like Inverloch and Loch Sport.
- Provide clear funding pathways for erosion-prone communities.
- Legislate agency accountability for coastal adaptation.

MINORITY RECOMMENDATION: That the Victorian Government implement a coordinated response to coastal erosion that integrates site-specific engineered solutions combined with ecosystem-based adaptation as appropriate. This strategy is flexible to future climate scenarios and developed collaboratively with communities, experts, and all levels of government, guided by best practice.

2. Politicisation of Emergency Services

The Liberals and Nationals opposed the inclusion of any reference to the politically divisive Emergency Services and Volunteers Fund (ESVF) legislation in the Majority report. The committee did not receive a single submission or hear any evidence that supports this section, nor did this tax exist at the time of the committee collecting evidence for this report

The ESVF was inserted into this process without proper scrutiny, consultation, or relevance to the inquiry's terms of reference. However, since the Labor, Greens, Cannabis alliance felt compelled to include the flawed policy, this Minority report will reflect more of a broader community sentiment.

The ESVF is a deceptive tax grab that strips \$765 million annually from Victorian families, farmers, and small businesses under the false pretence of supporting emergency services.

It has doubled or tripled property charges across the state, with farmers facing cruel hikes of up to 150%—a disgrace during a cost-of-living crisis and ongoing drought.

Despite the massive increase in revenue, there is no guarantee that funds will reach frontline services, leaving CFA and SES volunteers under-supported while communities are misled.

The Allan Labor Government has weaponised this levy to plug budget holes, punishing regional Victorians and eroding trust in emergency service funding—this tax must be scrapped and replaced with a fairer, transparent model.

The Liberals and Nationals strongly oppose the introduction of the ESVF.

MINORITY FINDING: Labor members politicised the inquiry process by using it to endorse the Emergency Services and Volunteers Fund (ESVF), a major funding reform that falls outside the scope of the Committee’s terms of reference. This undermines the integrity of the inquiry and diverts attention from evidence-based climate resilience strategies.

MINORITY RECOMMENDATION: The Liberals and Nationals in Government will scrap Labor’s Emergency Services and Volunteers Fund (ESVF) and reinstate the fairer Fire Services Property Levy to fund the CFA and provide secure funding for the SES transparently through the State Budget.

3. Cost vs Benefit: Resilience Without Transparency

Stakeholders consistently raised concerns about the economic viability of adaptation measures. Despite this, no formal cost-benefit analysis was provided for most recommendations.

FINDINGS:

- Stakeholders remain uncertain about the economic viability of climate resilience measures.
- The government has failed to provide adequate cost-benefit analysis.

RECOMMENDATION:

That this Committee invites the Victorian Auditor General to review the Government’s implementation of Adaption Action Plans and Climate Change Strategies to assess whether they are achieving their aims and objectives.

MINORITY RECOMMENDATION: That the Victorian Government ensures stakeholders are informed of the cost versus benefit of implementing climate resilience initiatives by conducting a Regulatory Impact Statement for all applicable recommendations it adopts from the Majority and Minority reports.

4. Bushfire Risk: A Need for Proactive Fuel Management

The Victorian Labor Government’s bushfire management policy is flawed in its practical application. While it promotes community engagement and risk-based planning, it has failed to deliver adequate levels of fuel reduction through planned burns and mechanical methods. This shortfall leaves vast areas of vegetation unmanaged, increasing the likelihood of intense bushfires and undermining the core objective of protecting communities.

The policy also lacks integration with broader land use and energy transition planning. Renewable energy developments have the potential to further impact bushfire-prone landscapes through increased ignition risks, restricted emergency access, and disruption to natural firebreaks, without sufficient bushfire risk mitigation.

Without a coordinated strategy that includes effective fuel management and fire prevention, the Allan Government’s approach has become reactive rather than proactive. It has consistently failed to meet its own fuel reduction targets, leaving large areas of vegetation untreated and communities increasingly vulnerable to severe bushfires.

RECOMMENDATIONS:

- Expand planned burns and mechanical fuel removal.
- Partner with First Nations to support accredited training and insurance for cultural fire practices.

MINORITY RECOMMENDATION: That the Victorian Government abandon its ‘Safer Together’ policy and adopt Recommendation 56 of the 2009 Victoria Bushfire Royal Commission which called for fuel reduction of 5% of treatable forest (rolling average). This target would incorporate increasing application of First Nations’ Forest fire management practices, where appropriate.

5. Planning and Building System Reform

Under this Government, red tape has become a substitute for real reform. The layering of uncoordinated environmental rules onto Victoria’s already strained planning system is stalling new housing, inflating costs, and putting home ownership further out of reach.

The Housing Industry Association (HIA) raised serious concerns about overlapping planning requirements, new sustainability requirements, and their compounding effect on affordability and housing supply.

“Victoria’s typical new house cost has surged more than \$133,000 since 2021 — and the average new home could cost \$500,000 to build by the end of the year.”

— Tim Reardon, Chief Economist, HIA (Source: [Realestate.com.au](https://www.realestate.com.au))

This represents an increase of nearly 40% in just two years, driven by:

- Supply chain disruptions
- Labour shortages
- Escalating energy and material costs
- New regulatory compliance, including seven-star energy efficiency standards

The Australian Bureau of Statistics confirms these trends:

“Prices received by building construction businesses have increased 31.1% from September 2020 to June 2024, with house construction prices rising 40.8%.”

ABS Producer Price Indexes Report, August 2024

Master Builders Australia echoed these concerns:

“Construction costs have increased by 40% in the past five years, while productivity has declined by 18%.”

Denita Wawn, CEO, Master Builders Australia

The Committee heard compelling evidence that local councils are increasingly burdened by unfunded state mandates, leaving them financially ill-equipped to meet growing infrastructure and climate adaptation demands.

For instance, the Bass Coast Shire Council representatives reported that ‘within the last five years the cost of reconstruction of [their] assets has doubled, and that is without factoring in the requirements of climate change’ [\[1\]](#) Similarly, Yarra City Council emphasised that ‘adaptation investment, particularly in new or upgraded public infrastructure, is far outside the financial capacity of local government’ and requires coordinated state and federal government action to bridge the adaptation financing gap. [\[2\]](#)

[\[1\]](#) Donna Taylor, *Transcript of evidence*, p. 4.

[\[2\]](#) Yarra City Council, *Submission 25*, p. 1.

Stakeholders call for coordinated state and federal support to bridge the adaptation financing gap. Yet the Victorian Government continues to pass responsibilities down the line without adequate funding—classic cost-shifting masked as climate reform.

FINDINGS:

- Regulations are fragmented and uncoordinated.
- Planning schemes duplicate National Construction Code standards.
- And support a nationally consistent approach to resilience planning.

RECOMMENDATION:

- That the Victorian Government works with other jurisdictions to support a nationally consistent approach to climate resilience in the housing sector that supports both climate resilience and housing affordability.
- That the Victorian Government undertake a review of planning and building regulations to reduce duplication and inconsistencies related to climate resilience requirements. This should include developing a clear, standardised framework that aligns local, state, and national regulations to provide greater certainty for developers and planners.

MINORITY FINDINGS:

- The Allan Labor Government's layering of uncoordinated environmental and planning rules has worsened Victoria's housing affordability crisis.
- Housing construction costs have surged over 40% since 2020, driven by supply chain issues, labour shortages, and costly new regulations. Planning delays and compliance burdens are choking housing supply and pushing home ownership further out of reach.
- Local councils warned they lack the resources to meet unfunded state mandates; further stalling infrastructure upgrades and adaptation works.

MINORITY RECOMMENDATION: That the Victorian Government improve transparency around planning and building regulation changes, and work with industry, local councils, and the community to reduce unnecessary costs and delays —making housing more affordable and accessible for Victorians.

6. Agriculture and the impact of renewable energy

6.1 Landholder rights

The rush to install wind and solar infrastructure is leaving regional communities behind. Farmers and councils raised concerns about planning bypasses, infrastructure damage, and long-term waste management. Renewable energy projects lack oversight and threaten agricultural operations. Regional communities are excluded from planning decisions.

"The Government's energy policy is all carrot for developers and no shield for landholders."

Submission 38, Victorian Farmers Federation

MINORITY FINDING: Many regional Victorians believe they are being steamrolled by Labor— giving energy companies access to their land without their permission.

MINORITY RECOMMENDATION: That the Victorian Government:

- a) reinstate the right of appeal to the Victorian Civil and Administrative Tribunal for planning decisions around renewable energy projects, ensuring that community voices are heard in the planning process.
- b) ensure that major transmission and large-scale wind and solar generation projects face a rigorous and independent planning panel assessment.
- c) reinstate 2 km turbine buffer.
- d) repeal legislation which would authorise forced entry on private land for the purposes of electricity transmission work.

At the time of the Committee inquiry the *National Electricity (Victoria) Amendment (VicGrid Stage 2 Reform) Bill 2025* had not been introduced to Parliament. The Liberals and Nationals strongly oppose this legislation in relation to energy projects which expands government powers to access private land without consent.

6.2 Solar Developments

Regional communities, particularly in agricultural areas like Colbinabbin, have raised valid concerns about the potential microclimate impacts of large-scale solar developments—such as the “heat island effect” and altered growing conditions. Despite these concerns, no research has been conducted, and expert testimony confirms the issue remains unstudied. The Government has proceeded with solar projects without first assessing their potential effects on agriculture, productivity, or land viability.

MINORITY FINDING: There is a significant research gap regarding the microclimate and agricultural impacts of large-scale solar developments, leaving regional communities without the scientific evidence needed to inform land-use decisions or assess long-term risks.

MINORITY RECOMMENDATION: That the Victorian Government commission independent research to consider the heat island effect of large-scale solar panel projects in regional areas and any associated microclimate effects on surrounding agricultural and horticultural activities.

6.3 Renewable recycling in a circular economy

Victoria’s rapid transition to renewable energy is outpacing its planning for what happens when that infrastructure reaches the end of its life. Solar panels, wind turbines and batteries all have limited operational lifespans — yet no coordinated recycling or disposal plan currently exists. Without urgent action, the state risks replacing one environmental problem with another by creating a new stream of high-volume, high-impact waste.

At the same time, the resilience of Victoria’s transmission and energy infrastructure — particularly in regional and agricultural areas — remains under-assessed. Road, rail, and port systems vital to the farm economy also lack a coordinated climate resilience strategy.

FINDING:

Without a proactive plan, Victoria risks creating a new category of environmental waste just as it works to reduce emissions. A government-led investigation into end-of-life pathways and domestic recycling capacity is needed.

RECOMMENDATIONS:

- That the Victorian Government investigate and report to Parliament on the end of life of renewable energy products including wind turbines, solar panels and batteries, and opportunities for recycling within Australia.
- That the Victorian Government commission an independent review of the resilience and sustainability of Victoria's energy generation and associated transmission, distribution and storage networks, including an assessment of impacts on agriculture and manufacturing.

MINORITY RECOMMENDATION: That a climate-resilient infrastructure strategy be developed for Victoria's road, rail, and port systems, with clear priorities to support agricultural production.

7. Infrastructure: Build Back Better

While retrofitting infrastructure is essential to protect communities from future climate events, it remains out of reach for many councils due to prohibitive costs and restrictive disaster recovery funding rules. Councils are often forced to rebuild damaged roads, levees, and bridges to outdated standards — setting the stage for repeat failures and wasted public money.

The lack of government flexibility, particularly around levee maintenance on Crown land, undermines community safety and resilience. Despite the clear need, no dedicated or legislated funding pathway exists.

FINDINGS:

- Retrofitting existing infrastructure is essential to withstand future climate impacts but remains cost-prohibitive for many councils.
- Recovery funding does not support infrastructure upgrades.
- Road, levee, and bridge systems lack climate resilience.
- The Government is increasingly relying on local governments and communities to bear the financial burden of building climate resilience.

RECOMMENDATIONS:

- That the Victorian Government work with local councils and the Commonwealth to identify pathways for integrating 'build back better' principles into post-disaster infrastructure funding, to reduce repeated damage and improve long-term resilience.
- That the Victorian Government work with the Commonwealth to reform disaster recovery funding frameworks to:
 - a) Ensure that betterment is recognised as an eligible expense, and infrastructure is not just replaced 'like for like' where appropriate.
 - b) Expand eligibility to include heatwaves, droughts, and other climate-related events in disaster declarations and funding access.
 - c) Support local capacity by providing long-term funding to councils for resilient upgrades to roads, drainage, and community assets.
 - d) Shift funding emphasis toward proactive mitigation, adaptation and resilience-building to reduce long-term recovery costs.

MINORITY RECOMMENDATION: That the Victorian Government ensure that levees on crown land be immediately restored where there is a community benefit and then maintained through a legislated inspection and maintenance program.

Conclusion

Victoria faces serious and growing challenges from climate change — but meeting those challenges requires more than rhetoric and reports. It demands real leadership, local empowerment, and policy grounded in evidence and practicality.

Throughout this inquiry, the Liberal and Nationals MPs have listened carefully to the concerns of Victorian communities, industries, farmers, councils, experts and local businesses.

The Government's approach to climate resilience is top-heavy, overly bureaucratic, and riddled with duplication. It lacks proper economic scrutiny, pushes responsibility onto already stretched councils, and leaves too many Victorians — especially in rural and coastal areas — out of the conversation.

The Liberal and Nationals members have set out constructive, community- and industry-led direction that:

- Protects coastal towns from worsening erosion with clear action, not endless studies;
- Backed an increase in fuel reduction bushfire mitigation with real resourcing and support for traditional knowledge;
- ensure in meeting climate resilience, housing affordability is not sacrificed to red and green tape;
- Enable farmers and local communities to have a voice on how renewable energy infrastructure is rolled out;
- Deliver infrastructure that is climate-smart and cost-effective — not just rebuilt to fail again.