



FOSSIL FUELS ARE A HEALTH HAZARD

A comprehensive report on the health impacts of coal, oil and gas,
and a treatment pathway to reduce health harms.



Acknowledgment Of Country

DEA members live and work around Australia. We acknowledge Aboriginal and Torres Strait Islander peoples as the Traditional Owners of these lands, in the spirit of reconciliation.

We recognise that First nations people have cared for Country and lived sustainably for millennia, and that sovereignty of this land was never ceded. We pay our respects to First Nations Elders past and present, and to emerging leaders.

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Key findings

Fossil fuels kill and harm our health

As the primary drivers of climate change, fossil fuels are responsible for the climate health emergency. Doctors and other health professionals who are on the frontline of care are seeing the escalating impacts in our clinics and in emergency departments.

Climate change harms health in multiple ways.

- It is increasing the incidence and severity of heat and heatwaves, droughts, bushfires and bushfire smoke, storms, and other extreme weather events.
- It is changing the patterns of infectious diseases.
- It is adding to the mental health burden across the globe, especially in our young people.
- It is contributing to biodiversity loss, increasing our risk of zoonotic diseases.
- It is causing rising sea levels, placing coastal communities at risk.
- It is threatening our food and water security.

The combustion of fossil fuels releases dangerous air pollution which kills more people globally than smoking. Emissions from coal-fired power stations, especially older ones, can travel long distances, impacting areas hundreds of kilometres away.

Fossil fuels are the source material for plastics, causing environmental pollution and harming health through hormonal disruption and increasing our risk of cardiovascular disease.

We must quit fossil fuels to protect health

Similar to addressing the health impacts of tobacco by first quitting smoking, to address the health impacts of fossil fuels we must first quit coal, oil and gas.

To protect the health of the Australian people, we must:

- Ban all new fossil fuel projects and accelerate investment in renewables
- Stop financial subsidies to fossil fuel industries and redirect them to carbon-free initiatives
- Ban fossil fuel advertising and industry sponsorship, just like we did with smoking
- Ban single-use and non-recyclable plastics and switch to reusable and/or compostable products
- Protect biodiversity and ban native forest logging
- Prepare healthcare and the wider community for what we can no longer avoid.

Foreword

Fossil fuels are a health hazard.

Coal, oil and gas pose significant threats to our health through air pollution¹ and as the primary drivers of global heating.² Fossil fuels contribute to biodiversity loss³ and are the main source of plastics which are clogging our arteries as well as our oceans.⁴ These dangers are not speculative; they are well-documented and increasingly alarming.

We can address our over-reliance on fossil fuels by reducing our overall energy consumption, by adapting our cities and housing,^{5,6} and by the utilisation of renewable energy which provides a viable alternative to fossil fuels without jeopardising our health.⁷ Similarly, there are multiple non-toxic alternatives to plastics.⁸ Embracing these alternatives is not just an environmental imperative but a crucial step for public health.

This report consolidates key evidence demonstrating how fossil fuels endanger our health. As medical professionals this is our primary area of concern. While we acknowledge the extensive damage fossil fuels cause to economies and the impacts of climate chaos on the cost-of-living, we draw on the expertise of other specialists for that information.

The goal of this report is to raise awareness and inspire action among our governments and the wider Australian community. It diagnoses the health hazard of fossil fuels by highlighting their direct impacts on our physical and mental well-being, as well as the broader systems essentials for our health and survival. Addressing these issues is at the heart of our medical mission.

We outline a treatment pathway that centres upon the urgent phasing out of fossil fuels and the removal of fossil fuel subsidies. We further prescribe the prohibition of fossil fuel advertising and sponsorship to address public acceptance of the fossil fuel industry and to hasten the needed transition to safer, healthier energy sources.

These actions would make a profound difference in protecting public health and ensuring a sustainable future for all our communities and ourselves.



Part 1-Diagnosis: The human health impacts of fossil fuels

Introduction



It is unequivocal that the use of fossil fuels is causing global heating and climate change.⁹ We know that the combustion of coal, oil and gas releases the greenhouse gases carbon dioxide, methane and nitrous oxide (and many others), increasing their heat-trapping effect in our atmosphere.¹⁰ This in turn is causing rising global land and sea temperatures, sea level rise, and worsening more frequent natural disasters.⁹ Coal, oil and gas are responsible for over 75% of greenhouse gas emissions making them the biggest contributors to global warming.⁹

We must not lose sight of the causal factor of fossil fuels when talking about the health impacts of climate change. As the World Health Organization (WHO) Director-General Dr Tedros Adhanom Ghebreyesus stated in Dec 2023 “Addressing climate change necessitates addressing the role of fossil fuels, much like we cannot discuss lung cancer without acknowledging the impact of tobacco.”¹¹

2023 was the hottest year since temperature records began.¹² In the 12 months from June 2023 to May 2024, every month had record-high global temperatures.¹³ Our world is getting hotter, and for the health community this means an increased need to manage multiple climate health impacts.⁷ These include direct health effects from heat waves, fires, smoke, floods and extreme weather events, as well as indirect effects from the accompanying infectious diseases, displacement of people, food and water insecurity and mental illness.¹⁴

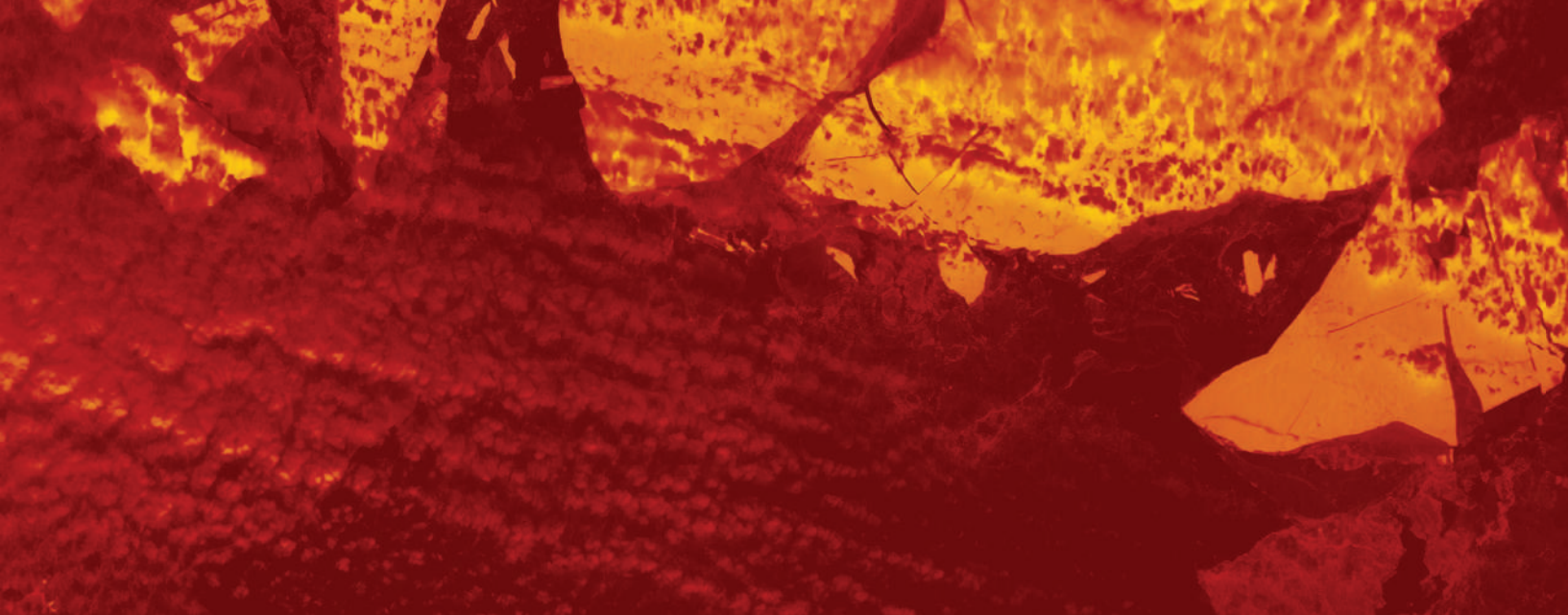
Climate change also places an extra burden on our healthcare system by increasing the need for healthcare services and by disrupting health service provision during and after extreme weather events.¹⁵

Global heating in turn is driving biodiversity loss,³ which carries its own health impacts, the most notable being increasing epidemics and pandemics from zoonotic diseases.¹⁶

Fossil fuels cause hazardous air pollution¹⁷ that is implicated in 8.1 million deaths globally per year¹⁸ and is increasing the rates of asthma,¹⁹ heart disease,²⁰ cancer,²¹ learning delays^{22,23,24} and poor pregnancy outcomes.^{25,26}

What is more, fossil fuels are contaminating our environment and bodies with plastics. There is very concerning evidence about the effects of plastics on endocrine function, male infertility, premature birth, cardiovascular disease and various cancers.^{4,27}

It is clear that fossil fuels are hazardous to our health in multiple ways, threatening the health of humans and also the health of our beautiful planet home. It is imperative that we address these health hazards to ensure the health of our communities and our environment.



1. Climate Change

Our failure to reduce emissions caused by fossil fuel combustion, means global warming poses the greatest global health threat of our time.⁷ The WHO has described climate change as the defining issue for public health in the 21st Century and warns that ‘The severity of impacts of climate change on health are increasingly clear and threaten to undermine the last 50 years of improvements in health.’¹⁴

Climate change affects health in many ways – directly through physical and mental trauma, illness and mortality caused by extreme weather events such as floods, storms, bushfires and heatwaves, and indirectly through changing patterns of infectious diseases and air pollution, exposure to bushfire smoke and allergens, rising sea levels with coastal inundation, biodiversity loss, and threats to secure shelter, food, and water.²⁸

A warming climate is clearly and inextricably linked to the disruption of environmental conditions that provide the very fundamentals for our physical and mental health – clean air, clean water, reliable sources of healthy and nutritious food, adequate shelter, and stable climatic conditions.²⁹

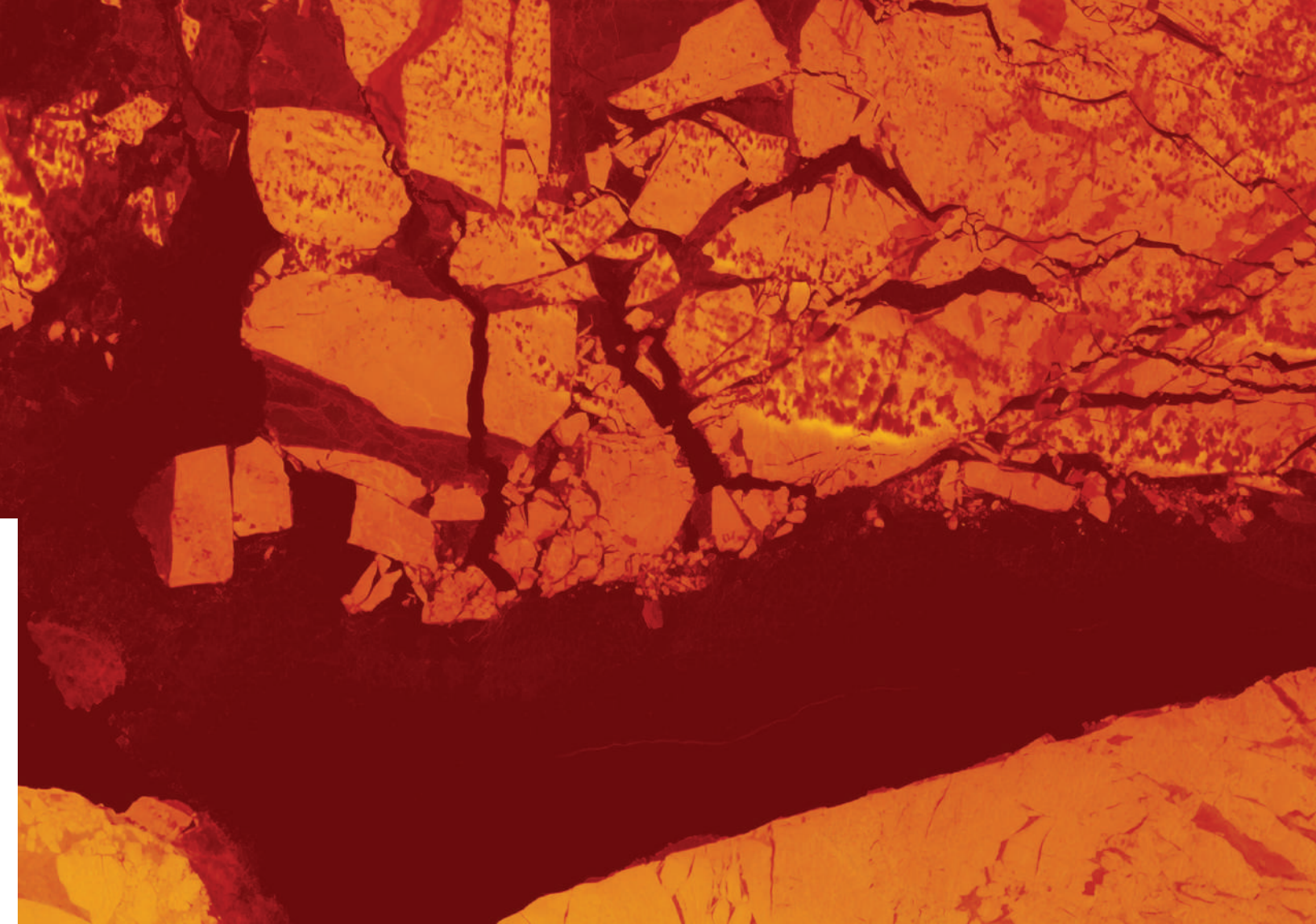
Climate change affects all populations, but also exacerbates existing inequities in Australian healthcare and society. The impacts of climate change are more profound on those who are already experiencing disadvantage, marginalisation or disempowerment, including

those experiencing poverty or with insecure work or disabilities, older people, and those with chronic health conditions.³⁰

Race, ethnicity and migration status (refugees, asylum seekers, and people on temporary visas) can increase vulnerability through language barriers and lack of access to services.³⁰ Aboriginal and Torres Strait Islander peoples are disproportionately affected by the impacts of climate change on their physical, mental, cultural and spiritual health.³¹ Also vulnerable are people living in rural and remote communities or in areas of climate risk, those living in areas with poor health infrastructure,³² first responders and emergency service workers, as well as pregnant women and their babies.^{7,30}

Children are amongst the most vulnerable to current health risks and face a lifetime of exposure to climate change and global heating.³³

Due to the number and complexity of climate health impacts, global mortality data for climate change is elusive. However, the World Economic Forum estimates that by 2050 climate change will cause an additional 14.5 million deaths per year³⁴ and the WHO estimates that between 2030 and 2050 there will be an additional 250,000 deaths per year



from undernutrition, malaria, diarrhoea and heat stress.¹⁴ This number does not include deaths from food and water insecurity, fires and smoke, floods, storms and extreme weather events, other infections, displacement and civil unrest.

Major medical organisations in Australia including Doctors for the Environment Australia (DEA), the Australian Medical Association (AMA), most specialist Colleges and other medical organisations around the world have declared a Climate Health Emergency,³⁵ calling on governments for strong and effective action to reduce emissions and for recognition, preparation, and management of the critical public health challenges ahead.

Urgent action is needed to reduce emissions to keep global warming as close to a global average of 1.5°C as possible. If we fail to do this, climate change tipping points will be reached at which limits on global heating will be exceedingly difficult or impossible to manage.³⁶ A tipping point will occur when rising temperatures trigger a cascade of interrelated

consequences with global repercussions. For example, the ongoing melting of Arctic permafrost is releasing large amounts of methane into the atmosphere, further accelerating global warming.³⁷ In such a scenario, changes to the Earth's climate may become irreversible, and many residential and farming areas in the world, particularly in Australia, may become uninhabitable.

We are currently at 1.3°C of global warming,³⁸ so the urgency of action cannot be overemphasised.

Heat and health

No one can remain untouched by the effects of rising heat and increasing heatwave frequency.

Extreme heat kills more Australians than any other climate disaster,³⁹ and dangerous heatwaves are increasing in frequency.⁴⁰ Causes of increased mortality from heat include heat stroke, heart attacks, cerebrovascular accidents (strokes) and kidney disease.^{7,14,41} Heat also means exacerbations of mental illness, including increased suicidality.⁴² There is increased domestic and community violence^{43,44,45} on high heat days.

Thirty-six thousand Australians are estimated to have died due to extreme heat between the years 2006 and 2017.⁴⁶ This is likely to be an underestimation; heat is called the 'silent killer' because deaths are often attributed to another cause such as heart attack or stroke.

Globally, the number of heat-related deaths is extremely concerning. In the European summer of 2022 there were 61,672 excess deaths from heat.⁴⁷ In China heatwave-related mortality was estimated at 50,900 deaths in 2022,⁴⁸ and in the United States heat wave mortality has increased by 95% between 2010 and 2022.⁴⁹ Of further concern is the impact of air pollution on heat, with evidence demonstrating that heat coupled with exposure to common air pollutants increased cardiorespiratory mortality.⁵⁰

Heat affects everyone

Many groups in our community are vulnerable to heat.

The very young and older people are vulnerable due to their physiology. More than 1 in 5 Australians are vulnerable to heat, based on age alone with 16% of Australia's total population being aged 65 and over,⁵¹ and just under 6% of Australians are 0-4 years old.⁵²

Chronic diseases and disability also increase vulnerability. In 2022, nearly half of Australians of all ages (49.9%) had one or more chronic

conditions, and almost one in five (18.6%) had two or more chronic conditions.⁵³ In particular, one in six Australians are living with cardiovascular disease, accounting for more than 4 million Australians.⁵⁴ Many of these people require medications such as diuretics and antihypertensives, which further increase their risks during hot weather from dehydration, falls and heart attacks.⁵⁵

Outdoor workers, people living in cities and people experiencing poverty and homelessness are vulnerable due to high exposure to heat.

Figure 1 summarises who is most at risk from heat and heatwaves.

Critical services

The ability to provide the critical services provided by our outdoor workforce is impacted by heat. Tradespeople, infrastructure, maintenance and farm workers have high exposure to heat and extreme weather, making global heating a major threat to these people and everyone who relies on the work that they do to keep electricity, water, roads and food supplies functioning. Increased temperatures are already affecting labour capacity in Australia, and are projected to reduce that capacity further by around 50% or more.⁵⁶

Australia imports around 11% of food consumed by value, and exports around 70% of the agricultural goods produced here.⁵⁷ Many of the agricultural products hardest hit by climate change are staples such as potatoes, rice and olive oil⁵⁸ resulting in higher prices due to crop reductions or failures from heat. Marine heatwaves that occur in concert with terrestrial heatwaves are already altering marine ecosystems and food chains around Australia, putting our fisheries at risk.⁵⁹ Collectively, these effects impact both income and the cost of living for all Australians.

Community and sporting events

Global heating is affecting our social fabric through community events and sport. Researchers at the University of New South Wales found that during the past four years,

High risk groups for health impacts of heat and heatwaves

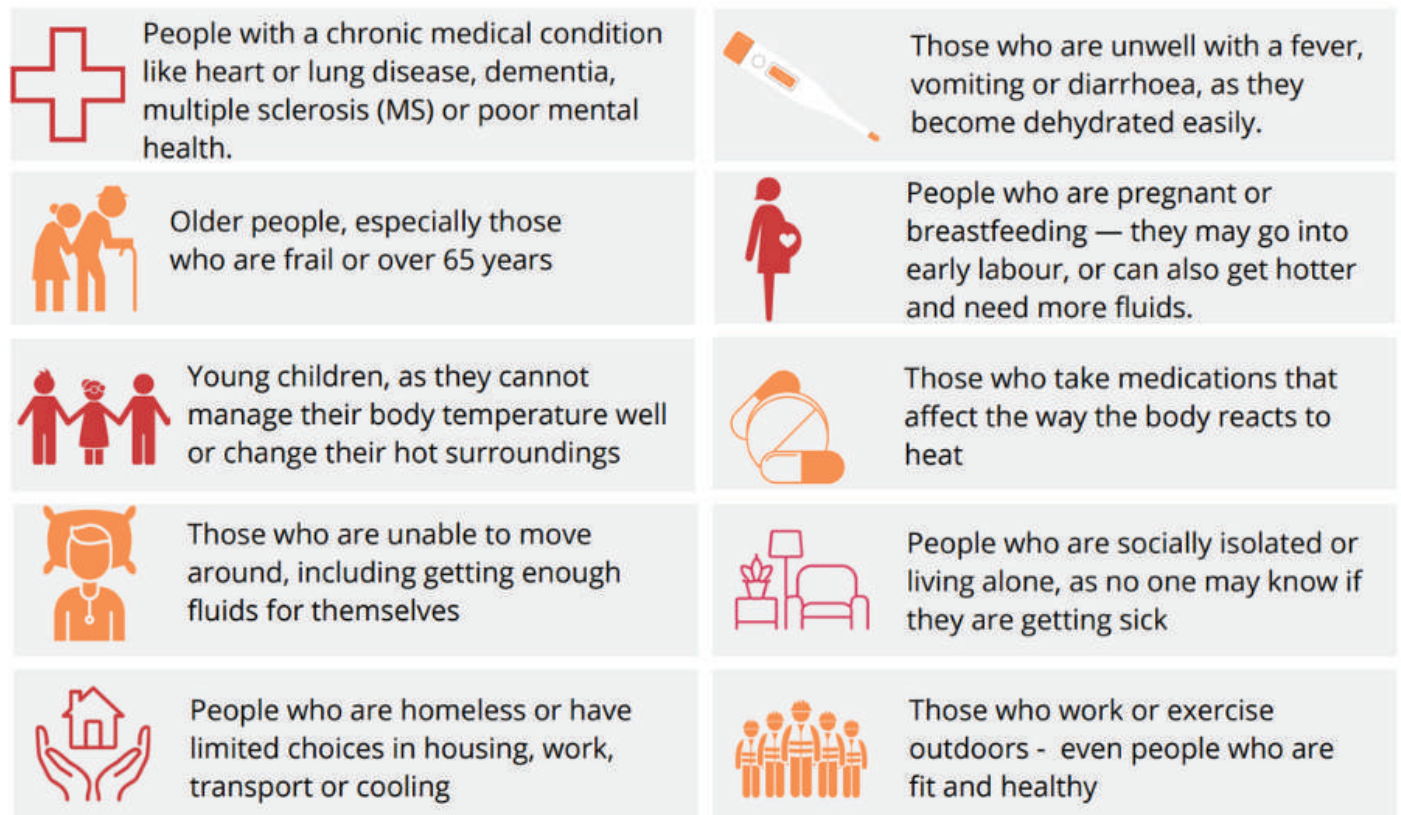


Figure 1: Adapted from “Heat and Health Fact Sheet” 2023. Doctors for the Environment Australia

more than 22 Australian festivals have been relocated, postponed or cancelled due to dangerous weather fuelled by climate change.⁶⁰

Furthermore, there is an increasing frequency of sports matches being cancelled due to extreme heat.⁶¹ The impact is significant, as about 13.5 million adults and 3.6 million children take part in sport annually. The importance of physical activity for human health is well documented, so a reduction in sporting activities will have a significant impact on the more than 90% of Australians who participate.⁶²

Heat and violence

Another concerning relationship between heat and social cohesion and wellbeing is that between heat and violence, in particular domestic and family violence.

A team from Macquarie University analysed close to one million reported incidents of domestic, non-domestic and sexual assaults over a 13-year period (2006-2018) in New South Wales. They found that all forms of violence

increase with heat, but that domestic violence has the most significant rises.⁴³ Moreover, this study reflects broader global trends in increasing conflict correlated with increasing ambient temperatures.⁶³ This has broad-reaching impacts on Australians through mental health, personal injury and social cohesion.

Heat kills and also disrupts our social fabric and economy, leaving no one untouched by its negative impacts.

Mental health

Climate change has serious and wide-reaching effects on the mental health of Australians today and this is anticipated to intensify without stronger efforts to reduce the use of fossil fuels.

Eco-anxiety and climate grief are increasingly recognised clinical phenomena and are considered by the Royal Australian and New Zealand College of Psychiatrists as a rational response to a real threat.⁶⁴

In 2021, a groundbreaking study on climate anxiety in children and young people surveyed people aged between 16–25 years old from 10 countries, including Australia. They found that 84% of respondents were worried about climate change, 83% thought that people have failed to take care of the planet and 75% thought that the future was frightening. More than 45% felt that their feelings about climate change negatively affected their daily life and functioning. They felt betrayed by their governments and their levels of anxiety and distress correlated with a perceived inadequate government response to the climate crisis.⁶⁵

Mental health is further affected by climate incidents. Climate change is exacerbating the frequency and severity of extreme weather events, including heatwaves, bushfires, storms, and floods. Exposure to these events induces psychological distress, ranging from mild anxiety to severe mental illness requiring specialised intervention. Communities affected by such events often experience increased rates of post-traumatic stress disorder (PTSD), anxiety, depression, and suicide.⁶⁶ These mental health impacts persist long after the immediate event and can lead to secondary issues such as substance abuse and domestic violence.⁶⁷

Heatwaves, in particular, are linked to heightened aggression, domestic violence, and self-harm.⁶⁸ There is clear evidence of increased mental health emergencies and hospital admissions during periods of hotter weather. Furthermore, multiple studies across various countries have found a consistent correlation between rising temperatures and increased suicide rates.⁶⁹ Prolonged drought, common in

Australian rural communities, has been specifically associated with elevated suicide rates among men.⁷⁰

Climate change heightens the risk of compound ‘domino’ events, where multiple disasters intersect with minimal recovery time in between. An example of this occurred from 2019 to 2022, with bushfires followed by multiple floods impacting various parts of the east coast of Australia. The Black Summer fires of 2019–2020 directly or indirectly affected 80% of Australia’s population. Exposure to such repeated disasters diminishes both community and individual mental resilience, exacerbating the impact of subsequent events.⁷¹



Overall, the health impacts of climate change are severe and far reaching. For the sake of brevity, we have highlighted heat and mental health, but there are equally concerning effects of fires, floods, infections, food and water insecurity and displacement of people, further underscoring that fossil fuels are a health hazard that needs to be phased out to protect health.

2. Air pollution

More people die from air pollution than from smoking.

The State of Global Air Report 2024 found that 8.1 million people died in 2021 from air pollution. This makes air pollution the second largest risk factor for death after high blood pressure, and followed by smoking. Of these, 58% of the deaths were due to particulate matter measuring less than 2.5 micrometres (PM_{2.5}) — also called fine particles — the most readily measurable pollutant from fossil fuel combustion. Six per cent were deaths from ground level ozone, also produced by burning fossil fuels.¹⁸

Other sources estimate that 8.34 million⁷² to 10.2 million⁷³ people die prematurely from fossil fuel air pollution every year and the WHO states that 99% of the planet breathes air that exceeds safety guidelines.⁷⁴

Air pollution is dangerous because when we breathe in we inhale harmful particles and gases into our lungs. From there, the particles can cross into our bloodstream, affecting our entire body, including our hearts, brains and reproductive systems.

As well as PM_{2.5} and ground-level ozone, burning fossil fuels produces other pollutants. This includes particulate matters measuring less than 10 micrometres (PM₁₀), carbon monoxide, nitrogen oxides (NO_x), sulphur dioxides (SO_x), volatile organic compounds (VOCs) like the carcinogen benzene⁷⁵ and the neurotoxin

toluene⁷⁶, and heavy metals such as lead, arsenic and mercury.¹


These pollutants carry extensive health risks, contributing to increased rates of asthma,¹⁹ heart disease,²⁰ cancer,²¹ learning delays^{23,24,77} and poor pregnancy outcomes.^{26,78}

Coal

In addition to being the most carbon intensive of the fossil fuels and the largest contributor to climate change, coal causes direct damage to health at every stage in its use for energy and metal manufacturing. Burning coal in power plants emits both PM_{2.5} and PM₁₀, NO_x, SO_x and the heavy metals, mercury, arsenic and lead.⁷⁹ Every stage of extracting, transporting and burning coal through to its resulting waste shows the harmful impacts of coal.

Open cut coal mines, such as those in the Hunter Valley (NSW), Central Queensland and the Latrobe Valley (VIC) cause local air pollution, leading to severe health issues. For example:

- PM₁₀ is associated with asthma, chronic obstructive pulmonary disease (COPD)⁸⁰ and black lung disease.⁸¹
- Mining blast plumes release Nitrogen dioxide (NO₂)⁸² a potent respiratory irritant which increases vulnerability to asthma and the risk of infection.⁸³
- PM_{2.5} passes into our bloodstream and



increases our risk of heart disease, stroke and dementia, and affects foetal growth and kidney function.⁸⁴

Coal transport generates significant amounts of air pollution as it passes through populated areas. In NSW, it is estimated that 175,000 people live within 200 m of a coal rail line.⁸⁵

Burning coal in power stations, particularly in older facilities, exacerbates health risks. PM_{2.5} emissions from these stations can travel long distances, impacting areas far from the source. For example, up to 18% of PM_{2.5} in Sydney is attributed to power stations as distant as 160 km away,⁸⁶ causing an estimated 45 deaths annually.⁸⁷

Finally, coal-fired furnaces generate coal ash waste containing mercury, lead and other pollutants. Stored in dams, these heavy metals pose risks to local waterways and can become airborne dust if the dams dry out.⁸⁸ This happened in Port Augusta in 2016, where houses were covered in coal ash exposing the local population to detrimental health impacts.

Petrochemical processing

Petrochemical processing includes the extraction of natural gas and crude oil, its storage and transportation and further refinement and manufacturing for commercial usage. There is concerning evidence regarding the health harms of these processes.

A 2020 systematic review and meta-analysis investigated the association between haematological (blood) malignancies and

living near petrochemical facilities. It found a 30% increased risk of leukaemia in fence-line communities, presumed due to exposure to air pollutants, notably VOCs like benzene.⁸⁹ The study defined 'fence-line' as living up to 5km from a facility, which is comparable to the distance from the proposed Middle Arm Industrial Precinct and the residential areas of Palmerston and Darwin.

Studies from Taiwan have calculated that living 10 km from petrochemical processing increased the risk of asthma by 167%⁹⁰ and living within 3 km increased the risk of the kidney disease chronic glomerulonephritis by 132%.⁹¹ In the Netherlands, exposure to heavy industries, including petrochemicals, demonstrated a 121% higher risk of low-birth weight in babies exposed to PM₁₀, NO_x, VOCs and SO_x.⁹²

As reported in the National Pollutant Inventory⁹³ gas processing plants in Australia such as Ichthys LNG onshore processing and Gladstone Ports emit these air pollutants including PM_{2.5}, PM₁₀, NO_x, SO_x and VOCs, raising concerns about the related health risks for the Australian population.

Gas in the home

The gas that is piped to Australian homes and used in our gas heaters and stoves is mostly methane, itself a powerful greenhouse gas.⁹⁴

Carbon monoxide (CO), NO₂ and other pollutants are released from these appliances. The amount of pollutants that stay inside the house depends on the design of the appliance, whether it has been serviced recently, the

effectiveness of the exhaust system in use and interaction with other exhaust fans in the building. These pollutants pose a higher risk to health in modern, tightly weather-sealed buildings as little fresh air enters.⁹⁵

CO is a dangerous, colourless, odourless gas produced when carbon (such as gas, wood or petrol) is burned incompletely — this can happen easily in faulty appliances. The presence of carbon monoxide is often not suspected in the home, resulting in chronic ill health at low levels. At higher levels, carbon monoxide can become rapidly life-threatening. Mild, non-specific symptoms such as headache, nausea and vomiting, skin flushing, muscle pain and weakness may progress to shortness of breath, dizziness, coordination problems and if severe enough, confusion, chest pain and death.⁹⁶

When breathed in, NO₂ dissolves in our lungs to create nitric acid, a potent irritant. The effects are increased incidence of asthma, as well as airway constriction in those already known to have airway disease.

For a child with current asthma who lives in a home with a gas stove, 30% of their risk of asthma can be attributed to the use of the stove. Australian researchers have estimated that across the community 12% of childhood asthma is attributable to the use of gas cooking stoves.⁹⁷

Transport-related air pollution

When we step outside, and particularly in urban areas, we are exposed to the health hazards of burning fossil fuels by our transport system, in particular from vehicles with an internal-combustion engine.

There is concern that the health impacts of this form of pollution are being underestimated as it is primarily PM_{2.5} that is being measured in pollution monitoring systems and the risk from other pollutants like NO_x is not being adequately assessed. A recent expert statement by Melbourne Climate Futures, recommends that Australian estimates of death and illness attributed to vehicle emissions should be updated to incorporate NO₂ impacts as well as those of PM_{2.5}.⁹⁸

Their modelling indicates that 11,105 premature deaths, 12,210 cardiovascular hospitalisations, 6,840 respiratory hospitalisations and 66,000 asthma cases annually in Australia are due to the NO₂ and PM_{2.5} components of transport-related air pollution.⁹⁸

Even small increases in NO₂ have been associated with significant increases in the number of new cases of childhood asthma. A rise of just 4 parts per billion (ppb) of NO₂ is associated with a 54% increase in childhood asthma prevalence.⁹⁹ In addition, there is a 4% increase in lung cancer risk for every 5 ppb rise of NO₂.¹⁰⁰ There is no safe threshold for NO₂ exposure so even minor reductions in concentrations can yield substantial health benefits.

Electrifying our transport sector as well as facilitating active transport (walking and cycling) away from major roads would reduce the health burden of transport-related air pollution.

Bushfire smoke

Bushfire smoke is a major source of fine particles and other pollutants that can spread hundreds of kilometres, with significant short and long-term health impacts. Climate change is worsening fire conditions globally¹⁰¹ with terrifying implications for Australia.

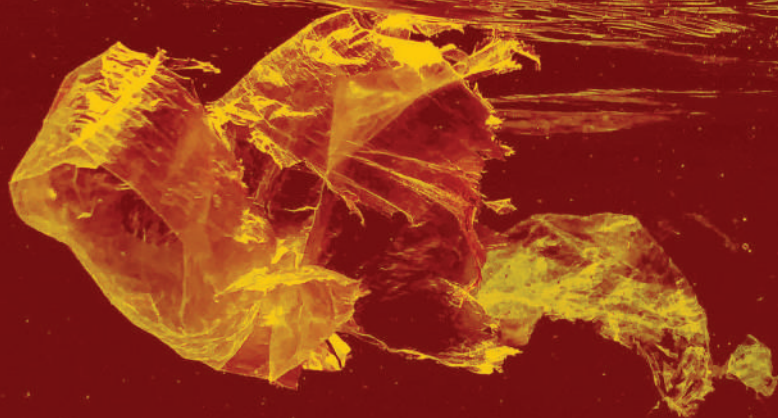
Many would remember the choking smoke that filled the air during the Black Summer of 2019–2020 as our country burned. It is hard to forget the devastation that tore down the east coast, through Kangaroo Island, the wheat belt of WA and across the Top End, dropping the ashy remains of our biodiverse coastal ecosystems into our houses and lungs.¹⁰² Scientists estimated almost 3 billion native vertebrates were lost in those fires,¹⁰³ let alone the untold loss of plants, invertebrates and fungi.

In terms of human costs, the air pollution produced by those devastating fires caused more than 400 extra deaths, more than 3,000 hospitalisations for heart and lung problems and an extra 1,300 presentations to emergency departments for asthma.¹⁰⁴ Prolonged exposure to bushfire smoke contributes to heart disease, dementia, cancers, stroke, diabetes, poor mental health and sudden death. Prolonged

exposure of pregnant women to smoke affects the growth of unborn babies.¹⁰⁵

Overall, air pollution from fossil fuel processing and combustion must be understood as causing immense harm to human health. Coal, petrochemical processing, transport, gas in the home and bushfire smoke are all contributing to this severe and under-recognised reason why fossil fuels are a health hazard.





3. Plastics

Fossil fuels are the source material for plastics.

The main ingredient in most plastic materials (naphtha) is a derivative of crude oil and natural gas.¹⁰⁶ In addition, the associated production of plastics generates an enormous carbon footprint. In 2015, plastics production was responsible for 4.5% of global greenhouse gas emissions and 6% of global coal generated electricity was used for plastics production.¹⁰⁷

Plastic is a seemingly unavoidable global pollutant, with terrible consequences for our environment. Everywhere we look we can see that our overconsumption of plastic is causing marine and terrestrial life to suffer for our convenience. Plastics are so pervasive that once microplastics have entered the environment, it is currently impossible to remove them.

Plastics have very concerning direct impacts on human health, with strong evidence for a range of health problems. Workers at plastic production plants have increased risks of haematological malignancies like lymphoma and leukaemia as well as brain and breast cancer.⁴

Plastics are so ubiquitous that we are all at risk. One recent study published in March 2024 has found that patients with asymptomatic carotid artery plaque in which microplastics and nanoplastics were detected had a higher risk of

a heart attack, stroke, or death from any cause at 34 months of follow-up, compared with those in whom these plastic fragments were not detected.¹⁰⁸

Different chemicals can leach from our plastic water bottles, utensils and skin products to enter our bodies. Microplastics under 100 nanometers in size can reach almost all organs after entering the human body^{109,110} with effects arising from the plastic polymers, stabilisers, additives and other materials found within the plastics. These are linked to serious health issues such as hormone disruption, weight gain, insulin resistance, reduced reproductive health, and cancers.^{4,109,111}

The extremely concerning health impacts of fossil fuel-derived plastics, further underscores that coal, oil and gas are health hazards and that we need to phase out fossil fuels to protect health.



4. Biodiversity loss

Biodiversity refers to ‘the variability among living organisms from all sources, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems.’¹¹²

Biodiversity is declining globally, with Australia experiencing the most significant loss among continents.¹¹³

The State of the Environment Report of 2021 showed that over the past two centuries, Australia has lost more mammal species than any other continent and has one of the highest rates of species decline among countries in the Organisation for Economic Co-operation and Development. Furthermore, 19 of Australia’s 89 ecosystems are showing signs of collapse.¹¹⁴

Despite years of environmental regulation, Australia’s accelerated rates of biodiversity loss are considered to be second in the world after Indonesia.^{115,116} Fossil fuel-driven climate change is a major contributing factor in biodiversity decline,¹¹⁷ exacerbating other human-induced threats like habitat change and pollution.

This loss impacts various aspects of human health, including food systems, water quality, immunological health, infectious disease

exposure, and pharmaceutical discovery.¹¹⁸

The severity of the combined health threats of biodiversity loss and climate crisis is well understood within the medical academic community. In October 2023 an editorial ‘Time to treat the climate and nature crisis as one indivisible global health emergency’ was simultaneously published in over 200 health journals across the globe. The editorial called on ‘the United Nations (UN), political leaders and health professionals to recognise that climate change and biodiversity loss are one indivisible crisis and must be tackled together to preserve health and avoid catastrophe’ and that ‘this overall environmental crisis is now so severe as to be a global health emergency.’¹¹⁸

Biodiversity loss profoundly affects food security and is particularly evident in the impact on insects. Insects play vital roles in ecosystems that are crucial for supporting terrestrial vertebrates,¹¹⁹ including pollination, pest control, and nutrient recycling.¹²⁰ About three-quarters of crop species rely on insects for pollination, with up to 40% of certain micronutrients required for human health dependent on insect pollination, including Vitamin A.^{121,122}

Climate change factors such as temperature shifts, extreme weather and fires can disrupt insect populations, leading to reduced genetic diversity, population declines, decreased pollination,¹²³ and increased pest activity.¹²⁴ Additionally, burning fossil fuels releases



atmospheric nitrites, further threatening insect biodiversity and causing ripple effects across plant communities and other species.¹²⁵ Globally, a 50% decline in pollination could result in an additional 700,000 deaths annually from nutrition-related diseases.¹²⁶

There is increasing evidence that exposure to diverse environmental microorganisms, particularly from the soil,¹²⁷ is key to regulating immunity, digestion and reducing inflammation. A number of studies have found associations between decreased microbial diversity and increased allergen sensitisation and inflammation.¹²⁸ Long-term climate warming has been implicated in reduced soil microbial diversity.¹²⁹

Biodiversity loss also tends to heighten pathogen transmission and disease incidence, through alteration of the numbers, behaviours and physiological robustness of hosts or vectors.¹³⁰ In Australia, climate change and biodiversity loss through habitat destruction has contributed to increased community spread of Hendra virus, lyssavirus, Ross River virus and Japanese encephalitis virus.¹³¹

Most pharmaceuticals, including antibiotics and anticancer medications, trace their origins to molecules found in natural life-forms. For instance, 10 out of the 14 major classes of antibacterials stem from natural sources.¹³² Coral reefs, the most biodiverse ecosystems globally, host a vast array of defensive chemicals with significant potential pharmacological value. Compounds from reef species are actively researched for pain relief, cancer treatment, and infection control.¹³³

However, if global warming reaches 2°C, tropical reefs, including the Great Barrier Reef, are projected to largely vanish, with frequent bleaching events already occurring.¹³⁴ Yet, only a fraction of reef biodiversity has been explored for its pharmacological potential. The National Cancer Institute in the US maintains a repository of around 80,000 plant specimens,¹³⁵ but this represents only a fraction of the known plant species, with nearly 40% of them vulnerable to climate change.¹³⁶ In essence, biodiversity serves as a crucial reservoir of potential treatments, and fossil fuel-driven climate change is rapidly depleting this invaluable resource.

Biodiversity loss is yet another way that coal, oil and gas are harming the health of humanity and the planet upon which we depend.

Fossil fuels life cycle analysis

Fossil fuels are hazardous to health due to their extraction and processing, their combustion for energy, their use as a source of plastics and as a cause of air pollution, climate change and biodiversity loss. All these things add up to profound far-reaching effects on humans and planetary health, as is summarised in Figure 2.

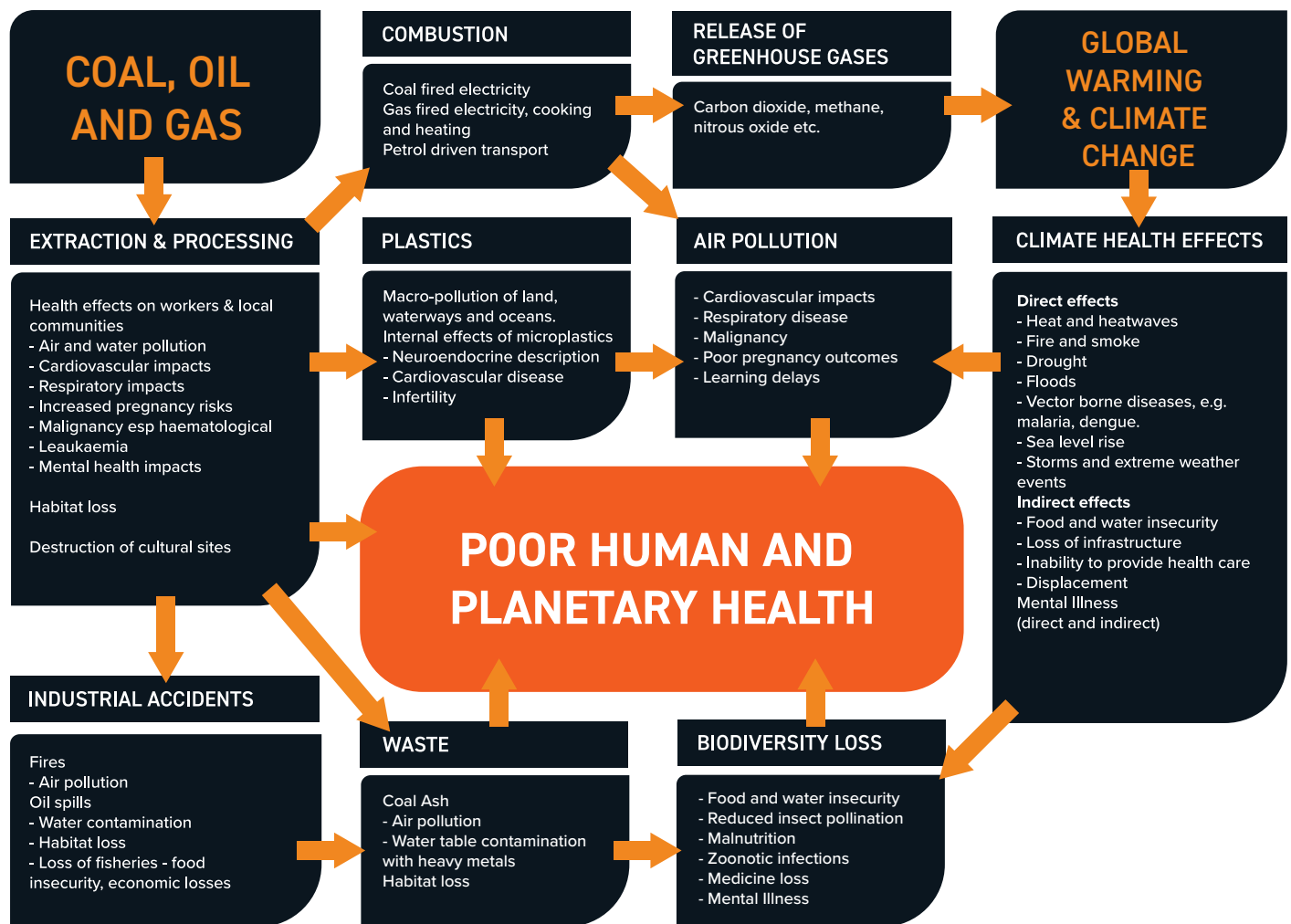


Figure 2: Fossil fuel life cycle analysis. © DEA 2024

Completing our diagnosis

As stated, the extraction, processing, utilisation and waste disposal of fossil fuels is having extensive and pervasive detrimental impacts on human health. Climate change, biodiversity loss, plastic waste and air pollution individually represent their own health crises. They each represent one of the nine planetary health boundaries that the Stockholm Resilience Centre calculates we must operate within a ‘safe zone’ in order for human civilisation to flourish.¹³⁷

It is a catastrophe that we have breached the ‘safe zone’ for climate change, biodiversity loss and novel entities (of which plastic is the most common). We are also in the danger zone for land system change, fresh-water change and biogeochemical flows and despite currently being in the safe zone for aerosols this report demonstrates the multiple dangers of air pollution.

The combination of all these assaults on our planet’s health means we face ecosystem collapse, where the fundamental physical processes upon which human life depends are put at risk. It would be a grave error to not grasp what this danger means for all of us in terms of food and water supply, economic turmoil and civil unrest. It would be equally grave to not recognise the malign influence of the coal, oil and gas industry in causing this global health emergency.

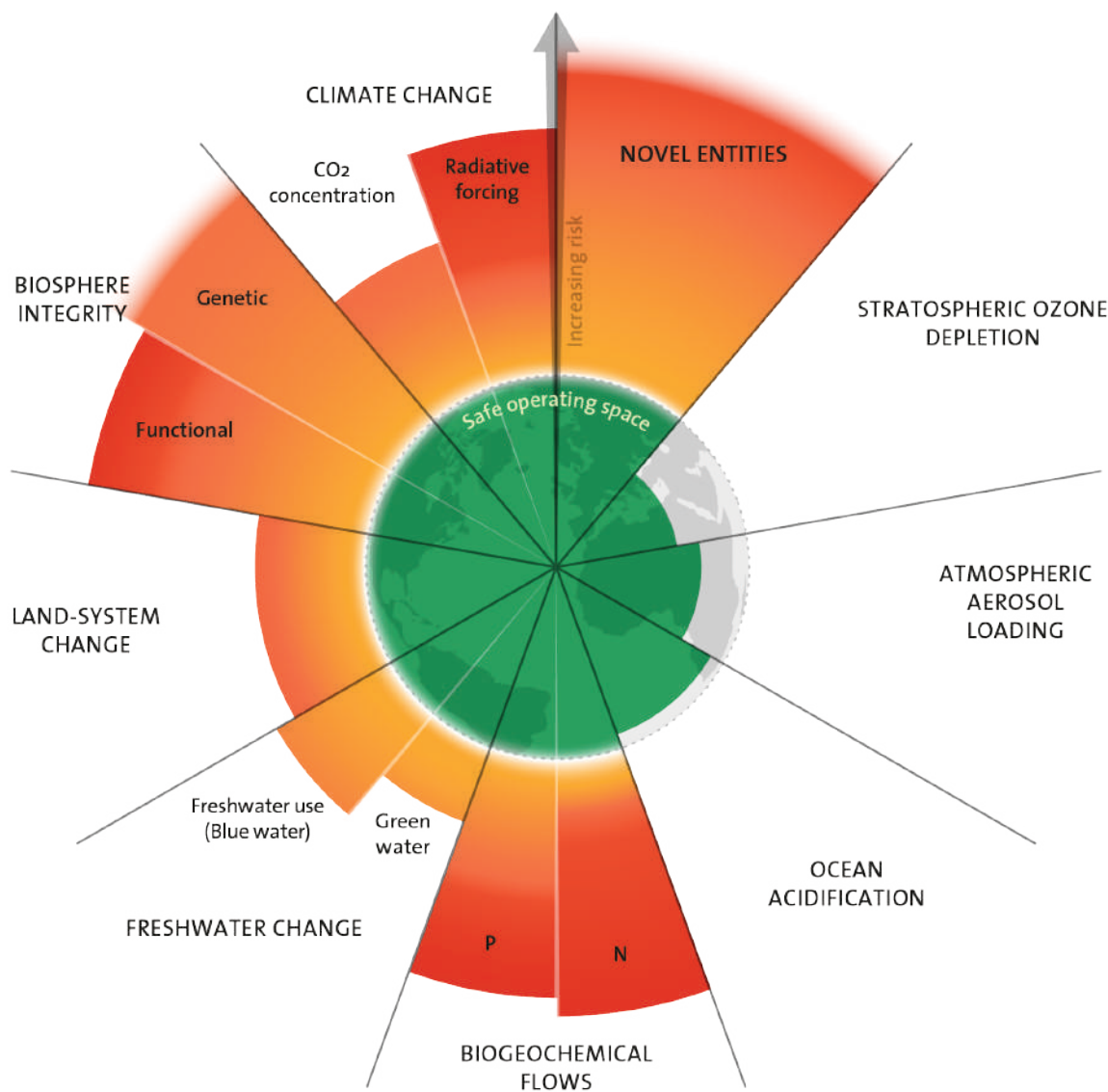


Figure 3 The 2023 update to the Planetary boundaries. Licensed under CC BY-NC-ND 3.0. Credit: “Azote for Stockholm Resilience Centre, based on analysis in Richardson et al 2023”.



Part 2: Treatment Plan

The most essential step we must take is to rapidly phase out fossil fuels.

Similar to addressing the health impacts of tobacco by first quitting smoking, to address the health impacts of fossil fuels we must first quit coal, oil and gas. This precautionary approach has been applied to other health hazards like asbestos, engineered stone-bench tops, and Dichlorodiphenyltrichloroethane (DDT) where recognition of their dangers prompted government regulations to cease their use.

Regrettably, fossil fuels are embroiled in many aspects of our lives and our dependence on them has become deeply entrenched. Their seeming advantages for modern living mean we have become addicted to fossil fuels and are blinded to the severe short and long-term harms they inflict.

To achieve a rapid phase out of coal, oil and gas requires the concerted efforts of all levels of government, our industries and ourselves. This is the most complex of all systems problems and it is only by a widespread understanding and universal action that we can effectively treat the health hazard of fossil fuels.

We cannot continue down this path and expect to lead healthy, long and prosperous lives. The reality is that we are inflicting intergenerational injustice on future generations creating a world that is increasingly inhospitable and unhealthy. To avert this grave calamity widespread change and cooperation is required and we all have a role to play.

1. A treatment plan for Governments

Ban all new fossil fuel projects and accelerate investment in renewables

In 2021, the International Energy Agencies (IEA's) 'Net Zero Emissions by 2050: A Roadmap for the Global Energy Sector' report stated that 'Achieving net zero emissions by 2050 will require nothing short of the complete transformation of the global energy system'.¹³⁸ At that time, they found that global pledges to reduce carbon emissions were inadequate to reach the agreed goal of keeping global heating to 1.5°C.

In its most recent analysis in September 2023, the IEA states that a significant downturn in demand for fossil fuels now and modelled into the future is required to achieve the greenhouse gas reductions necessary to achieve the target of the landmark international Paris Agreement.¹³⁹

There were 124 new fossil fuel projects on the Federal Government's Resource and energy major projects: 2023 list,¹⁴⁰ ten more than at the end of 2021. If all the listed projects proceed, they are projected to contribute over 4.8 billion tonnes of emissions by 2030.¹⁴¹ For context, the global carbon budget to give us a 2 in 3 chance of limiting warming to 1.5°C is 92 billion tonnes.¹⁴² These Australian projects alone would consume over 5% of the global budget by 2030.

Notably, this estimate does not include significant proposed gas fields like the Beetaloo Basin¹⁴³ with its estimated lifetime emissions of up to 3.2 billion tonnes¹⁴⁴ nor the planned Australian gas project, Burrup Hub, which has estimated lifetime emissions of 6.1 billion tonnes.¹⁴⁵ Combined, these two gas fields alone would consume over 10% of the global carbon budget for limiting global heating to 1.5°C.

Scientists calculate that for every 1,000 tonnes of carbon burned, one human being dies prematurely, meaning these two projects will be responsible for 3.2 million and 6.1 million premature deaths respectively.¹⁴⁶

While fossil fuel exports are not counted towards Australia's carbon budget under the Paris Agreement, no matter where they are burned they still add greenhouse gases to our atmosphere and impact the health and wellbeing of the Australian people. This is clearly contrary to the spirit of the Paris Agreement and the urgent need to cut emissions to net zero.

The Australian Government should be called upon to stop all new projects and do the important work of restructuring Australia's fossil fuel-based economy to one which safeguards our future.

Stop financial subsidies to fossil fuel industries and redirect them to carbon-free initiatives

While the world was experiencing the hottest year on record in 2023, fossil-fuel subsidies surged to a record US\$7 trillion.¹⁴⁷ In 2022, global investment in renewable energy was just US\$0.5 trillion. Even adding the investment in energy transition technologies (including energy efficiency) of US\$1.3 trillion¹⁴⁸ the disparity of investment is stark at a time of climate emergency.

In Australia, subsidies to fossil fuel producers and major users from all governments totalled \$14.5 billion in 2023–24, an increase of 31% on the \$11.1 billion recorded in 2022–23.¹⁴⁹

What adds insult to this injury are reports regarding the paltry amount of tax our nation receives from the fossil fuel industry. As found recently in an analysis by The Australia Institute, the Australian Government receives more revenue from the Higher Education Contribution Scheme than from the Petroleum Resource Rent Tax.¹⁵⁰ Market Forces analysis reports that in 2022 some fossil fuel companies, like ExxonMobil and Shell paid no tax at all.¹⁵¹

The fossil fuel industry should be expected to pay for the damage their products are causing



and taxed accordingly. The financial subsidies currently being enjoyed by the fossil fuel industry would be better spent on renewable energy and social equity measures in preparation for our increasingly hotter environment.

Ban fossil fuel advertising and industry sponsorship, just like we did with smoking

Fossil fuel advertising and sponsorship should be banned in recognition of their harmful effects on health and the environment. By its very definition, advertising seeks to persuade consumers to purchase a product and when that product is responsible for climate change, air pollution, plastic pollution and biodiversity loss, it is the responsibility of governments to legislate for its prohibition.

In 2020/21, the fossil fuels sector collectively spent \$238.8 million on advertising in Australia,¹⁵² persuading the people of our country to continue to use harmful coal, oil and gas.

Tobacco advertising bans spoke to the truth that smoking is hazardous to health. They have been successful in reducing public acceptance of tobacco and changing the normative behaviour of our community. We used to smoke on planes, in hotels and at the doctor's — a situation that seems outlandish today.

As we have shown, fossil fuels represent an even greater health hazard and should be subjected to rigorous government regulations

to protect human health.

As with tobacco, a nationwide ban on advertising and sponsorship by the fossil fuel sector would erode public support for their product and ease the whole-of-economy transition to clean energy sources that is required. It is unconscionable that the fossil fuel industry is currently allowed to peddle their harmful products on the backs of our children's sports uniforms, at major sporting events and during prime-time television.

A number of jurisdictions in Australia are to be congratulated for their regulations on fossil fuel advertising including the Cities of Sydney, Fremantle, Maribyrnong and Yarra,¹⁵³ leading the way for more widespread restrictions.

Ban single use and non-recyclable plastics and switch to reusable and/or compostable products

States and territories have various levels of bans on a range of single use plastic items, predominantly in food retail, such as cutlery, plates, and carry bags,¹⁵⁴ but these measures are piecemeal and do not address the pervasive nature of these materials.

Plastics recycling cannot be considered a sufficient method to reduce harm considering that, of all plastic ever produced, only around 9% has been recycled¹⁵⁵ — the rest contaminates our waterways, oceans, land and animal life. Furthermore, recycling cannot



protect from microplastics, nanoplastics and forever chemicals, which persist regardless.

The Australian healthcare sector alone produces 1.25 million tonnes per year of plastic waste that largely goes straight to landfill.¹⁵⁶ While there is active research to reduce carbon emissions and improve environmental performance of materials by using plant-based polymers,¹⁵⁷ the role of governments is to provide the regulatory and policy frameworks that hasten this work and direct capital into these technologies to bring them to market. A ban on single use and non-recyclable plastics is part of the necessary regulatory structure.

Australia being signatory to the Global Plastics Treaty auspiced by the United Nations Environment Programme (UNEP)¹⁵⁸ would be a positive step forward in reducing our global overuse of plastics. Such a scheme needs to be mandatory to be effective.

Protect biodiversity and ban native forest logging

It is time to give our natural world the protection it so desperately needs. As the State of the Environment Report 2021¹¹⁴ clearly demonstrates, biodiversity in this country is in decline, threatening the health of our ecosystems and ourselves.

Biological diversity is critical to human health. We depend on healthy and intact ecosystems for immune functioning, clean water, oxygen, temperature regulation, for potential

pharmacological treatments and much more.¹⁵⁹

At the very least, we need to ban native forest logging across all Australian states and territories to protect nature and as a way to reduce global heating. Old growth, remnant and high conservation value forests should be permanently protected and plantation forests managed sustainably.¹⁶⁰

While recognising that federal regulatory changes are currently afoot in this space with the Nature Positive Plan¹⁶¹ and reforms to the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act),¹⁶² the pace is grindingly slow and the scope uncertain. It is willful duplicity to continue to drive climate change through continued support of fossil fuel expansions while promoting peripheral changes to biodiversity conservation measures that are clearly not equal to the task.

Prepare healthcare and the wider community for what we can no longer avoid

The health impacts of coal, oil and gas are affecting us in the present-day,^{1,3,4,7,14} placing a health burden on the populace and our healthcare systems. There are welcome initiatives by state and federal governments to prepare for the impacts of global warming on health demonstrating understanding of the need to treat this health hazard.

The National Health and Climate Strategy in particular, sets out a “whole-of-government plan for addressing the health and wellbeing



impacts of climate change, whilst also addressing the contribution of the health system – encompassing public and preventive health, primary and secondary health care, and aged care – to climate change.”¹⁶³

This robust plan has four key aim, namely to:

1. Increase the resilience of the healthcare system to climate health impacts
2. Decarbonise healthcare to achieve net-zero for this sector
3. Collaborate internationally to improve our capability for resilience and decarbonisation
4. Adopt a “Health in All Policies” approach.

This last aim encompasses a whole-of-government approach to climate adaptation and mitigation recognising the relationship between health and climate outcomes and seeks to adopt a collaborative approach with the states and territories. Areas of collaboration include heat wave preparedness, reducing air pollution, dietary change, agriculture and land management, active transport, the built environment and climate-resilient housing.¹⁶³

Health in All Policies is to be commended for addressing the complexity of carbon mitigation and the multi-faceted approach required to achieve sustainable health outcomes. It shows us that widespread engagement across portfolios, levels of government and sectors of industry is sorely needed to treat the health

harms being caused by fossil fuels, recognising the complex interplay between these sectors, our climate and our environment.



2. A treatment plan for the private sector

Be leaders not laggards

As Australia's governments struggle to step up to weaning our economy from fossil fuels, there are industry leaders emerging who are, at least on face value, seeking to contribute to achieving net zero.

Some examples are Australia's Heavy Industry Low-carbon Transition Cooperative Research Centre (HILT CRC) which works with more than 50 industry and university partners across Australia and internationally to progress a low-carbon transition in the sector.¹⁶⁴ The Climate Leaders Coalition, with membership from many well known industries, are working towards net zero through providing case studies and support for CEOs to reduce the carbon footprints of their businesses.¹⁶⁵ The Australian Industry Energy Transitions Initiative is focused on decarbonising supply chains across Australia.¹⁶⁶

However, the fossil fuel sector organisations continue to resist change by making significant donations to major political parties¹⁶⁷ rather than putting these resources towards transitioning to carbon-free technologies. We need industry voices speaking to governments and applying pressure to move away from our reliance on fossil fuels to dilute the influence of the fossil fuel lobby.

This includes the health industry. Our healthcare system is estimated to cause

between 5.3 and 7% of Australia's domestic emissions,^{168,169} so we have a responsibility to address our own carbon footprint while advocating for change in governmental policy.

As a doctors' organisation, DEA calls on our medical colleges and the AMA to continue to lobby for a phasing out of fossil fuels to protect health

Making things better

Organisations of all types and sizes can lead by divesting from investment in the fossil fuel industry and choosing wisely where their money does go. Any business can now choose financial institutions to manage their funds which do not invest in fossil fuels, or superannuation funds that avoid carbon-intensive investments. The information is easy to find^{170,171} and draws power away from the fossil fuel sector.

Other ways that small and large businesses can reduce their carbon footprint and improve health outcomes is encompassed by the mnemonic B.E.T.T.E.R, which addresses mitigation and adaptation options via Buildings, Energy, Transport, Trees, Electronics and the three R's (Reduce, Reuse, Recycle). See Table 1

Area	Mitigation and Adaptation Options
<p>B</p>	<p>Buildings: Insulation of ceilings, floors, walls, roofs, window frames. Passive cooling design for new buildings Use of natural light Light coloured roofs</p>
<p>E</p>	<p>Energy: Solar panels and batteries Source electricity from a renewable energy provider Turn off products when not in use Use LED lights</p>
<p>T</p>	<p>Transport: Provide bike racks to encourage cycling to work Consider EV chargers Reduce travel by using online meeting options</p>
<p>T</p>	<p>Trees: Provide shade Support local habitat Improve mental health</p>
<p>E</p>	<p>Electronics: Online meetings to reduce travel Reduce unnecessary streaming Avoid replacing electronics that still work Empty your email box</p>
<p>R</p>	<p>Reduce, Reuse, Recycle: Reduce unnecessary consumption Reuse whenever possible rather than buying a new item Recycle properly especially avoid contaminating recycling with un-recyclable options</p>

Table 1 - Makings things better © DEA 2024



3. A treatment plan for individuals

Individuals can make a difference

When we consider the health hazards of coal, oil and gas it's easy to be overwhelmed by the scale and magnitude of the problem and wonder how we as individuals can really make a difference. But individuals can make positive choices and we can all direct our energy to reducing our use of fossil fuels and to advocating to our governments to do the same. Together our individual actions help transform our society and the more of us acting for our planet's health the better the outcome will be.

Use public and active transport

The benefits of public and active transport are well known. Reducing sedentary behaviour and increasing physical activity is the cornerstone of every health management plan, improves mental health and wellbeing¹⁷² and reduces hypertension¹⁷³. Buses and trains can reduce greenhouse gas emissions by up to two-thirds per passenger per kilometre, compared to private vehicles¹⁷⁴ and are seen as crucial to curbing climate change.¹⁷⁵ Affordable active transport like walking and cycling are not only good for health, but promote better air quality, stronger communities and social equity.¹⁷⁶

Electrify our homes & transport with renewable energy

The health harms of gas cooking and heating in the home are outlined in Part 1 of this report. Reducing pollutants like nitrous oxide and carbon monoxide in the home improves health by removing exposure to known respiratory irritants and systemic poisons.

Heating air and water is much more efficient with electric heat pumps than gas. Premium heat pumps can heat a room at 600% efficiency, while gas heaters are around 50% to 95% efficiency.¹⁷⁷ Electric vehicles are becoming progressively more competitive in their purchase price and cost much less to run than petrol fuelled cars.¹⁷⁸ Switching to renewable electricity can save money, as well as protecting health.

Government policy has an important role to play in this electrification. While some in our society may be able to afford the costs involved, for many people this is an unaffordable impossibility and all levels of government have a responsibility to ensure everyone in our society is equally supported.



Reduce meat consumption and eat more plant based food

About a third of all human-caused greenhouse gas emissions is linked to food.¹⁷⁹ Animal-based foods are associated with higher estimated environmental impacts, whereas increased consumption of plant-based foods is associated with estimated lower environmental impact.¹⁸⁰

The Planetary Health diet is designed to provide healthy nutrition and reduce emissions. This diet is low in animal products, like beef and lamb and high in plant based foods like vegetables and grains.¹⁸¹ The health benefits of such a diet include reducing the risk of developing non-communicable diseases such as cardiovascular disease, diabetes, and cancer.¹⁸²

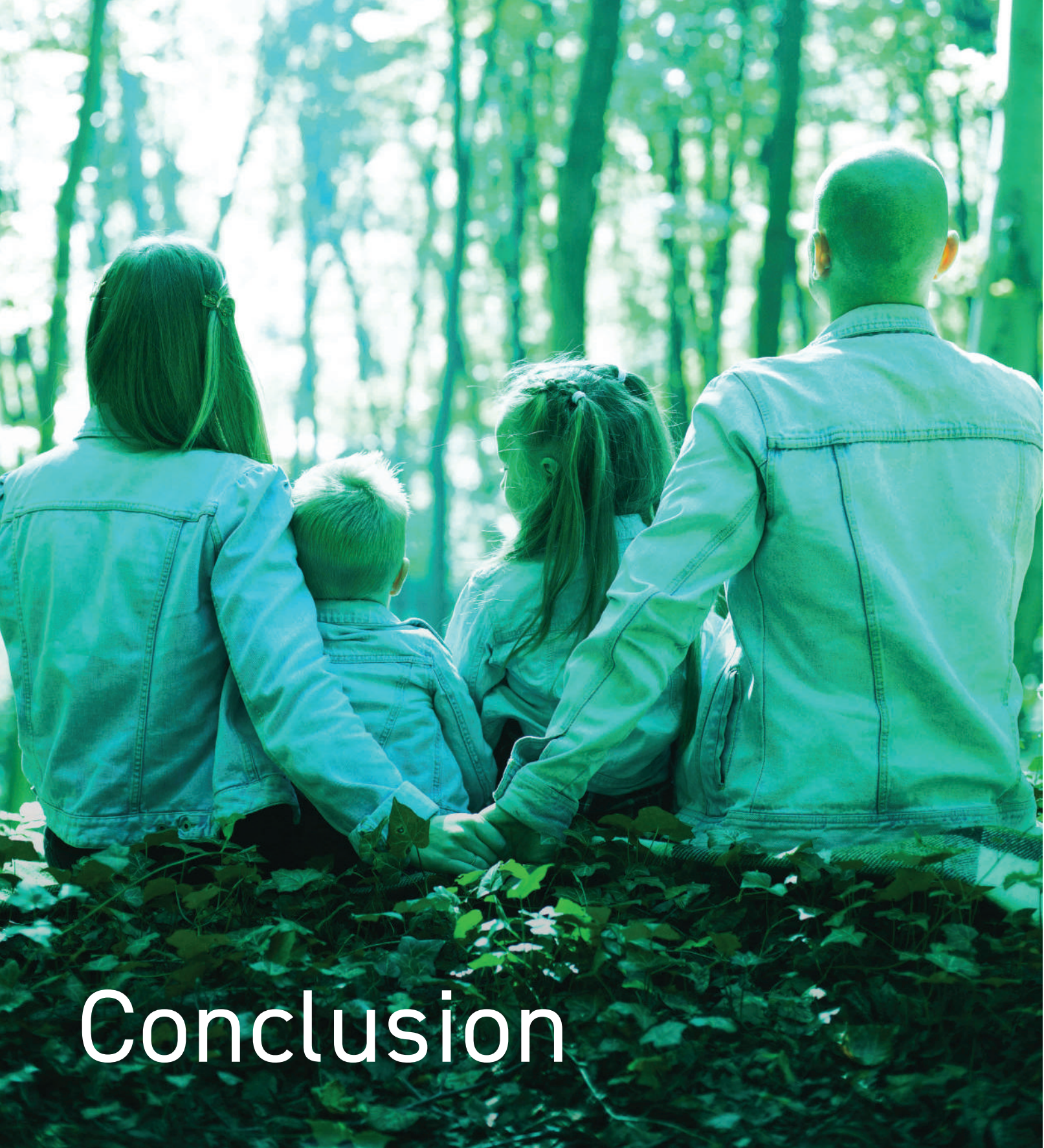
Healthy investment

Using banks, financial institutions and superannuation providers that do not lend or support fossil fuels sends a clear signal to the finance sector that they need to practise responsible lending. Almost every adult has money in a bank and the decisions we make about where to put our money can make a big difference to the future.

Become politically active

In our democracy we all have the right to speak with our elected representatives about the issues we care about. A politician's job is to represent our interests, and we can tell them what we value and how they need to best represent us.

Engaging with our elected representatives around the hazardous health harms of fossil fuels makes them more likely to represent those views when designing legislation and on the floor of Parliament.



Conclusion

A multimodal approach

Fossil fuels are causing harm to humans and our environment. Coal, oil and gas are implicated as primary causes of climate change, global air pollution, biodiversity loss and plastic pollution, each of which are causing immense health harms and in combination are threatening the very livability of our planet.¹³⁷ The need for widespread concerted action cannot be overstated.

It is a tragedy of our time that our use of coal, oil and gas is so intertwined into our energy generation, transport, buildings and agriculture¹⁸³ that many of us find it hard to imagine how we can continue our lives without them.

Perhaps the only good thing that has come from the Covid-19 pandemic, is that it showed how quickly we can institute widespread changes when there is great need. Let's apply that same thinking to the health hazard of fossil fuels, whose capacity for harm far exceeds that of the global pandemic.

We need combined action, approaching this problem from the levels of government, industry and individuals, each group working together to phase out fossil fuels as quickly as possible.

Our governments have a responsibility to ban all new fossil fuel projects and cease any subsidies that prop up this hazardous industry. They have an obligation to do this in a way that is equitable for all members of our society no matter their income, location or social standing.

Governments need to create the environment necessary for our industries to move forward into a renewable energy future with confidence. Equally these industries have a responsibility to reduce their own use of fossil fuels and support positive governmental action.

Government and industry are fundamentally made up of individuals and again each of us has a responsibility to work towards phasing out fossil fuels to protect health, reducing their use in our own lives and encouraging our friends, families and workplaces to do the same.

This multimodal approach is our best chance of ensuring a healthy future, where human civilisation can thrive and prosper.

Let's cooperate across jurisdictions, across society and party lines to protect ourselves from the severe detrimental effects of coal, oil and gas.

Let's treat the health hazard that is fossil fuels, because fundamentally our planet is worth saving, and so are we.

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Doctors for the Environment Australia (DEA) is an independent, self-funded, non-government organisation of medical doctors and students in all Australian states and territories. DEA's work is based on the premise that humans need a future with clean air and water, healthy soils capable of producing nutritious food, a stable climate, and a complex, diverse and interconnected humanity whose needs are met in a sustainable way. We are therefore interested in environmental protection and restoration to promote human health and social stability, and clean energy to reduce the impacts of fossil fuel industries on human health.

Our members work across all specialties in community, hospital, and private practice, including Aboriginal community-controlled health services.