Renewable Energy Target Scheme

Report of the Expert Panel

August 2014

ISBN 978-1-922098-74-0

15 August 2014

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Prime Minister
Parliament House
CANBERRA ACT 2600

The Hon Joe Hockey, MP
Treasurer
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The Hon Ian Macfarlane, MP
Minister for Industry
Parliament House
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The Hon Greg Hunt, MP
Minister for the Environment
Parliament House
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Dear Prime Minister, Treasurer and Ministers

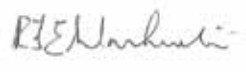
In accordance with our Terms of Reference we are pleased to present our report on the Renewable Energy Target scheme.

The Panel received more than 23,000 submissions and held over 100 separate meetings with interested stakeholders across Australia. In addition to these meetings and submissions the Panel also drew on modelling analysis of the impact of the scheme on the electricity market. This was undertaken by ACIL Allen Consulting, whose full report forms a companion document to the Panel's Report and is attached.

Our report concludes that the costs of the scheme to the community outweigh its benefits and that significant change is required. The report presents recommendations for the Government's consideration to achieve this.

In preparing its report the Panel was supported by a Secretariat based in the Department of the Prime Minister and Cabinet. We record our appreciation for their consistently professional and diligent assistance. We also record our appreciation for the time and effort of those who made submissions and met us during the course of the review.

Yours sincerely




Dick Warburton AO LVO (Chair) | Dr Brian Fisher AO PSM | Shirley In't Veld | Matt Zema

EXECUTIVE SUMMARY

Key points

- The objectives of the Renewable Energy Target (RET) are to: encourage the additional generation of electricity from renewable sources; reduce greenhouse gas emissions in the electricity sector; and ensure that renewable energy sources are ecologically sustainable.
- The RET has encouraged significant new renewable electricity generation, which has almost doubled as a result of the scheme. Installations of small-scale systems have exceeded expectations, with output from these systems already exceeding levels anticipated for 2020. To date, the RET has delivered a modest level of emissions reductions.
- With the renewables industry now established in Australia, the main rationale for the RET hinges on its capacity to contribute towards the Government's emissions reduction target in a cost effective manner. However, the RET is a high cost approach to reducing emissions because it does not directly target emissions and it only focuses on electricity generation. It promotes activity in renewable energy ahead of alternative, lower cost options for reducing emissions that exist elsewhere in the economy. In the presence of lower cost alternatives, the costs imposed by the RET are not justifiable.
- The economic landscape has changed significantly since the current RET was adopted in 2010. In particular, demand for electricity has been declining and forecasts for electricity demand in 2020 are now much lower. Rather than adding generation capacity to meet growth in electricity demand, the RET is contributing to a large surplus of generation capacity.
- The current RET would require a further $22 billion cross-subsidy to the renewables sector in net present value (NPV) terms over the remainder of the scheme (in addition to the $9.4 billion cross-subsidy provided from 2001 to 2013) and encourage more than $15 billion (in NPV terms) of additional investment in renewable generation capacity to 2020. This investment comes at the expense of investment elsewhere in the economy and the additional generation capacity is not required to meet the demand for electricity.
- Analyses suggest that, overall, the RET is exerting some downward pressure on wholesale electricity prices. This is not surprising given that the RET is increasing the supply of electricity when electricity demand has been falling. Artificially low wholesale electricity prices can distort investment decisions in the electricity market and are unlikely to be sustained in the long term. Over time, all other things being equal, wholesale electricity prices could be expected to rise to better reflect the cost of generating electricity.
- The direct costs of the RET currently increase retail electricity bills for households by around four per cent, but modelling suggests that the net impact of the RET over time is relatively small. The impact on retail electricity prices for emissions-intensive trade-exposed businesses and other businesses is significantly greater. The RET does not generate an increase in wealth in the economy, but leads to a transfer of wealth among participants in the electricity market.
- The Expert Panel has recommended options to the Australian Government for both the Large-scale Renewable Energy Target and the Small-scale Renewable Energy Scheme. The Panel considers the Government should emphasise alternative, lower cost approaches to reducing emissions in the Australian economy. In putting forward its recommendations, the Expert Panel has been mindful of the impacts particular options will have on those who have invested in renewables on the basis of the RET as currently legislated.

The Renewable Energy Target review

On 17 February 2014, the review of the Renewable Energy Target (RET) scheme was jointly announced by the Hon Ian Macfarlane MP, the Minister for Industry, and the Hon Greg Hunt MP, the Minister for the Environment. The Australian Government appointed an Expert Panel (the Panel) to undertake the review, comprising Mr Dick Warburton AO LVO (chair), Dr Brian Fisher AO PSM, Ms Shirley In't Veld and Mr Matt Zema, with support provided by a Secretariat in the Department of the Prime Minister and Cabinet.

The Terms of Reference for the review direct the Panel to examine the operation, costs and benefits of the RET, including the economic, environmental and social impacts, the extent to which the objectives of the scheme are being met and the interaction of the RET with other Commonwealth and state and territory policies.

The Panel consulted with a wide range of stakeholders to inform its review. The Panel received around one thousand general submissions and over 23,000 campaign submissions and held meetings with over 200 different stakeholders around the country.

To assist the Panel, ACIL Allen was commissioned to model scenarios that examine the impacts of the RET as it stands and potential changes to the scheme. While this modelling and other modelling provided by stakeholders has helped the Panel understand the impacts of the RET, the Panel recognises the limitations inherent in these exercises. In forming its recommendations, the Panel has considered the modelling results alongside the information received in submissions and stakeholder meetings.

The objectives and impacts of the RET

The RET has been operating in various forms since the Mandatory Renewable Energy Target (MRET) commenced in 2001. As set down in legislation, the objectives of the RET are to: encourage the additional generation of electricity from renewable sources; reduce greenhouse gas emissions in the electricity sector; and ensure that renewable energy sources are ecologically sustainable. The expanded RET scheme, which commenced in January 2010, is designed to ensure at least 20 per cent of Australia's electricity comes from renewable sources by 2020. To achieve this, the legislation contains annual targets for large-scale renewable generation, expressed in gigawatt hours (GWh) that rise each year to 41,000 GWh in 2020. It also provides upfront support for the installation of small-scale renewable energy systems.

The Panel found that the RET has broadly met its objectives. It has encouraged significant additional renewable electricity generation, with output from large-scale renewable generators having almost doubled as a result of the scheme. Installations of small-scale systems have exceeded expectations, with output from these systems already exceeding levels anticipated for 2020. To date, the RET has delivered a modest level of carbon dioxide equivalent (CO_2-e) emissions reductions. Commonwealth, state and territory environmental regulation provides a framework for ensuring that the RET promotes the use of ecologically sustainable renewable energy sources.

Since the current RET scheme commenced the economic landscape has shifted significantly, leading to questions about whether the objectives for the RET remain appropriate. Over the past five years demand for electricity has been significantly lower than forecast and electricity demand in 2020 is now expected to be much lower than when the current RET was adopted. At the same time the cost of renewable technologies has fallen, particularly for rooftop solar photovoltaic (PV) systems. These factors mean that the RET could achieve a 26 per cent share of electricity from renewable sources by 2020.

Australia's climate change policy framework has also changed since the expanded RET scheme began. The Government is committed to achieving Australia's five per cent CO_2-e emissions reduction target through the Direct Action Plan. In particular, the Government has repealed the carbon tax and intends for the $2.55 billion Emissions Reduction Fund (ERF) to be the primary mechanism to reduce CO_2-e emissions.

Under current settings, the RET could be expected to result in a further $22 billion cross-subsidy to the renewables sector (in NPV terms) over the remainder of the scheme (in addition to an estimated $9.4 billion (NPV) provided over the period 2001 to 2013) and encourage additional investment of $15 billion in new renewable generation capacity. However, this investment is not required to meet likely growth in the demand for electricity, which could largely be met from existing generation capacity. Hence, the RET would be diverting resources from more productive uses elsewhere in the economy, lowering productivity and national income. While the RET has visibly increased employment in the renewable energy sector, this has come at the cost of (less visible) reduced employment in other sectors.

Analyses suggest that, overall, the RET is exerting some downward pressure on wholesale electricity prices, largely because it is contributing to an increase in the supply of electricity when electricity demand has been falling. However, the net impact of the RET on retail electricity prices and electricity bills appears to be small and does not diminish the economic costs associated with the scheme. Also, it does not represent an increase in wealth in the economy, but a transfer of wealth among participants in the electricity market. In addition, artificially low wholesale electricity prices can distort investment decisions in the electricity market and are unlikely to be sustained in the long term. Over time, all other things being equal, electricity prices could be expected to rise to better reflect the cost of generating electricity.

With the renewables industry now established in Australia, the main rationale for the RET hinges on its capacity to contribute towards the Australian Government's CO_2-e emissions reduction target in a cost effective manner. However, the RET is a high cost approach to reducing CO_2-e emissions because it does not directly target CO_2-e emissions and it only focuses on electricity generation. It promotes activity in renewable energy ahead of alternative, lower cost options for reducing CO_2-e emissions that exist elsewhere in the economy.

Although many representatives of the renewables sector favour at least maintaining the current RET, the Panel is of the view that the interests of the broader community should take precedence and that, as the RET in its current form is imposing significant costs on the economy, it should be substantially reformed, with greater emphasis placed on lower cost alternatives for meeting the Australian Government's CO_2-e emissions reduction target.

Options for reforming the Large-scale Renewable Energy Target (LRET)

The Panel considered various options proposed by stakeholders for reforming the LRET. These include extending the target to achieve a 'real 30 per cent' share of generation by 2030, reducing the target to achieve a 'real 20 per cent' share of generation in 2020, setting a target that corresponds to a '50 per cent share of new growth' in electricity demand, 'closing the LRET to new entrants' and 'repealing' the LRET scheme.

Setting a target to achieve a 'real 30 per cent' share of renewables by 2030 would have the effect of reducing the 2020 target (although it would still be higher than a 'real 20 per cent' target) and allowing the targets to rise between 2020 and 2030. The Panel considers that the adoption of a higher target and/or extension of the scheme beyond its current timeframe are inconsistent with the objective of reducing the cost of the scheme and would prolong a relatively inefficient approach to reducing CO_2-e emissions.

Adopting a 'real 20 per cent' target would involve reducing the legislated target for large-scale renewable generation to a level consistent with 20 per cent of the latest projections of electricity demand in 2020, taking into account higher than previously expected growth in small-scale renewables. While many stakeholders were in favour of this approach, the Panel is concerned about fixing targets once again in legislation based on electricity demand forecasts that are inherently uncertain. If electricity demand to 2020 is higher or lower than currently forecast, a 'real 20 per cent' target will not be achieved, and if demand is lower than forecast, the RET will continue to add generation capacity that is surplus to the requirements of the

market. Consequently, if the Government wishes to consider a 'real 20 per cent' target, the Panel suggests that targets be periodically updated as electricity demand projections are revised.

Stakeholders in the renewables industry expressed concerns that complete repeal of the legislation would substantially affect both existing and future investments, constituting sovereign risk. The Panel considers that the risk of significant policy change is better characterised as regulatory risk and is always present. Nonetheless, the Panel recognises that repeal may result in adverse financial implications for existing investors.

The Panel has therefore recommended two options to the Government for the LRET. The first is to allow the LRET to continue to operate until 2030 for existing and committed renewable generators, but closing it to new entrants, otherwise known as 'grandfathering'. This will provide investors in existing renewable generation with continued access to certificates so as to avoid substantial asset value loss and retain the CO_2-e emissions reductions that have been achieved so far. Importantly, this approach avoids the costs to the community associated with subsidising additional generation capacity that is not required to meet electricity demand.

Alternatively, the Panel suggests that the LRET could be modified to increase in proportion with growth in electricity demand, by setting targets one year in advance that correspond to a '50 per cent share of new growth'. This would protect investors in existing renewable generators and would support additional renewable generation when demand is growing. Targets would not be mandated for future years, exposing renewable energy investors to the same market risk (that future levels of electricity demand are unknown) that other investors in the sector currently face. If the current forecasts of electricity demand prove accurate, this approach would result in renewables making up a 20 per cent share of forecast electricity demand in 2020, but the share may be different if demand is higher or lower than expected. Importantly, this approach would protect the broader community from the cost of subsidising unnecessary additional generation capacity if electricity demand continues to fall.

Options for reforming the Small-scale Renewable Energy Scheme (SRES)

Small-scale renewable energy systems supported by the SRES generated or displaced around 6,400 GWh of electricity in 2013, which is above the original expectation for the SRES of achieving a minimum of 4,000 GWh of annual generation by 2020. Based on information provided during the review, the Panel considers that the significant cost reductions of small-scale solar PV systems combined with the increase in retail electricity prices means that the small-scale renewable energy industry is becoming commercially viable. Additionally, the cost of the CO_2-e emissions reductions achieved by the SRES is very high, in the order of $100-$200 per tonne and at least two or three times that of the large-scale scheme.

Given these factors, the Panel considers that there is a strong case for winding back the SRES, through either closing the scheme immediately or accelerating the phase-out of the scheme.

Modelling indicates that repeal of the SRES would have an immediate effect of reducing the install rates of rooftop PV by at least 30 per cent and the number of solar water heaters by around 16 per cent. However, by the early 2020s, the rate of small-scale solar PV systems installed each year would recover to a rate similar to that if the SRES was left in place.

If the Government is concerned about the immediate impacts of repeal of the SRES and does not wish for the industry to contract below its long-term sustainable level, rather than immediately closing the scheme the Government could bring forward its closure from 2030 to 2020. Under this approach, the Panel recommends additional measures to reduce the cost of the scheme, including earlier reductions in the levels of support (certificate deeming periods) provided for the installation of solar PV and solar water heater systems. The Panel also recommends reducing the size eligibility threshold for rooftop solar PV systems from no more than 100 kilowatts to no more than 10 kilowatts, to ensure the scheme is targeted towards households.

Exemption arrangements

The direct (certificate) costs of the RET are borne by electricity consumers, both households and businesses, through electricity prices. Businesses conducting emissions-intensive, trade-exposed (EITE) activities receive an exemption for a portion of RET costs in recognition that these businesses are price takers in a global market. Many EITE businesses claim that the current exemption is not sufficient to prevent a loss of global competitiveness as a result of the additional cost of the RET.

If adopted, the Panel's recommendations on both the LRET and the SRES would reduce the costs of the RET for all electricity consumers, including EITE businesses. The Panel does not consider that an increase in the EITE exemption is warranted in addition to these changes, as this would increase the cost of the RET faced by all other electricity users, including other manufacturers, some of which are also trade-exposed. If the Government does wish to consider extending the EITE exemption, the Panel suggests that the electricity they consume be excluded from calculations of the target in order to avoid imposing additional costs on other electricity users (although this would be difficult to achieve if the RET is closed to new entrants).

The RET also provides an exemption for entities that generate and use their own electricity - the self-generation exemption. Strict eligibility requirements result in more limited access to this exemption than appears to have been intended. The Panel therefore recommends that the self-generation exemption be amended to extend the distance limit between the point of generation and use, and to include a threshold to permit self-generators to supply incidental amounts of electricity to third parties without attracting a RET liability.

Native forest wood waste

The Panel supports the Government's election commitment to reinstate the eligibility of native forest wood waste as a renewable energy source. It considers that reinstatement should be based upon the regulations previously in place, which allowed eligibility on the condition that native forest wood waste was being harvested under a Regional Forestry Agreement, complied with relevant government planning and approvals processes, and was demonstrated to be genuine waste. The Panel has not been presented with any evidence that these regulations resulted in unsustainable logging activities.

The interaction of the RET scheme with other policies

A range of national and state based climate change and energy policies affect the renewables industry and potentially have an impact on the operation and effectiveness of the RET.

The ERF is the centrepiece of the Government's Direct Action Plan. There is some potential for duplication between the ERF and RET schemes and the Panel is of the view that projects should not be eligible for funding under the ERF if they are eligible for support under the RET. In a similar vein, the Panel considers that projects that receive support under the RET should not be eligible to receive further assistance from the Clean Energy Finance Corporation or the Australian Renewable Energy Agency.

The Panel is supportive of the continuing development of a nationally consistent energy market framework. This framework should minimise differences between jurisdictions and eliminate excess regulation and duplication. The Panel also supports the reforming of network regulation. This will minimise cross subsidies between different customers and should lead to more efficient investment and energy choices, including whether to invest in solar PV systems.

Administrative arrangements, frequency of reviews and implementation of recommendations

Based on its consultations, the Panel considers that the administration of the RET scheme is generally efficient and meets the expectations of most stakeholders. Nonetheless, it identified some areas that could be improved. The Panel has put forward suggestions that could provide greater certainty for liable entities over their RET obligations, reduce compliance costs of the scheme and improve the efficiency of the scheme's operation.

The Panel recommends that the requirement for statutory reviews be removed from legislation. The Government can initiate a review of the legislation at any time it considers appropriate and the Panel heard from a wide range of stakeholders that frequent statutory reviews undermine investor certainty, hinder the achievement of the scheme's objectives and reduce the likelihood of any renewable energy target being met.

The Panel has identified some implementation issues associated with its recommendations on the LRET, the SRES and the self-generation exemption. In general, these concern ensuring stable certificate markets and support for existing investments that were undertaken on the assumption of the continuation of the current RET scheme. The Panel considers that consultation on the detail of implementation arrangements would be required once the Government has decided its preferred approach.

LIST OF RECOMMENDATIONS

Recommendation	Detail
1	The Renewable Energy Target (RET) should be amended in light of the changing circumstances in Australia's main electricity markets and the availability of lower cost emission abatement alternatives.
2	The Large-scale Renewable Energy Target (LRET) should be amended in one of the following two ways: *Option 1 – Closed to new entrants ('grandfathering')* In order to reduce the cost of the LRET and its impact on electricity markets, the Panel recommends that the LRET should be closed to new entrants. a. The LRET is closed to new renewable energy power stations (subject to limited exceptions described below). The Clean Energy Regulator (CER) should set targets annually based on estimated output from accredited power stations. b. In addition to those renewable energy power stations already accredited under the scheme, eligibility would be extended to: i. Renewable energy power stations already under construction. ii. Renewable energy power stations to be constructed where project proponents can demonstrate that there is full financial and contractual commitment to the project (e.g., final investment decision, engineering and procurement contract) within one month of the announcement of this approach. c. The last year of the operation of the LRET is 2030. *or* *Option 2 – Share of growth in electricity demand* In order to provide support for new renewable power stations and contribute to Australia's emissions reduction target while achieving less reduction than Option 1 in the cost of the LRET, the Panel recommends that the target be set to allocate a share of growth in electricity demand to renewables in the following manner: a. The target is set annually by the CER, increasing each year to 2020 by an amount equivalent to 50 per cent of projected growth in national electricity demand, ensuring that new renewable energy power stations are only supported under the RET where electricity demand is increasing. b. Where national electricity demand is projected to remain flat or fall, the target is held at the previous year's level. c. From 2021 onwards, the target is fixed at the 2020 level until 2030, the last year of the operation of the LRET. Based on current electricity demand forecasts, this approach would achieve a 20 per cent share of renewables in the electricity generation mix by 2020.
3	The Small-scale Renewable Energy Scheme (SRES) should be amended in one of the following two ways: *Option 1 – Abolition* In order to address the cost of the SRES (and its effect on electricity markets), the Panel recommends that it be closed immediately in the following manner: a. The SRES should terminate upon announcement. b. Those who contracted before the announcement for the installation of a small-scale system should receive the certificates they would have done.

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<tr><td>3 - Continued</td><td>or

Option 2 – Bring forward the phase-out of the SRES

In order to reduce the cost of the SRES while providing some support for new small-scale renewable energy systems, the Panel recommends that the phase-out of the SRES be brought forward in the following manner, to take effect immediately:

a. Bring forward the last year of operation of the SRES from 2030 to 2020.

b. Reduce the period for which certificates may be created for rooftop solar PV systems from 15 years to 10 years, and in each year from 2016 onwards further reduce the period for which certificates may be created, as set out below:

Rooftop solar PV: period certificates may be created

<table><tr><th>Year installed</th><th>Period</th></tr><tr><td>Prior to announcement</td><td>15 years</td></tr><tr><td>From announcement</td><td>10 years</td></tr><tr><td>2016</td><td>9 years</td></tr><tr><td>2017</td><td>8 years</td></tr><tr><td>2018</td><td>7 years</td></tr><tr><td>2019</td><td>6 years</td></tr><tr><td>2020</td><td>5 years</td></tr><tr><td>2021</td><td>Scheme closed</td></tr></table>
c. Reduce system size eligibility threshold for rooftop solar PV systems from no more than 100 kilowatts to no more than 10 kilowatts.

d. Reduce the period for which certificates may be created for solar and heat pump water heaters by one year each year, commencing in 2016, as set out below:

Solar and heat pump water heaters: period certificates may be created

<table><tr><th>Year installed</th><th>Period</th></tr><tr><td>Prior to 2016</td><td>10 years</td></tr><tr><td>2016</td><td>9 years</td></tr><tr><td>2017</td><td>8 years</td></tr><tr><td>2018</td><td>7 years</td></tr><tr><td>2019</td><td>6 years</td></tr><tr><td>2020</td><td>5 years</td></tr><tr><td>2021</td><td>Scheme closed</td></tr></table></td></tr>
<tr><td>4</td><td>The current partial exemption arrangements for emissions-intensive trade-exposed businesses should be maintained.</td></tr>
<tr><td>5</td><td>The self-generation exemption should be amended to extend the one kilometre radius restriction and to permit self-generators to supply incidental amounts of electricity (below a set threshold) to third parties without attracting a RET liability. The Government should consult with affected parties to determine an appropriate distance limit and threshold for incidental off-takes.</td></tr>
<tr><td>6</td><td>The Government's commitment to the reinstatement of native forest wood waste as a renewable energy source under the LRET should be implemented through the reintroduction of the relevant regulations in force prior to 2011.</td></tr>
<tr><td>7</td><td>The requirement for statutory reviews of the scheme should be removed from the Renewable Energy (Electricity) Act 2000.</td></tr>
</table>

8	Projects, or components of projects, receiving support under the RET should be excluded from participating in Emissions Reduction Fund auction processes.
9	Projects that receive support under the RET should not be eligible to receive further assistance from the Clean Energy Finance Corporation or the Australian Renewable Energy Agency.
10	To further reduce the costs of the RET the Government should consider the following proposals to improve the operation of the scheme: a. Bring forward the dates for setting the Small-scale Technology Percentage and the Renewable Power Percentage from 31 March in the compliance year to a date prior to the commencement of the compliance year (e.g., 1 December). b. Align the acquittal of LRET and SRES obligations so that both are acquitted six monthly, and allow liable entities to carryover a shortfall of small-scale technology certificates (as is currently the case for large-scale generation certificates). c. Publish the RET liable entity with whom an EITE business will negotiate the provision of the Partial Exemption Certificate. d. Update guidelines for determining the renewable components in waste for electricity generation.
11	The Government should consult with affected parties on implementation of the Panel's recommendations for the RET including: a. Measures for ensuring that large-scale generation certificates trade in a suitable price range that provides an appropriate level of support for accredited power stations. b. Methods for setting targets. c. Setting the distance limit and threshold for third party off-takes for the self-generation exemption.
12	The Panel's recommendations for progressively reducing the deeming rate for solar PV installations and reducing the size eligibility threshold from 100 kilowatts to 10 kilowatts should take effect from the date of announcement. Transitional arrangements should be provided for parties that have entered into contracts on the basis of the current policy at the date of announcement.

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1 INTRODUCTION

1.1 About this review

The Review of the Renewable Energy Target (RET) scheme was jointly announced by the Hon Ian Macfarlane MP, the Minister for Industry, and the Hon Greg Hunt MP, the Minister for the Environment, on 17 February 2014.

The Terms of Reference state that the review is to examine the operation, costs and benefits of the RET scheme including the economic, environmental and social impacts, the extent to which the objectives of the scheme are being met and the interaction of the RET with other Australian Government and state and territory government policies. The review is to provide advice on whether the objectives of the RET scheme are still appropriate and the range of options available for reducing its impact on electricity prices. The full Terms of Reference is in Appendix A.

An Expert Panel (the Panel) was appointed to undertake the review comprising: Mr Dick Warburton AO LVO (chair), Dr Brian Fisher AO PSM, Ms Shirley In't Veld and Mr Matt Zema. The Panel was supported by a Secretariat in the Department of the Prime Minister and Cabinet.

The Panel consulted widely with interested parties to gather information for this review. A paper calling for public submissions was released on 5 April 2014 and in response the Panel received around 1,000 general submissions with a wide variety of views on the future of the RET. The Panel also received over 23,000 campaign letters and emails supporting the continuation or expansion of the scheme, including from GetUp Australia, Hepburn Wind, Australian Wind Alliance, Engineers Australia and Lighter Footprints. The Panel conducted around 100 face to face meetings with more than 200 stakeholders representing the renewables industry, electricity retailers and generators, electricity consumers, environmental and welfare groups and state and territory governments. Further details on the consultation process and submissions received are in Appendix B.

The Panel has drawn on information contained in submissions to this review throughout this report to illustrate the issues raised by and the views of various stakeholders. However, the inclusion of a quote from a submission does not mean that the Panel agrees with or endorses this material.

In addition to the submissions and stakeholder consultations, the Panel's recommendations were informed by detailed electricity market modelling undertaken by ACIL Allen for the Panel that assessed the impacts of the current RET policy and alternative options. A consultation paper on the proposed approach to key modelling assumptions was released by the Panel as part of its *Call for Submissions* on 5 April 2014. The modelling assumptions were discussed at a stakeholder workshop on 23 April 2014. Feedback from both submissions and the workshop was considered when the Panel finalised the assumptions.

Preliminary modelling results were presented at a second stakeholder workshop held on 23 June 2014 that was attended by 78 participants. After the workshop, the Panel requested ACIL Allen to model an additional scenario, the '50 per cent share of new growth' in electricity demand scenario. The final results of the modelling are referred to throughout this report and are presented in detail in ACIL Allen's report, which is a companion document to the Panel's report. The approach to the modelling scenarios is described in Chapter 4 and the executive summary of the modelling report is reproduced in Appendix C of this report.

The Panel also gave consideration to other modelling of the RET provided as part of submissions to the review.

1.2 History of the RET and context of the Review

The Mandatory Renewable Energy Target (MRET) scheme was first introduced in 2001 to achieve an additional two per cent of renewable energy in the electricity mix by 2010. In 2009, the *Renewable Energy (Electricity) Act 2000* (the REE Act) was amended, replacing the MRET with the RET. From 2010, the scheme was expanded to ensure that an equivalent of at least 20 per cent of Australia's electricity would come from renewable sources by 2020. The target increased to 45,000 gigawatt hours (GWh) of additional renewable generation in 2020, staying at that level until 2030. At the time the scheme was expanded, the Solar Credits multiplier was introduced to boost support for small-scale solar photovoltaic (PV) systems, and Partial Exemption Certificates (PECs) were introduced to provide assistance with the costs of the RET to emissions-intensive, trade-exposed businesses (EITEs).

Shortly after the expansion of the scheme there was a boom in the installation of small-scale renewable energy systems (mostly rooftop PV systems), driven by generous feed-in-tariffs introduced by state and territory governments, the Solar Credits multiplier under the RET and falling system costs. This resulted in a large surplus of Renewable Energy Certificates (RECs) in the market, causing REC prices to fall. This created uncertainty in the REC market for potential investors in large-scale renewable generation. In response, the Australian Government amended the legislation to split the RET scheme into two parts, the Large-scale Renewable Energy Target (LRET) and the Small-scale Renewable Energy Scheme (SRES). Both schemes commenced on 1 January 2011. RECs created from the installation of small-scale systems prior to the split of the schemes can be used to meet obligations under the LRET, and there remains a substantial surplus of certificates in this market equivalent to roughly one and a half times the LRET target in 2014.

When the schemes were split, it was estimated that small-scale systems would contribute at least 4,000 GWh of renewable generation to the target. To ensure that a 20 per cent share of renewables would be achieved, 4,000 GWh was subtracted from the original 45,000 GWh target to derive the current LRET of 41,000 GWh in 2020, which is fixed in legislation.

Since the commencement of the expanded RET scheme in 2010, the policy and economic landscape has changed significantly. Over the past five years demand for electricity has been significantly lower than forecast and projections of electricity demand to 2020 have been repeatedly revised down, meaning that the RET is likely to achieve a greater than 20 per cent share of electricity from renewable sources by 2020 (Appendix D explains how the percentage share of renewables can be calculated). Wholesale electricity prices in the National Electricity Market (NEM) have been falling as demand for electricity has declined while supply has increased. However, this has not been mirrored in retail electricity prices, which have increased substantially mainly due to increasing network costs. At the same time the cost of renewable technologies has fallen, particularly for rooftop solar PV systems for which installations have grown much more quickly than anticipated.

The RET was reviewed in 2012 by the Climate Change Authority which did not recommend any major structural changes to the scheme.

The Australian Government has a commitment to reduce Australia's carbon dioxide equivalent (CO_2-e) emissions by five per cent below 2000 levels by 2020 and is introducing the Emissions Reduction Fund (ERF), in place of the carbon tax, as the primary mechanism for achieving this. The Australian Government is also committed to reducing business costs, cutting red and green tape and minimising cost of living pressures.

1.3 The operation of the RET

The RET scheme is underpinned by the REE Act, the *Renewable Energy (Electricity) Regulations 2001* (REE Regulations), the *Renewable Energy (Electricity)(Large-scale Generation Shortfall Charge) Act 2000* and the *Renewable Energy (Electricity)(Small-scale Technology Shortfall Charge) Act 2010*.

The RET works by allowing renewable energy power stations and owners of small-scale renewable energy systems (solar water heaters, heat pumps, and small-scale solar PV, wind, and hydro systems) to create certificates for every megawatt hour (MWh) of renewable electricity they produce. Liable entities (generally electricity retailers) are obligated to purchase certificates and surrender them to the Clean Energy Regulator (CER) each year to demonstrate compliance with the scheme. This creates a market which provides financial incentives to both large-scale renewable power stations and owners of small-scale systems.

If a liable entity does not surrender the required amount of certificates, it must pay a shortfall charge of $65 per certificate to the CER.[1] However, because the cost of a certificate is tax deductible and the shortfall charge is not, the effective price for the shortfall charge is around $92/MWh, depending on the liable entity's marginal rate of tax.

The RET scheme contains two types of exemptions. The first is a partial exemption for businesses that are deemed to be EITE businesses. The second is for generators producing and consuming their own electricity (self-generators). Further information on these exemptions is provided in Section 7.1.

The LRET and the SRES components of the RET have separate certificate markets and obligations for liable entities. The certificates created in each of the schemes are not interchangeable.

1.3.1 The Large-scale Renewable Energy Target (LRET)

The LRET encourages additional generation from large-scale renewable energy projects, such as wind and solar farms and hydro facilities, by allowing eligible renewable energy generators to create large-scale generation certificates (LGCs) for the electricity they produce, with each certificate representing one MWh of renewable generation.

Figure 1 provides an overview of the LGC market under the LRET. The CER administers the LRET by managing the REC Registry (a secure web-based application that facilitates the creation, trade and surrender of certificates), accrediting renewable power stations and establishing the annual LRET liability by setting the renewable power percentage (RPP). The amount of LGCs that a liable entity is required to surrender each year is proportionate to its liable electricity purchases – the RPP determines this proportion.

[1] The REE Act allows liable entities to carry forward a 10 per cent shortfall of LGCs to the following year. If the shortfall exceeds 10 per cent, the liable entity is required to pay the shortfall charge.

Figure 1 LGC Market under the LRET

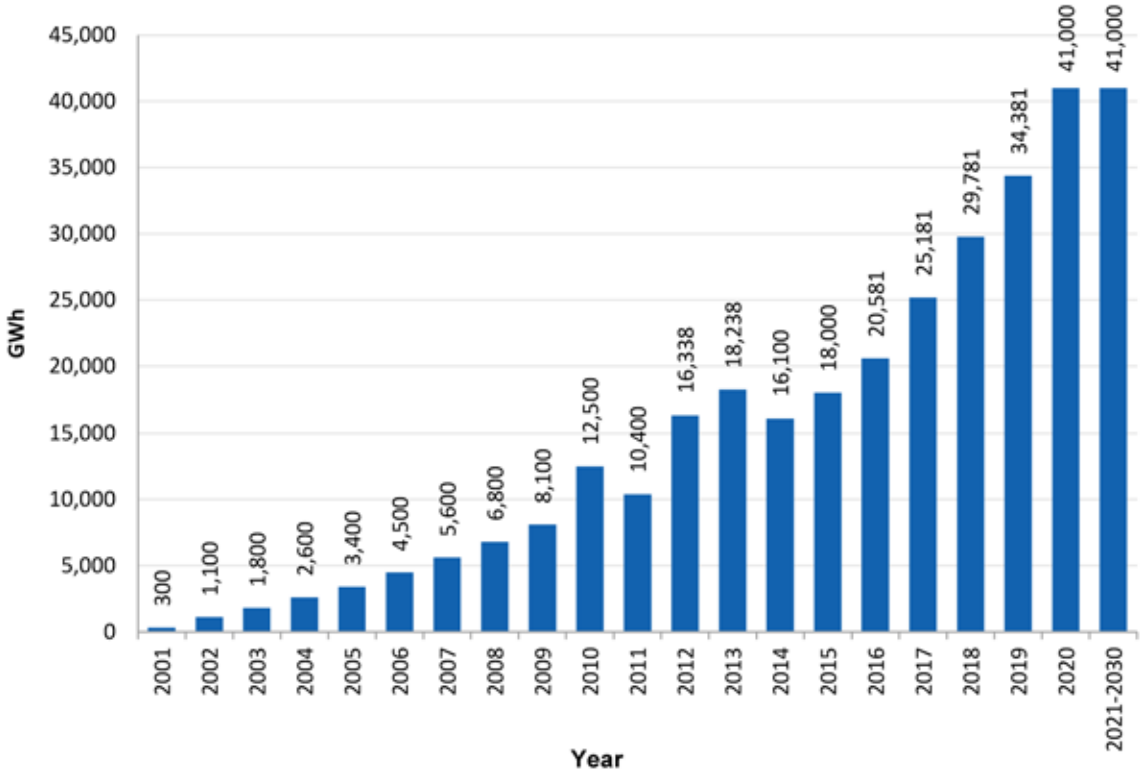
Accredited power stations can trade the LGCs they create with liable entities or other certificate traders through the REC Registry. The majority of LGCs are sold as part of a power purchase agreement (PPA), which provides a contract between a renewable generator and an electricity retailer for the purchase of both electricity and LGCs. If LGCs are not sold through contracts, they are sold in the LGC market, where the LGC spot price is determined by the supply and demand of certificates in the market. The CER does not regulate these prices.

To meet requirements under the REE Act, each year liable entities purchase and surrender LGCs equal to their liability for the previous calendar year to the CER. The purchase of PECs from EITE businesses may reduce this liability.

LGCs are only awarded for renewable generation above 1997 levels. Eligible generators producing electricity prior to 1997 (for example hydro generators) are able to create LGCs for annual generation above a set baseline, which is determined by the CER based on the electricity generated by that power station over the period 1994 to 1996.

The LRET includes legislated targets for large-scale generation each year that increase to 41,000 GWh of renewable electricity in 2020 and remain at this level until 2030. Figure 2 shows the currently legislated annual targets from 2001 to 2030.

Figure 2 Profile of annual targets under the LRET



Annual targets exclude allowance for waste coal mine gas generation
Source: Derived from data on the Clean Energy Regulator website.

As of 1 July 2012, electricity generated using waste coal mine gas (WCMG) from selected power stations that were operating prior to 2008 is also eligible to receive LGCs under the LRET, although it is not a renewable energy source. This forms part of transitional arrangements relating to the phase out of state based greenhouse gas reduction schemes and will be in place until 2020. The annual LRET targets were increased out to 2020 to account for this change. No new WCMG power stations can be accredited under the LRET.

Native forest wood waste was included as an eligible source of renewable energy when the MRET was established in 2001. In November 2011, eligibility for native forest wood waste under the four eligible sub-categories of wood waste was removed from the RET. Transitional measures were introduced for the 22 power stations that listed wood waste as an eligible energy source and are effective until 2020. As part of its election commitments, the Australian Government announced that it would reverse the exclusion of native forest sourced wood waste as an eligible renewable energy source.[2] Section 7.2 discusses the administrative and regulatory arrangements that should be in place to ensure that the reinstatement of native forest wood waste is consistent with the sustainable management of native forests.

1.3.2 The Small-scale Renewable Energy Scheme (SRES)

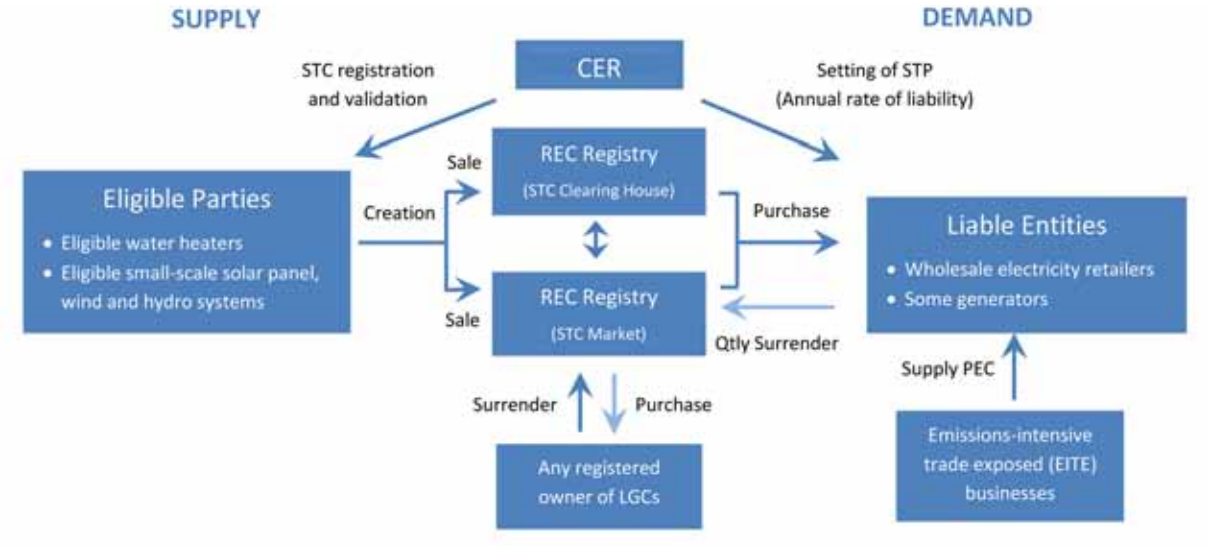
The SRES supports the installation of new small-scale renewable energy generation systems such as rooftop solar PV and micro wind and hydro systems. It also supports solar water heaters and air source heat pumps that displace other sources of energy used to heat water.

[2] The Coalition's Policy for a Strong and Sustainable Forestry Industry, September 2013.

When the LRET and SRES schemes were split, it was estimated that the SRES would deliver at least 4,000 GWh of generation by 2020. However, unlike the LRET, the SRES does not have binding annual targets. Rather, the scheme is uncapped allowing all eligible installations to receive assistance. Small-scale installations generated or displaced the equivalent of 6,400 GWh of electricity in 2013.

Figure 3 provides an overview of the Small-scale Technology Certificate (STC) market. The CER administers the SRES by managing the REC Registry, registering and validating STCs, and establishing the annual SRES liability by setting the Small-scale Technology Percentage (STP). The STP is based on modelled estimates of the number of STCs expected to be created in that year, adjusted for any surplus or deficit of certificates from the previous year.

Figure 3 STC Market under the SRES



Owners of eligible systems are able to create STCs through deeming arrangements that estimate the quantity of electricity an eligible system will generate or displace over its lifetime. For example, solar PV systems are entitled to create 15 years' worth of certificates at the time of installation. From 2017, support provided for small-scale solar PV systems gradually falls through reductions in the deeming period until it is phased out completely in 2030.

The Solar Credits multiplier was introduced in mid-2009 to provide further support for solar PV by multiplying the number of certificates that systems were able to create. The multiplier was originally set at five, so systems were eligible to create five times 15 years' worth of certificates. The multiplier was scheduled to progressively phase-out by reducing by one each year to mid-2015, however due to rapidly falling system costs and strong uptake, the mechanism was terminated on 1 January 2013.

Creators of STCs may sell certificates on the STC market for the market price or through the voluntary STC Clearing House at a fixed price of $40. The primary purpose of the Clearing House is to ensure that liable entities can meet surrender requirements at a maximum price of $40. If supply of certificates is greater than demand (as has typically been the case) the market price will be lower than the Clearing House price and liable entities will purchase from the market. However, if demand exceeds supply, STCs can be bought from the Clearing House at the capped price. To meet the requirements under the REE Act, liable entities surrender STCs to the CER on a quarterly basis.

2 PERFORMANCE OF THE RET AGAINST OBJECTIVES

The RET scheme is aimed at increasing renewable energy generation and reducing greenhouse gas emissions from the electricity sector. It is designed to ensure that the equivalent of at least 20 per cent of Australia's electricity comes from renewable sources by 2020.

The scheme is established by the *REE Act*. The formal objects of the *REE Act* are to:

a. encourage the additional generation of electricity from renewable sources;

b. reduce emissions of greenhouse gases in the electricity sector; and

c. ensure that renewable energy sources are ecologically sustainable.

2.1 Encouraging electricity generation from renewable sources

Box 1: Understanding generation and capacity

A power station's capacity refers to how much electricity it can deliver at a single instant in time. It is measured in watts (W). A kilowatt (kW) is a thousand watts, a megawatt (MW) is a thousand kW, and a gigawatt (GW) is a thousand MW.

Electricity delivered over time is typically measured in kilowatt hours (kWh), megawatt hours (MWh) or gigawatt hours (GWh). For example, a 10 MW generator running at maximum power continuously for one hour will deliver 10 MWh of electricity.

Power stations do not operate continuously at maximum power. A power station's capacity factor refers to the amount of electricity it actually produces relative to the maximum it could produce if it were operating continuously at full power. Typically, fossil fuel power stations have capacity factors of around 80 per cent while renewable power stations have capacity factors of around 30 per cent.

For example, a 100 MW wind farm with a 35 per cent capacity factor would generate 306,600 MWh of electricity per year (100 MW x 35% x 24 hours x 365 days). A wind farm of this size in Australia might have around 40 turbines (of 2.5 MW capacity each).

2.1.1 Installed capacity

Around 8,000 MW of large-scale renewable capacity, consisting mostly of hydro power stations, existed prior to 1997.[3] These power stations were accredited in 2001 and annual generation needs to be above their 1997 'baselines' (as determined by the CER) to create certificates and benefit from the RET.

Large-scale renewable generation capacity has grown by around 5,100 MW to 13,100 MW in July 2014. 2,400 MW of this capacity has been added since the RET scheme was expanded in 2010. As of July 2014 there were 416 renewable energy power stations accredited under the LRET, of which 125 gained accreditation since 2010.

[3] RET Review estimate based on data provided by the Clean Energy Regulator.

Table 1 shows the breakdown of additional large-scale renewable capacity by state and fuel source. The majority of the additional capacity has occurred through wind development in South Australia and Victoria, with total wind capacity increasing by over 3,800 MW since the MRET was introduced in 2001.

Table 1 Large-scale renewable capacity installed by state and fuel source, 2001 - 2014

Eligible energy source	ACT	NSW	NT	QLD	SA	Tas	Vic	WA	Additional installed capacity	Total accredited power stations
	MW	MW	MW	MW	MW	MW	MW	MW	MW	
Biomass	-	49	-	12	-	1	7	126	196	81
Hydro	1	32	-	16	3	26	174	-	252	105
Landfill gas	4	33	1	509	1	5	27	16	597	61
Solar	21	2	4	3	1	-	7	11	50	87
WCMG	-	29	-	130	-	-	-	-	158	7
Wind	-	454	-	12	1,473	312	1,070	488	3,809	75
Additional installed capacity (MW)	26	599	5	682	1,478	344	1,285	642	5,062	416

Installed capacity excludes accredited co-fired power stations: Bayswater, Liddell, Gladstone, Hazelwood, Vales Point and Wallerawang.
Source: RET Review estimates based on data provided by the Clean Energy Regulator, current at 16 July 2014

Over 2 million small-scale renewable energy systems have been installed under the RET, including around 1.3 million small generation units (SGUs), with an installed capacity of 3,500 MW, and 870,000 solar water heaters.[4] Rooftop PV systems make up the majority of the SGUs and new installations increased from around 100 per year in 2001, to a peak of over 360,000 in 2011. The rate of installation has fallen since 2011 to 215,700 installations in 2013[5], largely due to the removal of the Solar Credits multiplier and reductions in support under state and territory feed-in-tariffs. However the average rooftop solar PV system size has grown from 1.9 kW in 2010 to 3.7 kW in 2013.[6]

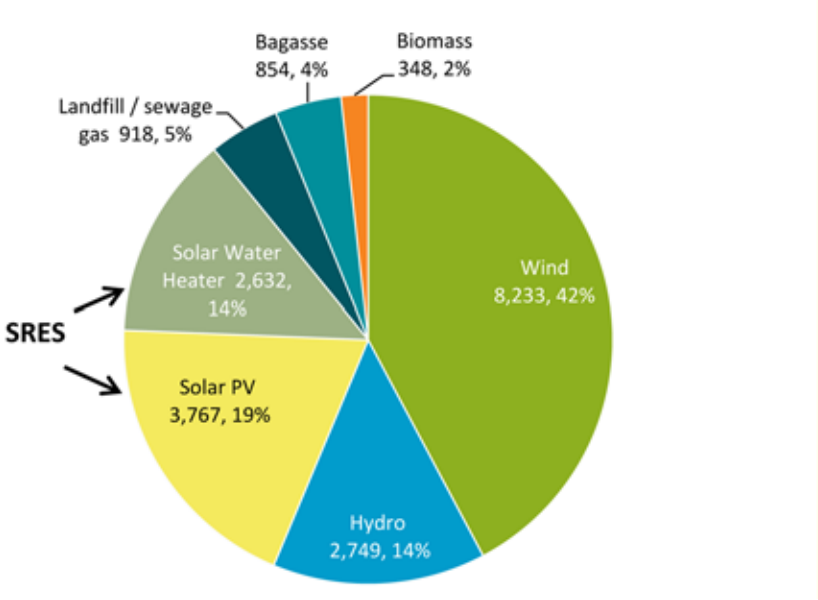
2.1.2 Generation

The Bureau of Resources and Energy Economics (BREE) estimated that around 18,000 GWh of electricity was generated from renewable sources in 2000-01, representing around 8 per cent of total electricity generation in that year.[7] In 2013, total renewable generation was around 33,000 GWh, representing approximately 14 per cent of electricity generation.[8]

Figure 4 shows that the total renewable generation or displacement supported by the RET in 2013 was around 19,500 GWh.[9] Of this, the LRET accounted for around 13,100 GWh (with wind energy being the largest contributor) and the SRES accounted for around 6,400 GWh.

[4] Clean Energy Regulator, *Small-scale installations by postcode*, July 2014.
[5] Green Energy Markets, *Small-scale technology certificates data modelling for 2014 to 2016*, January 2014.
[6] Ibid.
[7] Bureau of Resources and Energy Economics, *2014 Australian energy statistics*, July 2014, Table O.
[8] Renewable generation includes 2013 below baseline generation of around 16,000 GWh and excludes solar water heater displacement. There is no single data series that provides renewable energy generation for the period 2001 to 2013. The 2000-01 estimate is from Bureau of Resources and Energy Economics while the 2013 estimate is based on data provided by the Clean Energy Regulator.
[9] Based on data provided by the Clean Energy Regulator.

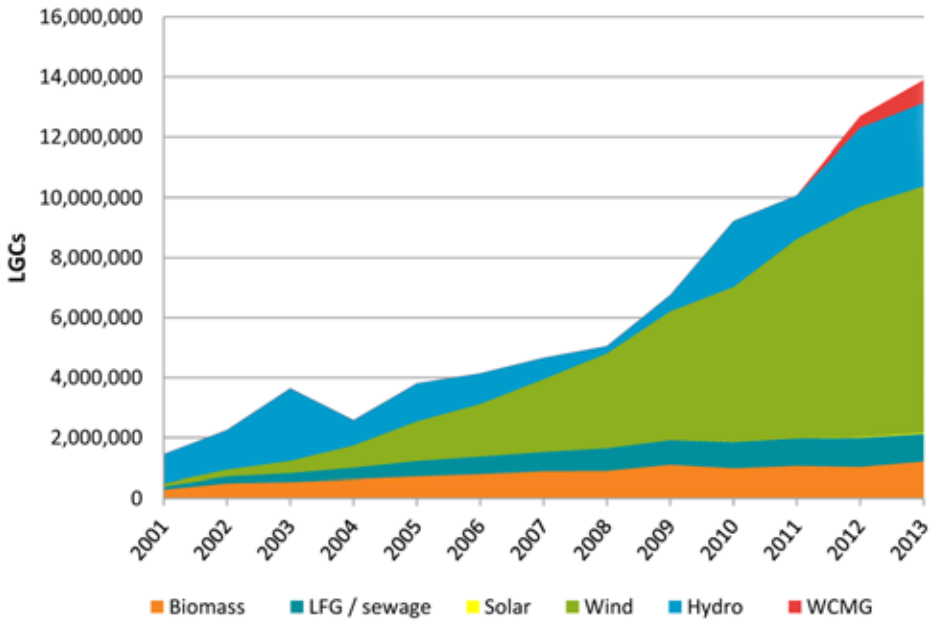
Figure 4 Renewable generation and displacement supported by the RET, 2013 (GWh)



Source: Data provided by the Clean Energy Regulator, current at 3 June 2014

Figure 5 shows the supply of LGCs by fuel source and highlights the growth in wind generation, which now accounts for around 60 per cent of LGCs. The total value of certificates that have been created by large-scale renewable generators from 2001 to 2013 is approximately $5.2 billion.[10] This represents the cross-subsidy received by large-scale renewable generators under the RET.

Figure 5 LGCs created by fuel source, 2001 - 2013

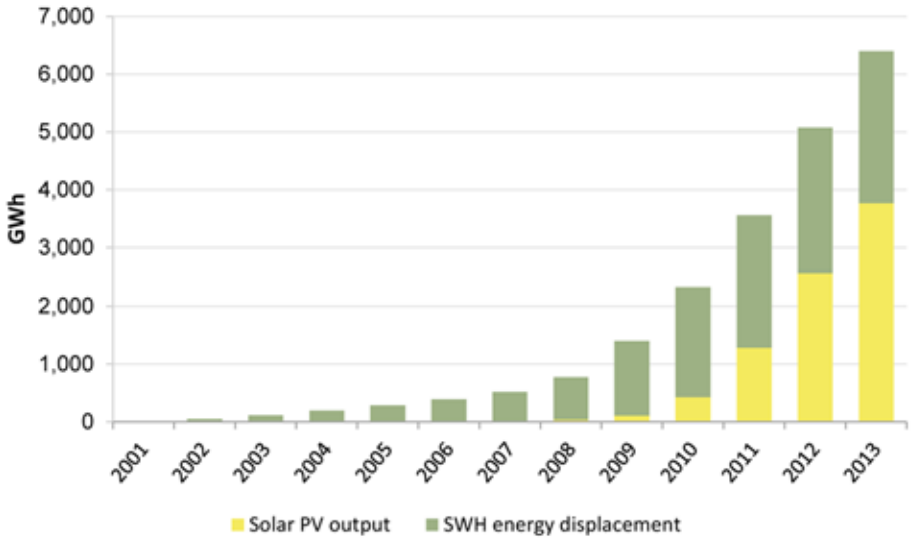


Source: Clean Energy Regulator *Register of Large-scale Generation Certificates, current at 3 June 2014*

[10] Calculation by the RET Review Secretariat based on data provided by the Clean Energy Regulator.

Since the commencement of the RET, over 110 million STCs have been created under the SRES, with solar PV systems accounting for around 94 per cent of these.[11] The total value of certificates that have been created by owners of small-scale renewable energy systems is approximately $4.2 billion over the period 2001 to 2013.[12] The number of STCs created in a particular year is greater than actual renewable generation by small-scale solar PV in that year due to the effects of the Solar Credit multiplier and deeming arrangements. The CER has estimated the generation from small-scale solar PV and displacement attributable to solar water heaters (SWH) and heat pumps over the period of the scheme as shown in Figure 6. Uptake of small-scale systems has been strong, with generation and displacement from small-scale systems estimated at 6,400 GWh of electricity in 2013.

Figure 6 Historical generation and displacement from small-scale PV and SWH, 2001 - 2013



Source: Data provided by the Clean Energy Regulator

A number of submissions commented on the performance of the RET against the objects in the REE Act. Most submissions acknowledged that the RET has delivered on the objective of encouraging the additional generation of renewable electricity. For example, Pacific Hydro noted the considerable investment in renewables since the commencement of the RET:

> *The Renewable Energy Target has performed exceptionally well against the objects of the REE Act on generation, investment and emissions. Some $18.5 billion has been invested in new renewable generation with annual output growing from under 2,000 GWh to around more than 14,000 GWh today. (Pacific Hydro, p.7)*

The REC Agents Association submitted that the SRES meets the objects of the Act:

> *The SRES continues to meet the objects of the Act. It has certainly encouraged the additional generation of electricity from renewable sources. Indeed, it has helped transform Australia's energy system, with more than 2 million homes – 5 million Australians – installing solar panels or solar hot water systems. (REC Agents Association, p.2)*

[11] Clean Energy Regulator, *Renewable Energy Target 2013 Administrative Report*, 2014.
[12] Calculation by the RET Review Secretariat based on data provided by the Clean Energy Regulator.

Although there is overall agreement that the RET has encouraged renewable generation, some stakeholders expressed the view that this has resulted from inefficient investment in non-competitive renewable energy, which has displaced fossil fuel generation and reduced CO_2-e emissions at a high cost.

The Institute of Public Affairs stated:

> *Wind and other renewables should be left to stand on their own feet commercially. They have achieved their current market position only through subsidies and show no sign of reaching commercial viability without them. Their on-going subsidisation severely weakens the national economy and imposes significant penalties on consumers both directly and indirectly. (Institute of Public Affairs, p.2)*

Major Energy Users Inc. stated:

> *The REE Act makes no reference to the promotion of the most cost-efficient solutions to renewable generation. It would be all the better, and more coherent, for doing so, and for linking explicitly to the National Electricity Objective and the long term interests of consumers. (Major Energy Users Inc., p.7)*

Some submissions argued that the RET encourages deployment of the most cost effective, commercial renewable energy technologies and suggest that it has driven down the cost of deployment of these technologies. In its submission, the Clean Energy Council indicated:

> *The RET has been fundamental to driving the development of the Australian renewable energy industry over the past 10 years. This has resulted in increasing scale and efficiency and in turn driving down the cost of deploying renewable energy; encouraging innovation, both in deploying proven technologies and seeking ways to maximise their output, but also in the development of new and exciting technologies; and developing Australian capability in the skills and supply chains that drive innovation, local jobs and flow-on economic benefits. (Clean Energy Council, p.10)*

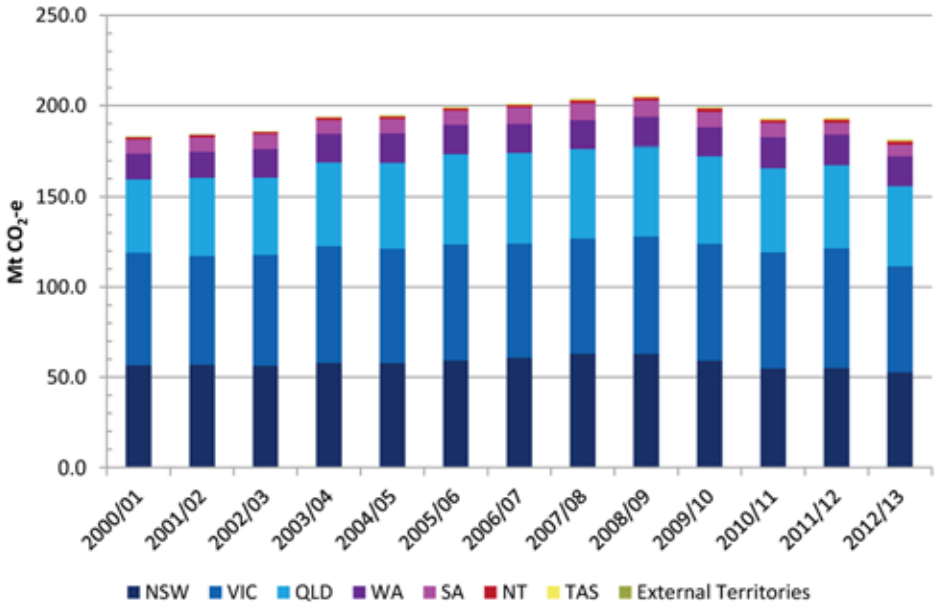
2.2 Reducing greenhouse gas emissions in the electricity sector

The second major objective of the REE Act is to reduce CO_2-e emissions from the electricity sector. The RET reduces CO_2-e emissions by providing an incentive for additional renewable energy which displaces electricity that would have been generated from fossil fuels. The CO_2-e emissions reductions achieved will depend on the emissions-intensity of the fuel source that would have otherwise been used. This counterfactual scenario cannot be observed, so the level of abatement can only be estimated, not measured.

Figure 7 shows that total CO_2-e emissions from Australia's electricity sector over the period 2000-01 to 2012-13 were approximately 2,500 Mt CO_2-e. Historical CO_2-e emissions abatement from the RET has been estimated by SKM to be around 20 Mt CO_2-e between 2001 and 2012.[13] The modest level of abatement achieved to date primarily reflects the small targets in effect under the scheme from 2001 to 2009.

[13] SKM, *Benefit of the Renewable Energy Target to Australia's Energy Markets and Economy*, 2012.

Figure 7 CO_2-e emissions in the Australian electricity sector, 2000-01 to 2012-13



Source: Data provided by the Department of the Environment to the RET Review Secretariat

A number of submissions stated the RET has achieved its objectives in delivering CO_2-e emissions reductions. The Australian Capital Territory (ACT) Government submitted that:

> *After a long history of growth, Australia's electricity emissions have declined over the last five years, in large part because of the RET. It is important that the momentum of this decline is sustained through maintenance of the current RET target. The chances of Australia meeting its national greenhouse gas emission reduction targets in the medium to long term will be greatly diminished if the current RET target is reduced or pushed out to a later year. (ACT Government, p.2)*

Although CO_2-e emissions reductions have been achieved through the RET, some submissions have indicated that this has been at a high cost relative to other opportunities for reducing CO_2-e emissions. For example the Independent Pricing and Regulatory Tribunal stated:

> *In terms of reducing emissions, the CPM [carbon pricing mechanism] or the ERF would achieve the objective at a lower cost. These schemes allow producers and consumers to develop the most cost effective way to reduce carbon emissions by sending a price signal about the cost of carbon emissions. (Independent Pricing and Regulatory Tribunal, p.3)*

The cost of abatement of the RET is further discussed in Section 5.6.

2.3 Ensuring the ecological sustainability of renewable energy sources

The third objective of the REE Act is to ensure that participants in the RET use renewable energy sources that are ecologically sustainable. The REE Act defines 'ecologically sustainable' as an action that is consistent with the following principles of ecologically sustainable development defined in the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* (EBPC Act):

a. Decision making processes should effectively integrate both long term and short term economic, environmental, social and equitable considerations.

b. If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

c. The principle of inter generational equity, which is that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

d. The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making.

e. Improved valuation, pricing and incentive mechanisms should be promoted.

There are 19 eligible renewable energy sources described in the REE Act. The main eligible renewable energy sources are wind, hydro, solar, landfill gas and biomass sources. There are no specific requirements set out in the REE Act for eligible renewable energy sources to be ecologically sustainable. However, to become accredited under the RET a power station must be operating in accordance with any relevant Commonwealth, state, territory or local government planning and environmental approval requirements. 'Standing notices' to this effect must be provided to the CER along with annual compliance statements. The CER also conducts risk based compliance monitoring visits to power stations. If a power station operates in contravention of a relevant law then it may be suspended by the CER.

Submissions to the review generally agreed that the RET is meeting the sustainability objective. For example the WA Renewable Energy Alliance stated that:

> *The RET has never been credibly challenged on the basis of ecological sustainability, largely because the eligibility requirements surrounding the creation of certificates have been sufficiently stringent. We believe it is of utmost importance that these standards are maintained so the public and industry can have continued faith in the legislation to deliver forms of renewable energy that are:*
>
> - *Ecologically sustainable;*
> - *Demonstrate clear environmental benefits relative to conventional electricity generation technologies;*
> - *An important addition to Australia's fuel diversity, security and reliability of supply. (WA Renewable Energy Alliance, p.9)*

The Clean Energy Council stated:

> *Every large-scale renewable energy project is subject to a rigorous environmental impact assessment through the relevant state planning approval process. Projects may also require planning and environmental approval by the Commonwealth if they are deemed to potentially affect matters of national environmental significance under the Environmental Protection*

and Biodiversity Conservation Act 1999 (EPBC Act). This ensures their impact on the environment is minimised. (Clean Energy Council, p.6)

Other stakeholders submitted that they were unclear on the meaning of this objective or how it could be assessed. For example Synergy stated that:

Synergy is not clear how the third objective could be assessed. To the extent that the RET avoids greenhouse gas emissions this would be captured by the second objective. "Ecological sustainability" may be captured by the discussion about the purposes of the RET in the Climate Change Authority's 2012 review which considered both "promoting energy security" and "avoiding some of the health and broader environmental costs associated with the production and use of fossil fuels". Synergy agrees with the conclusions of that review which found that:

"the RET is unlikely to be the most appropriate mechanism for reducing the negative health effects from fossil-fuel generation, and that such issues are more likely to be better addressed directly through regulations and planning permission"

The [CCA] Review did not consider whether there is a general environmental benefit from the RET. While it is likely that there may be localised environmental concerns associated with some fossil fuel plants, Synergy believes these would be more effectively addressed by regulations and planning permission consistent with the Climate Change Authority's view above.

Synergy therefore does not believe there is any strong evidence that this third objective has been delivered by the RET. (Synergy, p.4)

2.4 Findings: Performance of the RET against objectives

The RET has been successful in promoting additional generation from renewable sources, with renewable energy generation almost doubling from 2001 to 2013. This reflects the considerable cross subsidy that the RET delivers to owners of renewable energy power stations and small-scale systems, estimated to be about $9.4 billion over the same period.

The RET has resulted in a modest reduction in CO_2-e emissions from electricity generation, reflecting the relatively small targets for renewables in effect prior to the expansion of the scheme in 2010.

Commonwealth, state and territory environmental regulations provide a framework for ensuring that the RET promotes the use of ecologically sustainable renewable energy sources.

3 IMPACTS OF THE RENEWABLE ENERGY TARGET

Chapter 1 described how the RET supports additional renewable generation by requiring liable parties (electricity retailers) to purchase and surrender certificates created by renewable power stations and owners of small-scale renewable energy systems. Electricity retailers will generally pass the cost of purchasing these certificates to their customers. The RET is therefore not a government subsidy for renewable generation, but a cross-subsidy that transfers wealth from electricity consumers and other participants in the electricity market to renewable generators and owners of small-scale renewable energy systems.

3.1 Energy markets and electricity prices

3.1.1 Trends in electricity demand

In order to evaluate the impact of the RET on electricity markets and the economy it is important to understand the changed circumstances since the expanded scheme commenced in January 2010. At that time it was assumed that electricity demand would increase, in keeping with historical trends, to around 300,000 GWh in 2020. A target of 45,000 GWh for additional renewable generation in 2020 was fixed in legislation to ensure that at least a 20 per cent share of renewables would be achieved.[14]

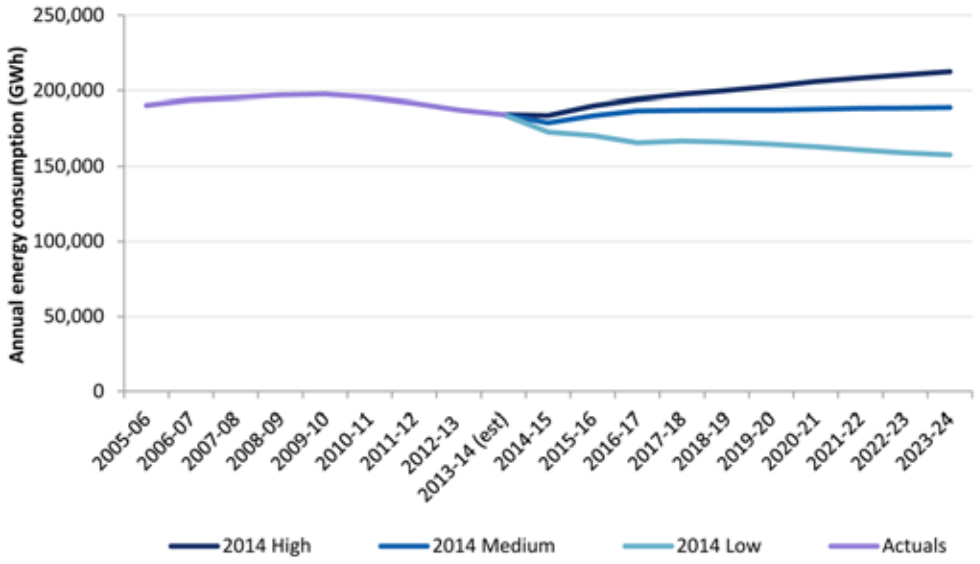
However, annual electricity consumption sourced from centralised electricity generators has been declining in the NEM. Electricity demand has fallen from around 198,000 GWh in 2009-10 to around 184,000 GWh in 2013-14, which is a drop of around 1.7 per cent per year on average.[15] This is likely to have occurred for a range of reasons, such as declining activity in the industrial sector (including the closure of the Kurri Kurri aluminium smelter in New South Wales in 2012), global economic trends, energy efficiency initiatives and consumers responding to increasing electricity prices. The strong growth in rooftop solar PV systems has also contributed to a reduction in demand for electricity sourced from the grid.

The Australian Energy Market Operator's (AEMO's) latest forecasts for electricity demand in the NEM (Figure 8) suggest that there will be a temporary uptick in demand growth, largely driven by liquefied natural gas (LNG) projects in Queensland, followed by a period of subdued growth, with demand in 2023-24 projected to remain below the peaks of 2009-10. The drivers for this include the decline in energy intensive industries (including the closure of the Point Henry aluminium smelter in Victoria in August 2014), strong projected growth (24 per cent annually) in rooftop PV installations, particularly in Queensland and Victoria, and strong growth (10 per cent annually) in total energy efficiency savings, with key contributions from air conditioning, refrigeration and electronics.[16]

Forecasts by the Independent Market Operator for the South-West Interconnected System (SWIS) in Western Australia suggest growth in electricity demand of around two per cent per year over the period 2015 to 2040.

[14] It was estimated that underlying generation from existing renewable generators would represent 15,000 GWh per year, so an additional 45,000 GWh would be required to reach 20 per cent of 300,000 GWh in 2020. When the RET was split into the LRET and SRES schemes on 1 January 2011, it was assumed that small-scale systems would contribute 4,000 GWh of generation to the target, so the LRET was fixed at 41,000 GWh in 2020.
[15] Australian Energy Market Operator, Final NEM and Regional Forecasts (2014 NEFR – NEM), 16 June 2014. http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report (native annual energy forecasts including small non-scheduled generation).
[16] Australian Energy Market Operator, *National Electricity Forecasting Report*, 2014, p.2-1.

Figure 8 Annual energy consumption in the NEM, actual and forecast, 2005-06 to 2023-24

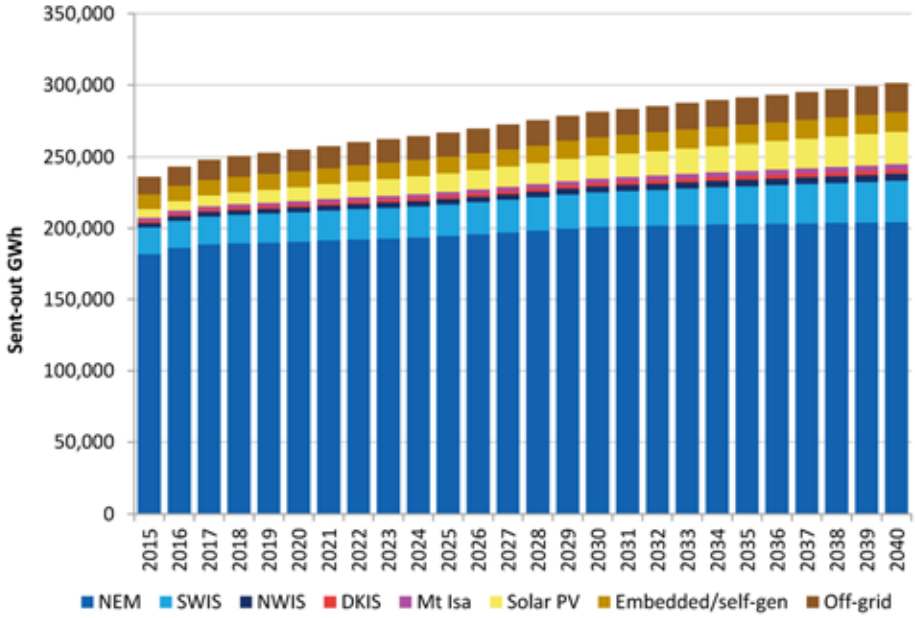


Source: Based on Australian Energy Market Operator (2014) data published with the National Electricity Forecasting Report.

Regional electricity grids and off-grid electricity use is predicted to grow at a higher rate than the NEM and the SWIS, though this represents a small share of Australia's total electricity demand. Figure 9 shows the forecast electricity demand for electricity in Australia over the period to 2040.

Falling electricity demand in recent years and a subdued outlook mean that the RET is likely to deliver more than a 20 per cent share of renewable energy in 2020. Modelling by ACIL Allen for the review suggests the RET as currently legislated would deliver around a 26 per cent share of renewables by 2020 (see Section 5.1).

Figure 9 Forecast Australian electricity demand, 2015 - 2040



Source: ACIL Allen

As electricity demand has declined, the RET has resulted in investment in new generation capacity that would not otherwise have been required, contributing to some incumbent fossil fuel generators being mothballed or curtailed. This was noted in a number of submissions, for example, EnergyAustralia stated that:

> *The RET was not designed to operate in a declining energy demand environment where renewable generation capacity is effectively 'forced' into a wholesale energy market when additional capacity is not required. (EnergyAustralia, p.3)*

ACIL Allen estimates that around 4,155 MW of coal-fired generation capacity has been mothballed since mid-2012 and 385 MW of gas-fired capacity is due to be mothballed in October 2014.

3.1.2 Impacts on electricity prices

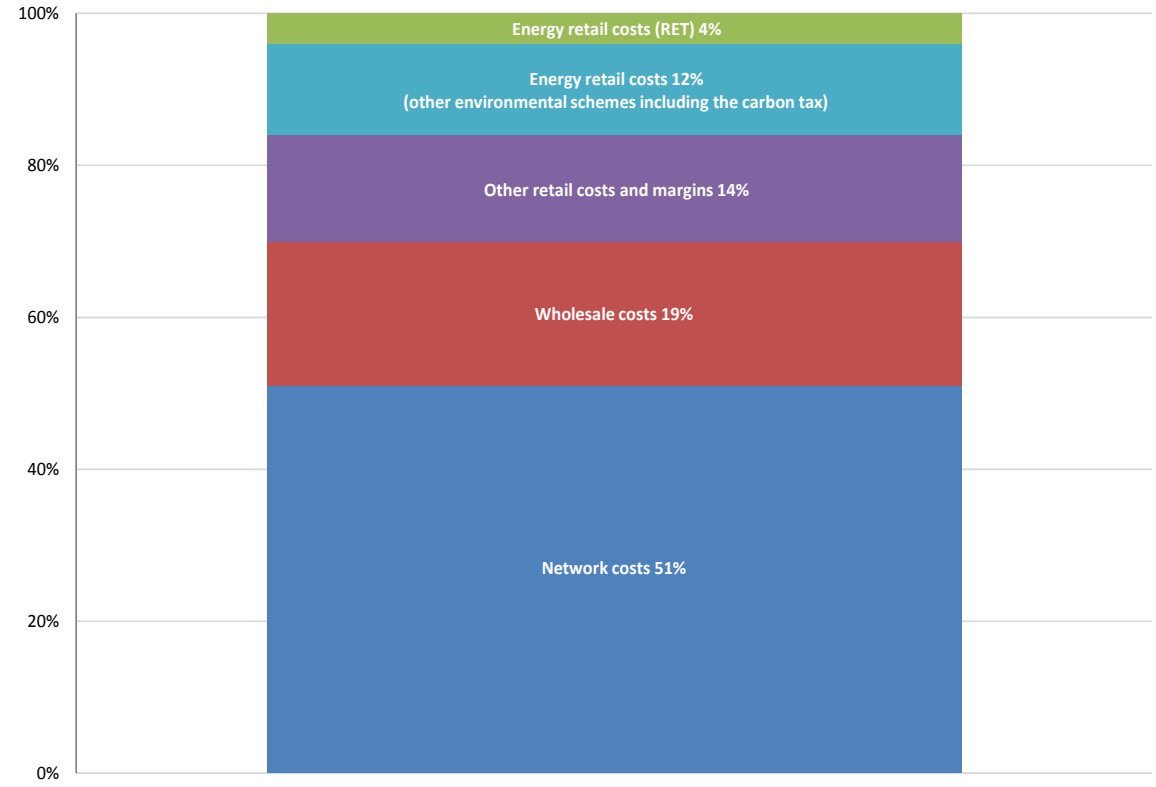
Until July 2014, all jurisdictions except Victoria and South Australia regulated retail electricity prices for residential and small business customers. New South Wales has deregulated retail prices from July 2014.

Residential and small business customers in regulated jurisdictions have access to two types of electricity contracts – standing offer (default) contracts set by state regulators, or market contracts offered by energy retailers. Both types of contracts include mandatory terms and conditions, with market offers also including options such as different billing periods, discounts, fixed-term contracts, switching incentives and bundling services.

There are three broad components of household electricity prices: the cost of generating electricity (wholesale costs); the cost of sending it through poles and wires (network costs); and costs from retailers which includes the cost of complying with government policies such as the RET. Figure 10 shows the proportion of these components for retail prices in 2013-14 as estimated by the Australian Energy Market Commission (AEMC). On average, the cost of generating electricity accounts for around 19 per cent of retail electricity prices, network costs account for 51 per cent and retail costs account for around 30 per cent (including the cost of environmental schemes).

Over the past five years, household retail electricity prices have risen on average by 78 per cent nationally, largely due to increases in network costs.[17] Environmental schemes such as the carbon tax, the RET and state and territory feed-in-tariffs have also contributed to higher prices.

Figure 10 Breakdown of Australian average residential electricity prices, 2013-14



Source: Based on Australian Energy Market Commission, *2013 Residential Electricity Price Trends report, Dec 2013*

The RET influences both wholesale and retail electricity prices. The RET places a direct cost on liable entities (electricity retailers) who are required to purchase certificates (LGCs and STCs) to comply with the scheme. These costs are passed onto customers through electricity bills and represented an average of four per cent of residential retail electricity prices in 2013-14.[18]

The RET has affected the wholesale electricity market by encouraging additional generation capacity into the market at a time of falling demand, putting downward pressure on wholesale electricity prices. The additional renewable capacity deployed as a result of the RET may have lower short-run marginal costs than traditional fossil fuel generation, which may have the effect of further lowering wholesale electricity prices as it displaces coal or gas generation with higher short-run marginal costs. This is referred to as the 'merit order effect'.

Numerous submissions commented on the impact of the RET on electricity prices. For example, Acciona's submission stated that:

> *The introduction of renewable energy generation supply, with a very low marginal cost both increases competition in the supply mix, and on an economic basis displaces coal and gas fired generation (both have higher marginal costs). This results in the wholesale marginal cost of electricity supply being lower than what it might otherwise be. (Acciona, p.6)*

[17] Australian Bureau of Statistics (ABS) *Consumer Price Index (CPI)* Cat no. 6401.0 TABLE 7. CPI: Group, Sub-group and Expenditure class, weighted average of eight capital cities electricity. (Based on the period June 2009 - June 2014).
[18] Australian Energy Market Commission, *Residential Electricity Price Trends report*, December 2013, p.12.

The net impact of the RET on retail electricity prices will depend on the extent to which any reduction in wholesale prices is passed through to consumers and offsets the direct cost of the certificates. As market retail prices reflect decisions by retailers in a competitive market, and there are many factors influencing wholesale electricity prices, the net impact of the RET on electricity bills cannot be directly observed. The impact of the RET on electricity prices is further analysed in Chapters 5 and 6.

Households and small business

For households and businesses on standing offer contracts, the state regulator determines the maximum cost pass through for each component of the retail tariff, including the cost of the RET. The RET component will vary by jurisdiction according to methodologies used to calculate this tariff component. For example, the submission from the New South Wales regulator, the Independent Pricing and Regulatory Tribunal, stated that the RET cost around $107 for a typical New South Wales customer on regulated prices in 2013-14.[19] According to the Queensland regulator, the Queensland Competition Authority, the cost impact of the RET for a typical household in Queensland for 2014-15 is around $65.[20] In Western Australia, the AEMC forecasts the RET to contribute 4 per cent or $62 to electricity bills in 2013-14.[21]

The RET helps households with the cost of installing their own rooftop solar PV system, providing an opportunity for households to save on electricity bills. Some have argued that the SRES benefits high and middle income households who can afford to install rooftop solar PV systems and reduce exposure to increasing retail electricity prices, while renters and those on lower incomes may not be able to do so, despite the cross-subsidy.

However, analysis by the REC Agents Association found that to date, the installation of rooftop solar PV systems has been higher in postcodes in outer-metropolitan and regional areas. The REC Agents Association concluded that:

- *Rural and regional areas have 42 per cent of all solar systems installed, despite having only 32 per cent of the housing stock. This translates into rural and regional areas having the highest uptake of solar systems per household at 29 per cent;*
- *Installation of solar systems in the capital cities were typically characterised by postcodes in the outer metropolitan mortgage belt;*
- *There is an inverse relationship between average incomes and solar penetration levels (as income levels increased, solar uptake declined). (REC Agents Association, p13)*

The combination of premium feed-in-tariffs offered by state and territory governments and strong support under the RET have increased the affordability of rooftop solar PV systems for low and middle income households, which are more sensitive to the upfront costs of systems. A different trend may emerge in the future as incentives to install rooftop solar PV have been substantially reduced.

[19] Independent Pricing and Regulatory Tribunal submission to the Renewable Energy Target Review, p.5.
[20] Queensland Competition Authority, *Estimate of the Impact of the Carbon Tax and RET - 2014-15*, (corrected) June 2014.
[21] Australian Energy Market Commission, *2013 Residential Electricity Price Trend*, December 2013.

Large energy users

Electricity represents a significant proportion of costs for many large businesses. For example, the mining and manufacturing sectors are the biggest industrial consumers of electricity, spending around $1.6 billion and $5.5 billion respectively in 2011-12.[22]

Australia's largest trade-exposed energy users receive assistance with RET costs through PECs. This assistance was introduced in recognition of the combined impact that the expanded RET and the introduction of carbon pricing would have on the competitiveness of these businesses that are price takers on global markets. Over recent years, highly emissions-intensive business activities have received an exemption for around 68 to 78 per cent of the costs of the RET, and moderately emissions intensive business activities have received an exemption for around 50 per cent of the costs.[23]

A number of large energy users, such as aluminium smelters, have entered into long-term electricity supply contracts and in some instances, the location and viability of these energy-intensive businesses has been influenced by the availability of low cost electricity. Some stakeholders have indicated that where these contracts have been recently renegotiated, the increase in retail electricity prices has been significant while there has not been any wholesale price reduction associated with the RET.

Many large energy users claim that the cost of the RET remains significant despite the partial exemption. For example, the Business Council of Australia submission states:

> *Increases in electricity prices caused by the RET add to the cost base of many of Australia's electricity intensive industries, such as steel manufacturing and aluminium smelting. Australia's historically low electricity prices mean there are many sectors that have built up around what has been one of Australia's previous comparative advantages. Higher electricity prices, however, are eroding the competitive edge once held by these businesses and the RET is a contributing factor towards increases in electricity prices. (Business Council of Australia, p.5)*

The submission from the Cement Industry Federation notes that:

> *In general, since the RET effectively subsidises the renewables industry at the expense of households, industry and existing generators – this program impacts on the international competitiveness of energy intensive trade exposed industries such as cement manufacturing. (Cement Industry Federation, p.4)*

Australia's manufacturing sector has declined in recent years, with increasing retail electricity prices, the high Australian dollar and global competition all contributing to difficult trading conditions over a sustained period. This has particularly affected the aluminium sector. In 2012, the Kurri Kurri aluminium smelter ceased operation and Alcoa closed its Point Henry facility in August 2014. The aluminium sector argues that it is highly affected by the RET as electricity represents around 30-40 per cent of production costs. For example, the submission from the Australian Aluminium Council states that:

[22] Australian Bureau of Statistics, *Energy Use, Electricity Generation and Environmental Management Australia 2011-12*, Cat no. 4660.0.
[23] Information provided by the Clean Energy Regulator to the RET Review Secretariat.

Since the inception of the M(RET) scheme, aluminium smelting has generated RET liabilities of more than half a billion dollars. The ongoing RET liabilities generated by aluminium are $70-80 million per annum in total and $15-25 million per annum per smelter. (Australian Aluminium Council, p.5)

Other industries also consider the RET adds significant costs to their operations. Cotton Australia submitted that the RET and carbon tax equate to 20 per cent of their electricity costs, which have increased by 300 per cent since 2009:

Even a small cost increase has a large impact on farm business income and productivity. There is already some evidence to suggest that the rapid escalation in electricity price has forced some growers to abandon drip irrigation systems in favour of lower energy use methods. Some irrigators are even borrowing money and selling water rights to pay electricity bills. (Cotton Australia, p.1)

These concerns have led energy intensive industries, particularly the aluminium industry, to call for a decrease in the target along with an increase in exemption arrangements to cover 90 or 100 per cent of the costs of the RET. Options for adjusting the target are discussed in Chapter 6 and exemption arrangements are discussed in Section 7.1.

3.1.3 Findings: The impact on electricity prices

The RET impacts on electricity prices in two, countervailing ways:

- The direct costs of renewable energy certificates contribute to higher retail electricity prices. This impact on household electricity bills is estimated to be in the range of four per cent in 2013-14 and higher for energy-intensive businesses.
- By encouraging additional renewable energy generation into the market and increasing electricity supply capacity, the RET is also exerting downward pressure on wholesale electricity prices. This impact has likely been made more pronounced by the recent declines in demand in the NEM and the low fuel costs of renewables compared with fossil fuel generation.

3.1.4 Impacts on electricity supply

Reliability and security of electricity supply

Some submissions raised concerns about the implications of high levels of variable wind and solar PV generation on market price volatility and power system security. For instance, Synergy submitted:

The RET impacts on reliability arising from variable renewable energy resources. Synergy concurs with the [RET Review] *Issues Paper's conclusion that this is currently manageable but notes the Economic Regulation Authority's conclusion that the impact may become more significant as more wind generation capacity is being added to the system. (Synergy, p.10)*

The submission from AEMO, the organisation responsible for system security in the NEM, concluded that:

> *Whilst there are technical challenges [from integrating renewable generation], AEMO feels the NEM design is well placed to deal with them. This includes some existing beneficial features, such as:*
>
> - *Five-minute security constrained economic dispatch and pricing.*
> - *The Australian Wind Energy Forecasting System which is forecasting variations in output and thereby assisting non-intermittent plant to predict dispatch. This system is being expanded to also forecast the output of large solar plants.*
> - *The semi-scheduled generator provisions in the National Electricity Rules (NER) that requires intermittent generators such as wind generators to respond to AEMO dispatch signals to reduce output when network security is threatened.*
>
> *The NEM has been uniquely successful in securely integrating wind generation to date at low cost. For example, AEMO has not had to change or materially increase the quantity of ancillary services purchased to maintain system security. (AEMO, p.2)*

AEMO considers that it is technically feasible to integrate the renewable energy likely to emerge from the current RET:

> *Based on experience to date and analysis of likely future outcomes, AEMO considers that it is technically feasible to integrate the renewable energy likely to emerge from the existing RET settings while maintaining the security of the power system. At higher levels there is likely to be some additional costs, though any such costs are expected to be of a much lower order than the consumer and investment costs being modelled by the panel, so their exclusion from the modelling process should not undermine the analysis. (AEMO, p.3)*

Grid integration

Notwithstanding the conclusions above, AEMO has undertaken work on the challenges of integrating the level of wind generation expected under the RET into the power system. These challenges are expected to arise first in South Australia and Tasmania, where forecast levels of wind generation are highest compared with demand. Further challenges could arise from increased distributed generation, such as rooftop PV, and from changing consumer behaviour contributing to declining consumption from the grid.[24]

The challenges identified by AEMO include lower system inertia, particularly in South Australia and Tasmania, making control of power system frequency more challenging.[25]

There are a range of options to address these challenges. Some options could be implemented through existing processes and systems, for example using constraint equations in the dispatch process to limit the dispatch of wind generation at certain times (i.e., to constrain wind off). Other options that could be considered would require changes to processes, systems and regulatory instruments, for example, new ancillary services markets could be introduced to provide frequency control when there is low system inertia. The costs of such measures would be passed through to consumers.

[24] Australian Energy Market Operator, *Integrating Renewable Energy - Wind integration studies report*, 2013.
[25] Inertia is the rotating energy in the system. Asynchronous renewable energy does not provide this property, which affects the frequency control capability of the system. Ancillary service markets can provide incentives for adequate control of frequency.

AEMO is continuing to study these issues and intends to release further reports.

SRES impacts on demand for grid electricity and network business models

In recent years there has been unprecedented growth in consumers generating their own power in the form of rooftop solar PV. This was initially supported through premium feed-in-tariffs in different jurisdictions, with the Solar Credits multiplier under the RET also playing a role. Rapid reductions in solar PV costs combined with higher retail electricity prices have underpinned ongoing growth in solar PV, albeit at a slower pace, despite moves away from premium feed-in-tariffs and reductions in support under the RET. This expansion in solar PV has contributed to the decline in demand for grid electricity.

Solar PV connections and reduced demand from the residential sector in turn affect network business models and may, in part, contribute to higher network charges as network businesses seek to recover expenditure from fewer units of energy sold.

Concerns have been raised that consumers without solar PV may subsidise those that have it. Consumers with solar PV use less total electricity from the network and pay less, while still using the infrastructure for reliable supply, especially in locations where the output from their own systems is low at times when electricity use is high. Other consumers therefore have to pay more per unit of energy to cover the fixed costs of the network, which have not changed.[26]

This raises the issue of how to reflect the full costs and benefits of rooftop PV systems connected to the grid. Structuring tariffs to recognise the many cost drivers and incorporate time-of-use pricing could help provide the right price signals for efficient investment decisions by both consumers and network operators.

The potential for cross-subsidisation of electricity prices between consumers in the context of rapidly changing technology capabilities is not part of the scope of this review but is a priority area for energy market reform, which is discussed further in Section 8.4.

3.1.5 Findings: The impact on electricity supply

While the integration of significant levels of intermittent renewable generation into electricity markets has presented new challenges for market operators, the reliability and security of electricity supplies have so far been maintained.

Electricity market operators and regulatory authorities will need to continue to analyse and, where appropriate, respond to the implications of future growth in the deployment of renewables for the safe, reliable and secure supply of electricity.

3.2 Environmental and social impacts

There are socio-economic and environmental impacts of wind and solar farm developments supported by the RET, particularly in regional and rural communities (aside from CO_2-e emissions abatement which is discussed in Chapter 2). The RET has stimulated employment opportunities in renewable energy and associated industries and communities have benefited from the increased investment in their local regions. There is also potential for renewables to reduce the grid dependency of rural communities.

[26] ACIL Tasman, *Distributed Generation - Implications for Australian electricity markets*, Prepared for the Energy Supply Association of Australia (ESAA), April 2013.

On the other hand, concerns have been raised about uneven allocation of benefits from local investment in renewable energy and about the overall burden on the economy of the additional economic cost of the RET.

3.2.1 Employment

The RET has the effect of creating local employment opportunities in the renewable energy sector. The Clean Energy Council's Clean Energy Australia report states that 21,000 people were directly employed by the renewable energy industry in a construction, installation, operations or maintenance role at the end of 2013, with over 13,000 people employed in the solar PV industry.[27]

A large proportion of this employment is transitory and has occurred in rural and regional areas where other work opportunities are not easily found. CATCON, a civil construction company that has been engaged with renewable energy projects, noted:

> *CATCON have been supplying services to the Gas Fired Power Station industry since our inception (nearly 20 years) - we are in a position to advise that there are different outcomes in relation to local community involvement between a Gas Fired PS Project and a Renewable WTG Project and we can confirm there is a significantly greater benefit to a local community during the construction phase of renewable project. (CATCON, p.3)*

However, this employment occurs as a result of a cross-subsidy that transfers investment from elsewhere in the economy and is offset by other job losses, such as jobs at fossil-fuel generation plants. Therefore the RET does not result in an increase in employment at a national level. The effect of the RET on economy-wide employment was not analysed in the modelling by ACIL Allen for the Review, but it was considered in modelling by Deloitte undertaken for the Australian Chamber of Commerce and Industry, the Business Council of Australia and the Minerals Council of Australia which found that an average of 5,000 full-time jobs would be created to 2030 if the RET was abolished.[28] The submission from the Australian Chamber of Commerce and Industry stated:

> *Another key objective of the scheme is to stimulate the development of a renewable energy industry in Australia. Whilst the scheme has done this up to a point, it has also come at a significant cost, with consumers forced to support the renewable energy industry via a large subsidy to renewable energy production. The jobs and investment created have been costly and are more than offset by the loss of other job and investment opportunities, resulting in an overall lowering of economic welfare. (Australian Chamber of Commerce and Industry, p.15)*

3.2.2 Socio-economic impacts

A diverse range of views were expressed on the impacts of the RET in regional areas. Submissions opposing renewable energy projects in rural areas noted the potential for wind farms to cause division in rural communities between landowners hosting turbines and other interests. For example, the Tablelands Wind Turbine Action, a group of Atherton Tableland residents concerned about the impacts of wind farms in far north Queensland, highlighted this potential conflict in relation to agriculture:

[27] Clean Energy Council, *Clean Energy Australia Report 2013*, p.18.
[28] Deloitte, *Assessing the Impact of the Renewable Energy Target*, July 2013, p.2.

> *The experiences overseas and in other areas of Australia are the costs of wind turbine developments are externalised to other sectors, especially agriculture. These impacts are wide ranging, beginning during construction when road congestion disrupts agricultural industries which rely on the road network to haul cane, bananas and other produce. (Tablelands Wind Turbine Action, p.2)*

However, many community group and individual submissions expressed strong support for renewable energy including community ownership of renewable power stations. For example, Hepburn Wind's submission stated that:

> *The Hepburn Community Wind Farm is owned by almost 2000 members, the majority of whom are local to the region. With massive volunteer effort and nearly $10m of community capital, the members of Hepburn Wind have shown that under the right conditions, regional communities will embrace the opportunities presented by wind farms. (Hepburn Wind, p.1)*

The Australian Wind Alliance articulated the benefits for rural communities as:

> *… greater income security for farmers, ongoing local jobs, a more diversified economic base, income for rural councils, retention of people in local schools, community and sporting groups…(Australian Wind Alliance, p.2)*

Submissions also noted that renewable energy presents rural communities with opportunities to diversify their electricity supply. For example Regional Development Australia stated:

> *...renewable energy has a key role to play in securing the energy future of the region in remote (off-grid), rural (fringe-off-grid) and regional locations. (Regional Development Australia, p.2)*

3.2.3 Health impacts

In general terms, submissions suggested that electricity generation from pollution free energy should be good for the environment and human health. Engineers Australia noted there are health hazards associated with the mining, transport and burning of coal, citing figures from the Australian Academy of Technological Sciences and Engineering for the health and environmental costs of coal and gas fired electricity.[29]

The Panel also received some submissions raising concerns about adverse health impacts of wind farms. The Panel notes that the Government is addressing these concerns through separate processes involving the National Health and Medical Research Council.

The regulation and approval of wind farm developments, including the setting of noise limits, is a matter for the relevant state and territory authorities. The Australian Government only becomes involved where matters of national environmental significance trigger the application of the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*.

3.2.4 Land uses

Increased renewable energy generation has resulted in a greater amount of land used for wind and solar projects and landowners leasing land for wind turbines have supported renewable generation as an additional source of income. However, some submissions from individuals in regional communities argued that there is no direct benefit to the properties surrounding wind farms yet there are direct negative impacts, such as potential decreases in land values. Many of these concerns are planning matters and are the responsibility of state and territory governments.

[29] Engineers Australia, *Submission to the review of the Renewable Energy Target*, May 2014, p.6.

3.2.5 Broader economic impacts of the RET

The economic impact of the RET is broader than simply the impact on electricity prices. There are several ways these costs can be measured, which include:

- The additional resource cost to the electricity sector. This includes the additional capital expenditure on new generation capacity, refurbishment of existing and new generators, fixed operating costs and variable operating costs (fuel etc.) brought on by the deployment of renewables under the RET.
- The total certificate cost. This is the total cost of certificates created and sold through both the SRES and LRET schemes (i.e., total quantity of certificates multiplied by the price). This represents the value of the cross-subsidy that flows to renewable generators and owners of small-scale renewable energy systems through the RET.
- The economy-wide impact. This represents the total economic impact of subsidising investment in renewable electricity generation. In the case of the RET, this is a cost as the investment in renewables comes at the expense of more efficient investment opportunities elsewhere in the economy and the benefit of the abatement brought about by the RET can be achieved at a lower cost through other methods.

Chapter 5 further discusses these impacts in relation to the current RET scheme, and Chapter 6 provides analysis of the economic impacts of various options for reforming the RET.

3.2.6 Findings: Environmental and social impacts

The RET has encouraged significant levels of employment in both the small-scale and large-scale renewable energy industries. However, this employment occurs as a result of a cross-subsidy that transfers investment from elsewhere in the economy and is offset by other job losses. Net employment is likely to be lower overall as a result of the RET.

Stakeholder feedback suggests that the RET has both positive and negative consequences for broader socio-economic outcomes such as those relating to health, land values, and environmental amenity. The Panel has not conducted in-depth or quantitative analysis of these factors. The Panel notes that there are deeply held and divergent views about the benefit or otherwise of renewables at the community level, with most debate focused upon the impacts of wind farms.

4 APPROACH TO MODELLING THE RET

ACIL Allen was commissioned to model for the Panel the impacts of the current RET scheme and alternative options for the RET on the electricity generation mix, wholesale and retail electricity prices, CO_2-e emissions, renewable energy certificate prices, capital costs and resource costs. While the modelling estimates the effects of the RET on the electricity market, it does not assess broader, economy-wide impacts, which the Panel has also considered, informed by submissions to the Review.

A consultation paper on the proposed approach to key modelling assumptions was released by the Panel as part of its *Call for Submissions*. Feedback on the consultation paper and at the assumptions workshop was considered when the Panel finalised the assumptions. The details of the assumptions are included in ACIL Allen's modelling report. In brief, the key assumptions were developed as follows:

- Electricity demand – uses market operator projections for the NEM and SWIS and previous analysis involving ACIL Allen and the Government for other grids and off-grid generation.
- Capital costs – uses Australian Energy Technology Assessment (AETA) and ACIL Allen projections.
- Gas and coal prices – uses International Energy Agency (IEA) and ACIL Allen projections.

The modelled policy options (scenarios) were chosen to reflect a range of views expressed to the Panel during consultations. The scenarios are as follows:

- Reference case – the current legislated scheme. This includes an LRET target of 41,000 GWh by 2020 and an uncapped SRES scheme, where solar PV installations receive 15 years of deemed certificates (progressively phased out from 2017) and solar water heaters receive 10 years of deemed certificates (progressively phased out from 2022).
- Real 30 per cent by 2030 – the LRET is reset to achieve a 30 per cent share of renewables in the generation mix by 2030, based on the electricity demand projections used in the modelling, and the targets remain at 2030 levels until 2040. There is no change to the current legislated SRES (it remains uncapped and the scheme is progressively phased out by 2030).
- Real 20 per cent by 2020 – the LRET targets are reset to achieve a 20 per cent share of renewables in the generation mix by 2020, based on the electricity demand projections used in the modelling. The LRET targets are maintained at 2020 levels until 2030. The SRES ceases in 2020, with deeming for solar PV lowered from 15 years to 10 years from 1 January 2015 and fixed at that level until 2020.
- 50 per cent share of new growth in electricity demand (scenario added following the modelling workshop) – annual LRET targets are set corresponding to the previous year's target plus a 50 per cent share of expected growth in electricity demand on the main networks and large-scale off-grid demand over the next year. The LRET targets are retained at 2020 levels until 2030. The SRES ends in 2020. Deeming is reduced from 15 years to 10 years for solar PV installations on 1 January 2015, and then reduces by one year each year until 2020 when the deeming rate is five years.

- Repeal of the RET – the complete removal of both the LRET and SRES schemes from 1 January 2015.
- Closing the RET to new entrants – the LRET scheme continues to operate, but only large-scale renewable energy power stations currently accredited under the scheme and those currently under construction or fully committed are able to create LGCs. For modelling purposes a fixed price of $40 in nominal terms per LGC was chosen. The SRES ceases from 1 January 2015, with transitional arrangements in place for those with contracts to install systems.

Reflecting uncertainty in key assumptions, sensitivities of the results to changes in some of the central assumptions were also modelled. The choice of sensitivities was informed by stakeholder views expressed to the Panel. Modelled sensitivities include:

- Low and high electricity demand – uses low and high market operator projections for the NEM and SWIS, while growth in other generation is held flat in the low sensitivity case and grows one per cent faster in the high sensitivity case.
- High capital costs – uses higher wind (around 15 per cent) and higher solar (around 20 to 30 per cent) capital cost projections.
- A shadow carbon price from 2021, starting at around $10 per tonne CO_2-e and growing at three per cent (real) per year thereafter.
- A greater withdrawal of fossil-fuel capacity in response to the large amount of renewable capacity installed in the reference case.

The ACIL Allen modelling has not incorporated the impact of the ERF as information was not avaliable at the time of modelling about the nature and magnitude of the impact of the ERF on electricity markets.

In weighing the results from ACIL Allen's modelling in its deliberations, the Panel has also given consideration to other modelling and analysis of the RET presented in submissions to the Review as well as qualitative submissions on the impact of the RET.

5 THE CURRENT RET POLICY

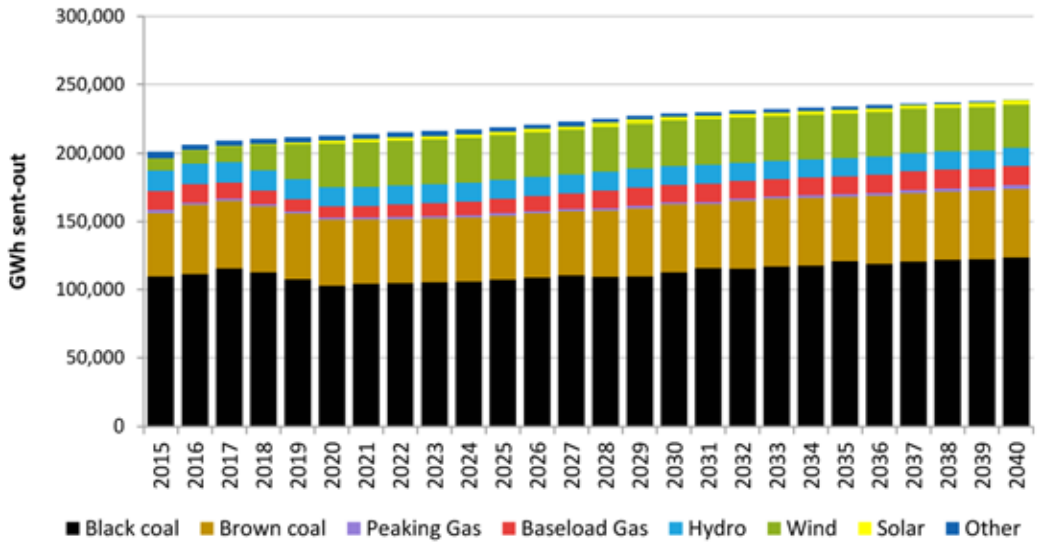
This chapter analyses the impacts of continuing with the RET under current settings (the reference case), measured against a scenario in which there is no RET (the repeal case).

5.1 Generation mix

ACIL Allen projects that around 26,000 GWh of additional renewable generation will be needed to meet the 41,000 GWh LRET in 2020. This would require around 9,000 MW of new renewable capacity to be built to deliver this additional generation. Figure 11 shows that wind development is expected to make up the majority of new renewable generation in the NEM and the SWIS regions over the period 2016 to 2021 and will displace primarily black coal generation. Once the wind development necessary to meet the LRET target is complete, the future generation mix is relatively static, with most generation growth beyond 2020 being met by increased output from existing coal-fired generators.

A small amount of large-scale solar PV installations occur in the regional markets (the North-West Interconnected System, the Darwin-Katherine Interconnected System and Mt Isa) in the period 2018 to 2020 as higher wholesale prices prevail in these regions.

Figure 11 Generation mix: Reference case, 2015 - 2040

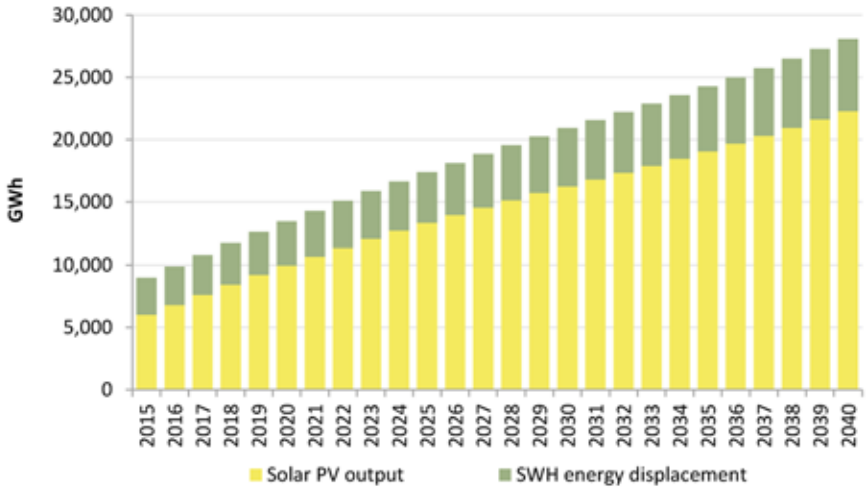


Source: ACIL Allen

Figure 12 shows ACIL Allen's projections for electricity generation from small-scale systems and solar water heaters in the reference case. Generation from small-scale solar PV is expected to increase from around 5,200 GWh in 2014 to 10,000 GWh by 2020 and to 16,300 GWh by 2030. This growth occurs despite declining support from the SRES as certificate deeming rates decline from 2017.

Growth in installations of new solar water heaters is projected to maintain a relatively stable pace, with total installations increasing from an estimated 916,000 at the end of 2014 to over 1.5 million systems by 2030. Annual installations are projected to be around 35,000 to 43,000 systems over 2014 to 2030. The energy displaced from solar water heaters increases from around 2,900 GWh in 2014 to around 3,500 GWh in 2020 and to 4,700 GWh by 2030.

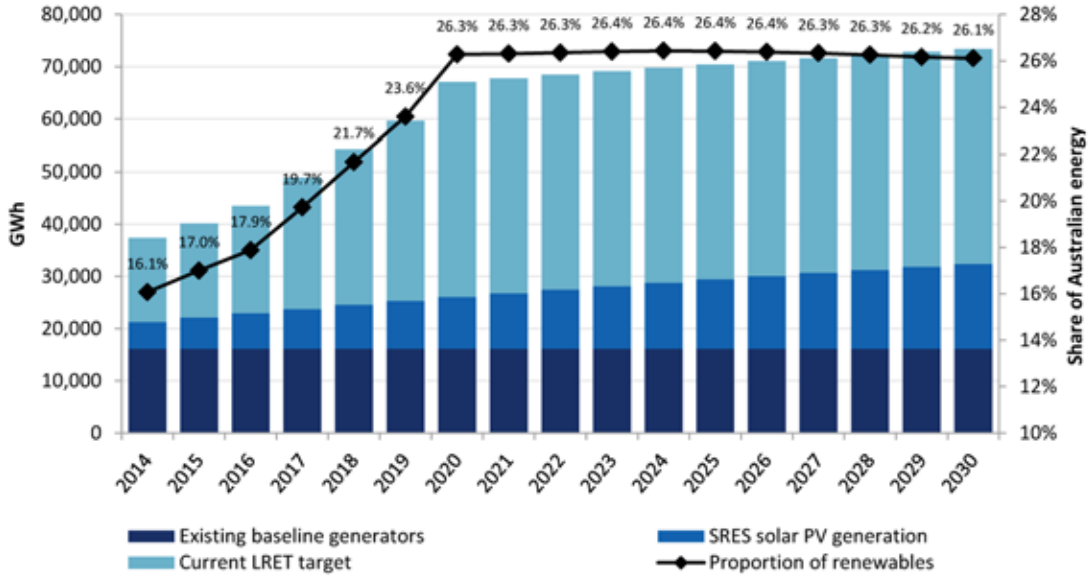
Figure 12 Generation and displacement from small-scale PV and SWH: Reference case, 2015 - 2040



Source: ACIL Allen

ACIL Allen's modelling results for the RET as currently legislated indicate that the proportion of renewables in Australia's energy mix will reach around 26 per cent by 2020 and will then remain steady to 2030 (Figure 13). This percentage for renewable generation does not include energy displaced from solar water heaters and voluntary LGC surrender volumes. The methodology for calculating the share of renewables is discussed in Appendix D.

Figure 13 Proportion of renewables in Australia's electricity mix: Reference case, 2014 - 2030



Source: ACIL Allen

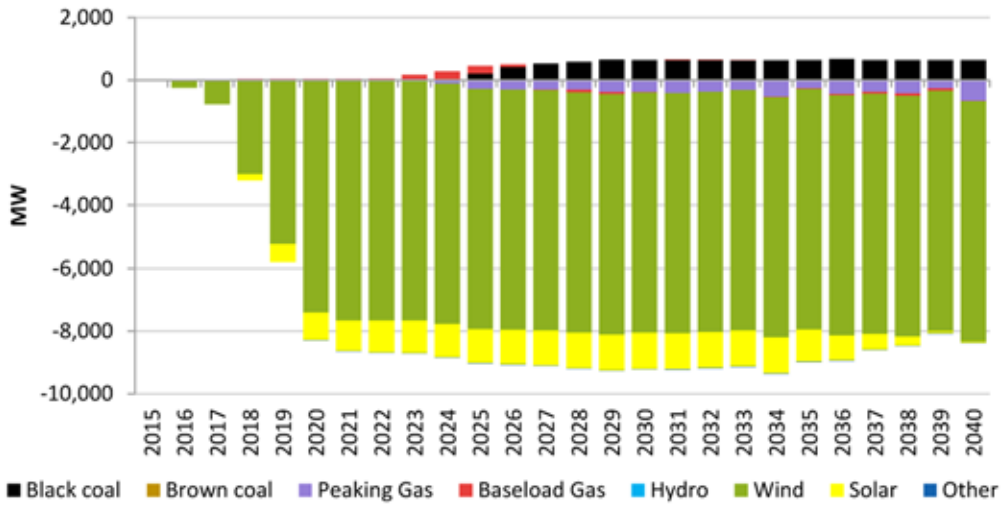
As mentioned in Chapter 3, the deployment of additional renewable generation capacity under the RET has the effect of displacing the output of incumbent fossil fuel generators. The ACIL Allen modelling projects that some of the 4,155 MW of currently mothballed coal capacity will

come back to service over the next couple of years as a result of the repeal of the carbon tax and lower gas plant utilisation (one gas-fired plant, Swanbank E, is expected to be taken offline in 2014 and replaced with one of the currently mothballed coal-fired plants, Tarong). However, the modelling suggests a further 1,200 MW of black and brown coal-fired generating capacity will be subsequently withdrawn from the market by 2020.

Figure 14 compares the ACIL Allen modelling results for the new generation capacity that would be built if the RET is repealed relative to the current RET scheme. It shows that while almost 9,000 MW of renewable generation capacity is required by 2030 to meet the current RET, only 640 MW of additional new coal capacity in the SWIS and a small amount of new baseload gas capacity would be brought forward in the absence of the scheme. This underlines that the vast majority of the generating capacity that would be brought on by the LRET – predominantly wind farms – is surplus to market needs. Without this additional wind capacity, mothballed existing capacity would return to service sooner as market conditions warrant.

The 2014 *Electricity Statement of Opportunitites* released by AEMO estimates that there is more than 7,500 MW of generation capacity that could be removed from the NEM without disrupting system adequacy.[30]

Figure 14 Change in new installed capacity: 'Repeal' – Reference case, 2015 - 2040

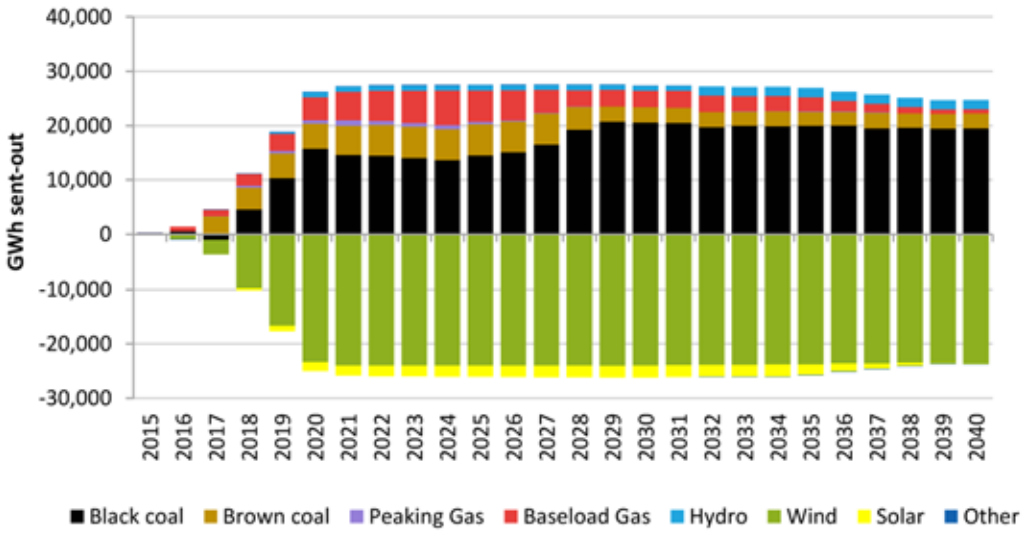


Source: ACIL Allen

The ACIL Allen modelling shows (Figure 15 and Figure 16) that if the RET were to be repealed, the additional wind and solar generation that occurs under the RET would be replaced by coal and a small amount of gas-based generation.

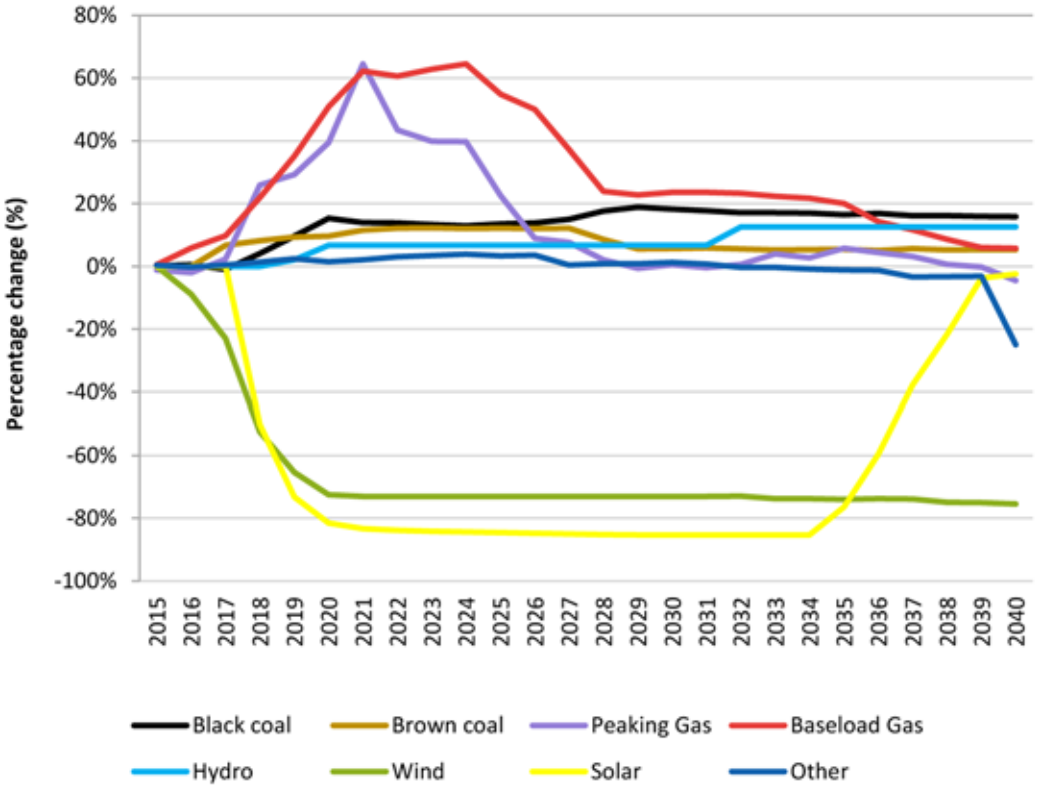
[30] Australian Energy Market Operator, *Electricity Statement of Opportunities for the National Electricity Market*, August 2014.

Figure 15 Change in generation mix: 'Repeal' – Reference case, 2015 - 2040



Source: ACIL Allen

Figure 16 Percentage change in generation mix: 'Repeal' – Reference case, 2015 - 2040



Source: ACIL Allen

5.2 Can the LRET be met?

An important consideration is whether it is feasible that 9,000 MW of new renewable capacity can be built in time to meet the 41,000 GWh generation target by 2020.

Information on the planning and development of large-scale renewable energy projects is contained in BREE's 2013 Electricity Generation Major Projects Database and AEMO's 2014

Electricity Planning Database. The CER has investigated the status of these projects in 2014 and its findings are shown in Table 2. The project pipeline consists of 16,800 MW of wind farm projects and 1,700 MW of large-scale solar projects, and about 6,000 MW of this has planning approval. Given this pipeline, it appears technically possible that sufficient projects could go ahead to reach the target, subject to the resolution of commercial contracts and the availability of finance.

Table 2 Large-scale renewables project pipeline

Project Status	Capacity (MW)
Project Status Monitoring/economic feasibility/waiting for RET Review outcome before conducting approvals	6,850
Undergoing approvals/approvals finished, other issues require solving before financial close	4,750
Has all approvals and will go ahead if financially viable	6,000
Is undergoing construction/will go ahead	900
Total	**18,500**

Source: Information provided by the Clean Energy Regulator to the RET Review Secretariat

A number of stakeholders expressed a view on the likelihood of the current legislated target being met. Some had the view that the industry is on track to meet the current target. For example, Infigen Energy stated:

> *The rate of build of new renewable energy plant is keeping pace with the current target trajectory to date, and there is currently 15,799 MW of proposed wind generation and 639 MW of proposed solar generation projects, of which ~6,000 MW have already received development approval. Therefore there is a sufficiently advanced project development pipeline to meet the current LRET scheme, which would require 6,000 – 8,000 MW of new capacity between now and 2020, subject to the restoration of regulatory certainty. (Infigen Energy, p.15)*

Acciona, a wind farm owner that has a pipeline of large-scale renewable energy projects in Australia, stated in its submission:

> *In addition to those projects already developed, there are around 5,000 MW of capacity that is permitted and ready for construction, in addition to over 10,000 MW of projects in the planning and permitting stage. (Acciona Energy, p.4-5)*

Other stakeholders suggested that the target will not be met on time due to the regulatory uncertainty surrounding the RET, the oversupply of generation capacity and the build rate for renewables. For example, the submission from the Energy Supply Association of Australia, drawing on modelling by Oakley Greenwood, stated:

> *Oakley Greenwood's modelling shows that based on current market environment – low demand, low wholesale prices and an oversupply of generating capacity – the existing RET is unlikely to be met economically. Wholesale prices have become unbalanced because falls in demand have not been matched by falls in supply. Aside from the LRET requiring new entrant plant, existing plant is not exiting in a timely manner, in strong measure due to the significant barriers to exit that exist. (Energy Supply Association of Australia, p.3)*

EnergyAustralia also had the view that the LRET would not be achieved:

> *Deployment of 10,000 MW of new large-scale renewable generation required to achieve the legislated LRET of 41 TWh by 2020 is virtually impossible for two key reasons:*
>
> - *The current 'new build' rate for large-scale renewable generation would need to increase more than 5 fold, from an average of 300 MW per year to about 1500 MW per year — it is important to note that the time required to undertake adequate community consultation for the development of new projects presents a challenge at even the current rate of 'new build'.*
>
> - *suppressed wholesale electricity market conditions are testing the economics of investment proposals which are highly sensitive to the LRET certificate value, the duration over which certificates can be created and the wholesale price of energy over the life of a project — the combination of an oversupplied wholesale generation market, imminent removal of the carbon price and RET policy uncertainty, make it extremely difficult for the market to finance and deploy substantial volumes of large-scale renewable generation capacity by 2020. (EnergyAustralia, p.4)*

5.3 Resource costs

There is an economic cost associated with building new generation infrastructure that is not necessary to meet demand for electricity. ACIL Allen estimates that new capital expenditure on large-scale generation required under the RET is $15 billion by 2030 in net present value (NPV) terms, and only $2 billion of this would be required if the RET is removed.

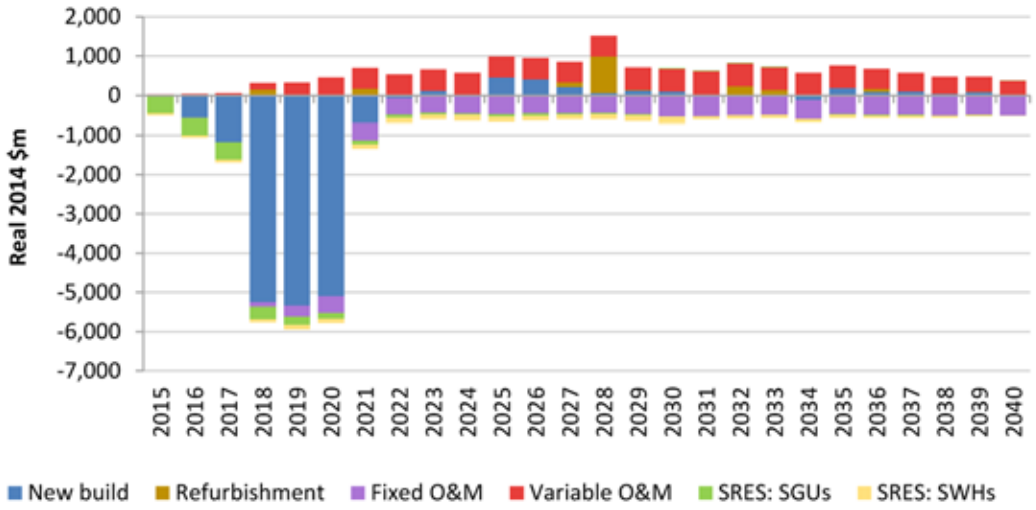
Other modelling reports provided to the review have also estimated the capital costs of the current RET scheme. For example, the modelling undertaken by Deloitte estimates there is a $10.2 billion increase in investment in NPV terms should the RET continue in its current form relative to repeal and modelling by ROAM Consulting for the Clean Energy Council suggests that additional investment of nearly $15 billion in NPV terms would be required under the RET by 2019-20.[31]

ACIL Allen estimates that total resource costs for the generation sector in the reference case total approximately $122 billion in NPV terms over the period to 2040. This includes capital expenditure on large-scale electricity generation, investment in small-scale solar PV and solar water systems, refurbishment of existing new generators and fixed and variable operating costs. The largest component of this cost is new build costs followed by fixed and variable operating costs associated with fuel and maintaining the existing generation fleet Network costs are not included in these estimates.

If the RET were repealed, resource costs for the sector would total approximately $108 billion. Figure 17 shows that additional resource costs of continuing with the current RET scheme (compared to repealing the scheme) are estimated to be around $14 billion in NPV terms.

[31] ROAM Consulting, *RET Policy Analysis*, 2014, p.4.

Figure 17 Change in generation sector resource costs: 'Repeal' – Reference case, 2015 - 2040



Source: ACIL Allen

Submissions also pointed out that the economy-wide cost of the cross-subsidy to renewable generators could be greater than the direct costs to the electricity sector. For example, the Australian Industry Greenhouse Network stated:

> *AIGN's submission highlights the distributional impacts of the RET on industry with a particularly heavy burden borne by the Other Metals sector and other energy intensive sectors. The burden is imposed on a few highly exposed sectors, and is contrary to the general proposition that climate policies should allow for economic growth.*
>
> *Overall, the long run reduction in GDP resulting from the RET is around 0.2 per cent each year (this is the reduction in GDP compared with what it would have been without the RET). This is a large impact for a single policy. The GDP cost needs to be assessed against the claimed benefits of the RET. (Australian Industry Greenhouse Network, p.2-3)*

ACIL Allen estimates that the total cross-subsidy provided to renewable energy through the RET will be in the order of $22 billion over the period 2015 to 2030 in NPV terms, $19 billion of which is associated with large-scale investment. The ACIL Allen modelling did not estimate the economy wide impacts of the RET scheme – the costs that result from investment being diverted to renewables and away from more efficient investment opportunities elsewhere in the economy.

The Government has identified the importance of lifting Australia's productivity performance in raising the living standards of Australians in the longer term.[32] The investment forced by the RET scheme will reduce multi factor productivity (MFP) in the electricity sector as more capital is unnecessarily deployed for no increase in output. The Productivity Commission noted recently that:

> *To the extent that demand growth can be met without the need for new investments in capacity, this should provide positive impetus for measured MFP growth in the electricity sector. (Productivity Commission, p.15)*[33]

[32] Commonwealth of Australia, *Budget Paper No. 1, Statement 4: Sustaining strong growth in living standards.*
[33] Productivity Commission, *PC Productivity Update*, April 2014, p15.

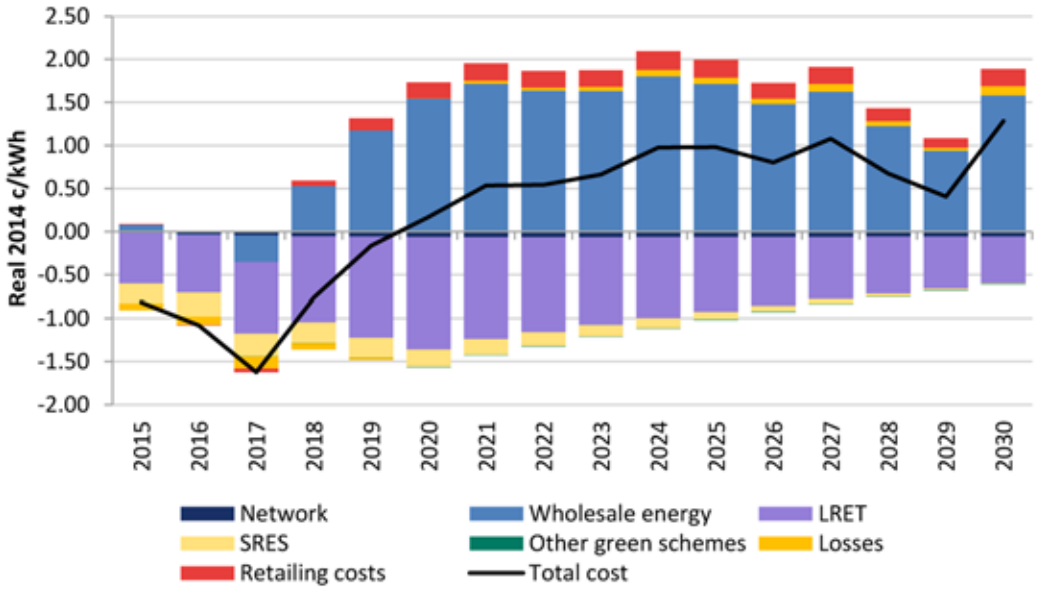
An indication of the consequences of lower productivity and the longer term cost to living standards comes from modelling by Deloitte that suggests that the distortionary effects of subsidising higher cost renewable technologies will reduce cumulative real Gross National Product (GNP) in NPV terms by around $33 billion to 2030.[34]

5.4 Electricity prices

The ACIL Allen modelling results indicate that under the current RET scheme, wholesale electricity prices would fall slightly over the period 2015 to 2020 due to significant amounts of new wind capacity entering the market. Wholesale electricity prices then rise slowly from 2025 onwards, as demand growth begins to absorb the excess generation capacity. Lower wholesale prices outweigh the direct cost of certificates over the period 2020 to 2030, meaning that retail electricity prices over this period are lower with the RET in place.

However, the cumulative impact of the RET on household bills over time appears to be small. The ACIL Allen modelling shows (Figure 18) that repealing the RET would lead to a small increase in electricity prices over the period 2020 to 2030, but prices would remain within 1.5 per cent of current levels. The NPV of the cost of the RET to households is estimated to be $247 over the period 2015 to 2020 and one dollar over the period 2015 to 2030 (Figure 19).

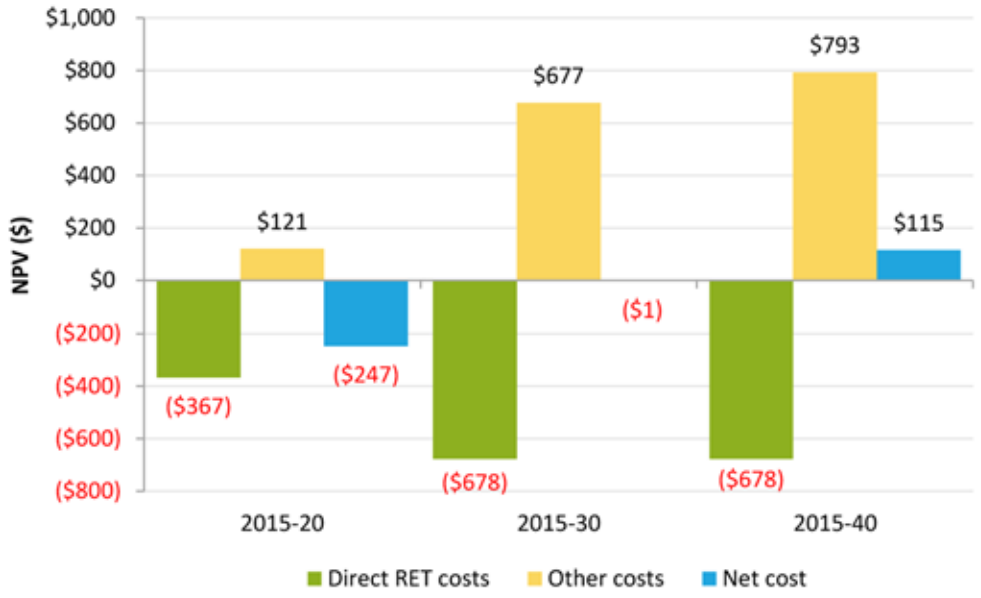
Figure 18 Change in annual residential retail electricity prices: 'Repeal' – Reference, 2014 - 2030



Source: ACIL Allen

[34] Deloitte, *Assessing the impact of the Renewable Energy Target scheme*, July 2014, p25.

Figure 19 NPV of change in residential retail bills: 'Repeal' – Reference case, 2015 - 2040



Source: ACIL Allen

Other modelling exercises present varying results for the net impact of the RET on retail electricity prices.

Similar to the ACIL Allen modelling, modelling undertaken by ROAM Consulting, Bloomberg New Energy Finance and Schneider Electric show that repealing the RET would result in lower retail electricity prices initially, but higher retail prices in the medium term due to a rise in wholesale electricity prices.

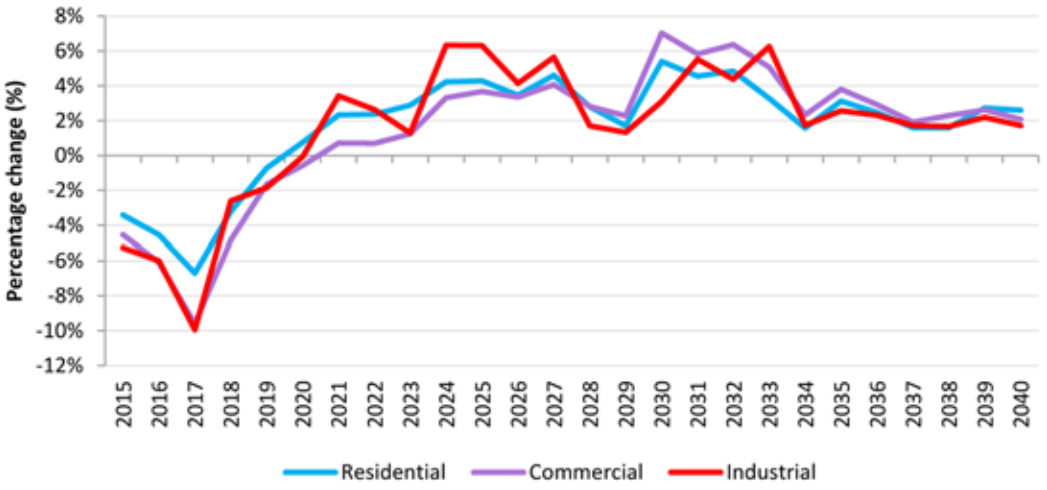
Modelling by Deloitte indicates that retail electricity prices will remain lower if the RET is repealed, on average by $50 per year from 2014 to 2020 as the savings in certificate costs are greater than the increase in wholesale prices.[35] Modelling by Frontier Economics for the AEMC found that the RET will increase retail prices in the period to 2020, but from the mid-2020s the impact of the RET on electricity prices is uncertain.

For businesses, the ACIL Allen modelling shows that as a share of retail electricity costs, direct RET costs will peak in 2020 at nine per cent for commercial consumers and 11 per cent for non EITE industrial consumers. ACIL Allen's modelling indicates the cost impact of the RET for commercial and industrial businesses declines after 2020 due to lower wholesale prices and lower LGC prices.

Figure 20 shows the ACIL Allen modelling results for the change in retail electricity prices for different consumers when the RET is removed.

[35] Deloitte, *Assessing the impact of the Renewable Energy Target scheme*, July 2014, p.19.

Figure 20 Change in average retail electricity prices: 'Repeal' – Reference case, 2015 - 2040

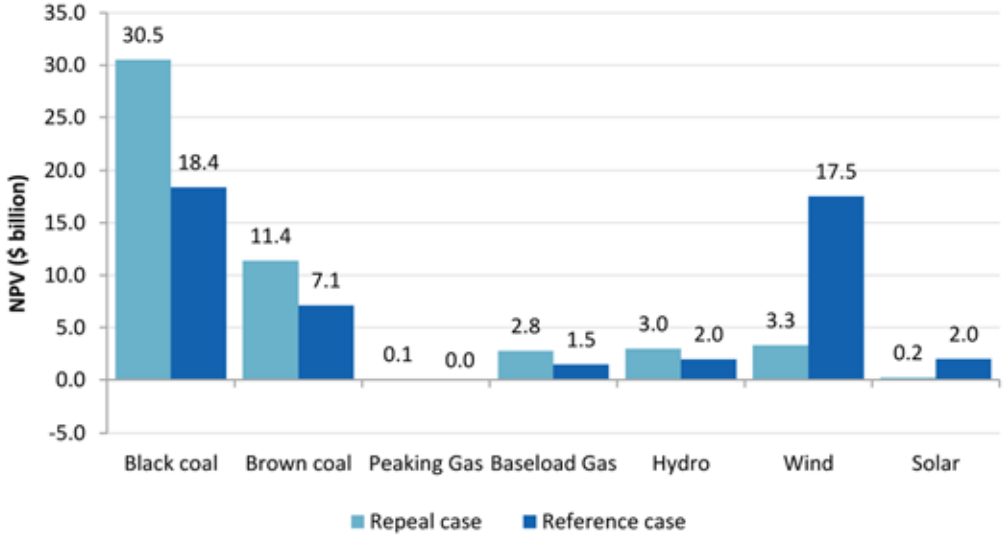


Source: ACIL Allen

In contrast to the ACIL Allen modelling results, the Deloitte modelling concluded that electricity prices for businesses would be marginally higher under the current RET and this would flow through to other sectors of the economy, having a dampening effect on economic activity.

The ACIL Allen modelling indicates that the suppression of wholesale prices will come at the expense of revenues of incumbent generators. Figure 21 shows the net revenue of generators under the current RET policy compared with having no RET in place, including revenue from the sale of wholesale electricity and certificates.

Figure 21 Revenue to generators: 'Repeal' and Reference case, 2015 - 2040



Source: ACIL Allen

Some submissions questioned the extent to which incumbent capacity will respond to demand signals. In theory, incumbent plant will only continue operating while wholesale electricity prices cover variable operating and maintenance (O&M) costs. However, a number of stakeholders suggested that incumbent fossil fuel generators may have an incentive to keep operating even

when O&M costs are not covered in the short-run. If a generator could stay in operation and avoid being the first to exit, it may benefit from the departure of a competitor, as this would tighten the supply-demand balance in the electricity market and raise wholesale prices for the remaining generators. Other factors, such as contractual arrangements and the prospect of large site remediation costs may also lead to deferred exit from the market.

There is a risk that lower profits flowing to incumbent generators could lead to less investment in existing power stations, including maintenance expenditure, and could result in lower reliability of supply from these generators over time. Some submissions noted that subdued wholesale prices distorted investment signals away from meeting demand efficiently when needed. For example, the submission from the AEMC stated:

> *In the NEM, the efficacy of the price signal is critical to market participants making efficient decisions. This is because short term dispatch and long term investment decisions are driven primarily by wholesale market prices or derivative prices in the contract market. If prices are influenced by external factors unrelated to supply and demand (e.g. subsidies that favour specific technologies), this can result in an inefficient mix of generation being dispatched. Over the longer term, it can result in an inefficient level of investment in capacity, increasing costs for consumers. (AEMC, p.8)*

The extent to which renewable energy deployed under the RET can reduce wholesale electricity prices in the long-run is unclear. When new capacity (either thermal generation or unsubsidised renewable generation) is eventually required in the market, wholesale electricity prices should rise to equal the long-run marginal cost of the new entrant. This was noted in submissions that argued that while the RET may depress wholesale prices, it still represents a cross-subsidy paid by incumbent generators and cannot be efficient in the long-run. For example, a Principal Economics report provided by the Minerals Council of Australia argued that:

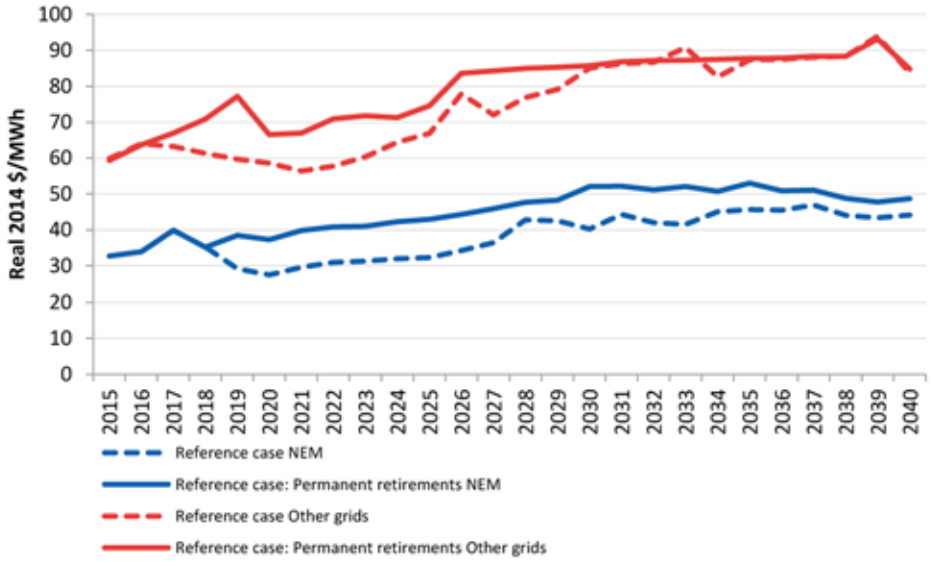
> *In the NEM, the LRET has had the effect of depressing wholesale prices and reducing the revenues of existing thermal generators. Falling wholesale prices tend to offset some of the cost burden of the RET on consumers, but this outcome cannot be considered a 'benefit'. Artificially depressed prices have effectively stranded a share of thermal capacity, which is progressively being withdrawn from the market. Any wholesale price reductions observed to date are therefore likely to be short-lived. Longer-term, a policy such as the RET that reduces wholesale prices undermines investment in thermal capacity that is essential to maintaining reliable electricity supply. (Minerals Council of Australia, p.2)*

In modelling the reference case, ACIL Allen has assumed that incumbent fossil fuel power stations will withdraw from the market temporarily as additional renewable capacity is deployed, to ensure that all remaining plants are operating on a commercial basis. As market conditions improve over time, this capacity is returned to service. ACIL Allen also modelled a sensitivity where the supressed profitability of incumbent fossil fuel generators led to around 2,400 MW of capacity being withdrawn over the period 2017 to 2021 and not being returned to service over the remainder of the modelling period.

The results for the sensitivity show that if generation plant retires permanently, continuation of the current RET scheme would lead to higher retail electricity prices. In the reference case, the RET has the effect of supressing wholesale electricity prices due to an over-supply of generation capacity in the market. If plant is retired permanently, the modelling suggests this wholesale price suppression would not occur and wholesale electricity prices would be well above the price estimated for the reference case (Figure 22).

Permanent retirement of fossil fuel plant would increase the NPV of household electricity bills by $584 over the period 2014 to 2030 compared with the reference case.

Figure 22 Wholesale electricity prices: 'Permanent retirement sensitivity' and Reference case, 2015 - 2040

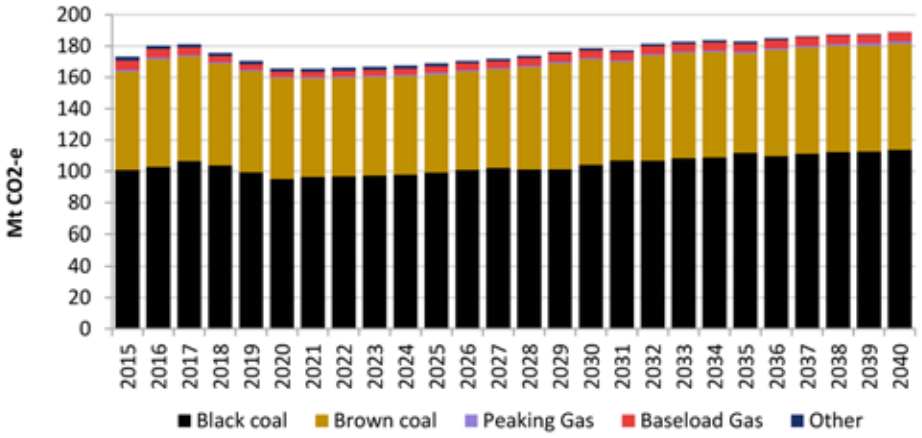


Source: ACIL Allen

5.5 Carbon dioxide emissions

Figure 23 shows ACIL Allen's modelling results for annual CO_2-e emissions from the electricity sector to 2040 under the RET. Annual CO_2-e emissions increase in the short term with the withdrawal of the carbon tax and decreased output from east coast gas-fired generation (largely a result of increasing wholesale gas prices), before declining out to 2020 as a result of renewable energy development. Emissions increase thereafter as more fossil fuel generation is deployed.

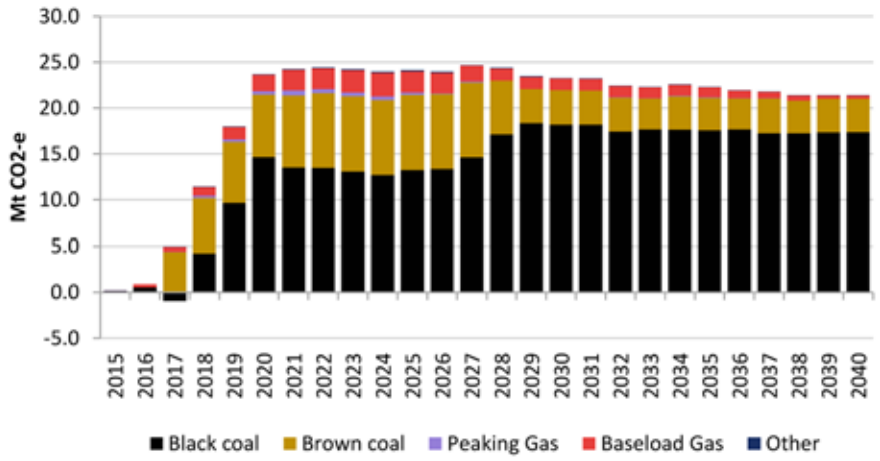
Figure 23 Annual CO_2-e emissions from the electricity sector: Reference case, 2015 - 2040



Emissions for the generation sector only. Excludes non-scheduled generation in NEM regions and own-generation generation in the SWIS and off-grid generation. Source: ACIL Allen

Figure 24 shows the ACIL Allen modelling results of the impact of repealing the RET on annual CO_2-e emissions. Repealing the RET is estimated to lead to an increase in annual emissions of about 24 Mt CO_2-e from 2020 to 2030. Cumulative emissions would increase by 58 Mt CO_2-e over the period 2015 to 2020 and by 299 Mt CO_2-e over the period 2015 to 2030.

Figure 24 Increase in annual emissions from repealing the RET: 'Repeal' – Reference case, 2015 - 2040



Average emissions for modelled grids. Excludes non-scheduled generation in NEM regions, own-generation in the SWIS and off-grid generation. Source: ACIL Allen

A number of other modelling exercises have produced comparable results. Bloomberg New Energy Finance estimates that removing the RET would increase cumulative emissions from the power sector by 57.3 Mt CO_2-e over the period 2015 to 2020 and 259 Mt CO_2-e over the period 2015 to 2030.[36] Modelling by ROAM Consulting for the Clean Energy Council found that cumulative emissions would be 34.7 Mt CO_2-e higher by 2019-20 if the RET is repealed[37] and modelling by Schneider Electric suggests that removing the LRET would increase cumulative emissions in the National Electricity Market by around 50 Mt CO_2-e by 2020 and by 260 Mt CO_2-e by 2030.[38]

CO_2-e emissions from the electricity sector have declined significantly from 2009 to the present. A number of factors contributed to this decline, including one off supply events such as milder weather conditions, the Queensland floods and the closure and/or reduced production from energy-intensive activities. Longer term trends also contributed to the decline in emissions including reduced absolute demand for electricity, uptake of renewable generation (both large and small-scale) and lower growth in economic activity.

Projections for CO_2-e emissions from the electricity sector are also lower than in the past. CO_2-e emissions are forecast to rise slightly over the medium term to 2020 before growing steadily from 2020 to 2030 attributed to growth in demand from LNG facilities and increased generation from black coal capacity.[39] The reduction in CO_2-e emissions from the electricity sector and the lower projected growth means that a smaller contribution is required from the RET in order to achieve CO_2-e emissions reductions in the sector.

[36] Bloomberg New Energy Finance, *Modelling Options for Australia's RET Review*, May 2014, p.14.
[37] ROAM Consulting, *Report to Clean Energy Council, RET Policy Analysis*, April 2014, p.44.
[38] Schneider Electric, *Australia's Large-scale Renewable Energy target: Three Consumer Benefits*, April 2014, p.8.
[39] Commonwealth of Australia (2013), *Australia's Abatement Task and 2013 Emissions Projections*.

5.6 Cost of abatement

The cost of abatement is an estimate of the cost of a policy measure in reducing CO_2-e emissions, expressed in dollars per tonne of abatement. It is a tool that enables an assessment of the relative cost-effectiveness of different emissions reduction policies. As a key objective of the RET is to lower CO_2-e emissions in the electricity sector, the cost of abatement of the RET is an important consideration when assessing the merits of the scheme.

Two methodologies were used by ACIL Allen to calculate the cost of abatement from the RET. Both used the present value of the change in resource costs[40] (the numerator), while one method applied a discount factor to the change in emissions (the denominator). In addition to the choice of methodology, the cost of abatement estimate depends on modelling assumptions, particularly capital costs.

ACIL Allen's estimates for the cost of abatement of the RET are summarised in Table 3. The cost of abatement of the current RET policy is estimated to be $35 to $68 per tonne over the period 2014 to 2030, with the SRES being higher than the LRET at $95 to $175 per tonne in comparison with $32 to $62 per tonne to 2030.

Table 3 ACIL Allen estimates of the cost of abatement of the RET ($/t CO_2-e)

	2014 to 2030			2014 to 2040		
	RET	LRET	SRES	RET	LRET	SRES
Undiscounted	**35**	**32**	**95**	**25**	**22**	**79**
Discounted	**68**	**62**	**175**	**62**	**56**	**185**

Similar cost of abatement estimates have recently been made elsewhere. Modelling by Frontier Economics estimates that the cost of abatement from the RET is between $55 and $65 per tonne.[41] Modelling by Deloitte estimates the cost of abatement (based on LGC costs alone) of the RET to be $72 per tonne in 2020, increasing to $82 per tonne in 2030.[42]

These estimates of the cost of abatement can be compared with estimates from other CO_2-e emission reduction measures. ClimateWorks has used bottom-up modelling to develop a CO_2-e emissions reduction cost curve that estimates the size and cost of CO_2-e emissions reduction opportunities across Australia for the year 2020.[43] This analysis helps to identify the scope for potential CO_2-e emissions reductions that could result if various actions were implemented across the economy. The analysis indicates that there are many measures offering abatement at lower cost compared with the RET, such as energy efficiency improvements and pasture and grassland management measures.

[40] Described in Section 5.3
[41] Frontier Economics, *RET Review Analysis*, June 2014, p.32.
[42] Deloitte Access Economics, *Assessing the impact of the renewable energy target scheme*, July 2014, p.20.
[43] ClimateWorks, *Low Carbon Growth Plan (2011 update)*, 2011.

5.7 Findings: Continuation of the current RET scheme

Technically, there is a sufficient pipeline of renewable energy projects for the 41,000 GWh LRET to be met in 2020, subject to the resolution of commercial contracts and the availability of finance. However, the increasing targets to 2020 necessitate a significantly higher build rate of renewable energy power stations than has been required to date.

Under current settings, assuming the 41,000 GWh target is met the RET could deliver a renewable energy share of around 26 per cent in 2020, with the RET resulting in an additional 9,000 MW of new large-scale renewable generation capacity, entailing capital expenditure of around $15 billion in NPV terms.

In the absence of the RET, over the period to 2030 none of this investment in large-scale renewable generation is likely to be needed and only a very small amount of fossil-fuel capacity would be likely to be built. This highlights that the additional investment in generation capacity to 2020 resulting from the RET is not required to meet electricity demand, based on current projections.

Generation from small-scale solar PV is expected to roughly treble by 2030, despite support under the SRES gradually phasing out over this period. With the SRES in place, the installation of solar water heaters continues at a steady pace.

The RET as currently legislated would deliver a cross-subsidy, as measured by the value of renewable energy certificates created under the LRET and SRES, to the renewable energy sector of around $22 billion in NPV terms from 2015 to 2030.

With the RET in place, modelling shows that retail electricity prices could be expected to be higher to 2020 but lower thereafter. Over the period to 2030, these outcomes balance each other out such that households pay almost the same with or without the RET. However, these results are sensitive to the response of incumbent generators. If incumbent generators shut down permanently, rather than temporarily, the additional renewable generation capacity deployed as a result of the RET would lead to increased retail electricity prices.

The RET is estimated to deliver cumulative emissions reductions of around 58 Mt CO_2-e from 2015 to 2020, compared with there being no RET in place. Modelling for the review provides estimates of the cost of abatement of the RET in a range from $35 to $68 Mt CO_2-e over the period 2014 to 2030.

5.8 Conclusion

To meet its five per cent CO_2-e emissions reduction goal, the Government's projections indicate that Australia needs to reduce its cumulative emissions by 421 Mt CO_2-e in the period to 2020, including by 131 Mt CO_2-e in 2020. The CO_2-e emissions reduction task has fallen over recent years due to declining industrial activity, reduced demand for electricity and a carry-over of surplus emissions units from exceeding the target in the first commitment period of the Kyoto Protocol (2008 to 2012). It could fall further if industrial activity or electricity demand more generally, continues to decline. Nonetheless, Australia will need to lower its CO_2-e emissions below current levels to meet the target.

In 2012, electricity generation contributed just over one-third of Australia's CO_2-e emissions. Emissions from this sector have been declining, in part due to declining demand for electricity but also as a result of government policies including the RET, solar PV feed-in-tariffs and energy efficiency measures. However, access to cheap and reliable power (historically, predominately provided by coal) helps to underpin Australia's economic growth and Australia needs to balance its emissions reduction efforts with the need to maintain this source of competitive advantage.

To the extent that policies are required to meet Australia's five per cent CO_2-e emissions reduction target and longer term goals, a policy targeted directly at CO_2-e emissions reduction would be more efficient than a policy such as the RET that may promote renewable generation ahead of other lower cost abatement opportunities in other areas of the economy. The Government has repealed the carbon tax and is adopting the ERF as the primary mechanism for meeting the 2020 target.

Most recent modelling exercises suggest that the RET is exerting some downward pressure on wholesale electricity prices, largely because the RET is increasing the supply of electricity when electricity demand has been falling. There is some uncertainty over these results in the long term, and the ACIL Allen modelling showed that different assumptions around the permanent withdrawal of fossil fuel plant from the market could lead to different wholesale electricity price outcomes. Nonetheless, all of these studies indicate that the net impact of the RET on retail electricity prices, whether positive or negative, is relatively small.

The Panel considers that the RET is providing an incentive for investment in renewable generation that is not required to meet demand for electricity and is not viable without the cross-subsidy from the RET. This subsidy is substantial, in the order of $22 billion from 2015 to 2030 in NPV terms, and is funded by a wealth transfer from incumbent generators, electricity retailers and consumers.

The Panel considers that the significant changes that have occurred, and will continue to occur, in the Australian economy since the expanded RET scheme was put in place in 2010 will cause the RET to have much greater costs to Australians than was anticipated.

Given the findings of this review, that $13 billion of new large-scale generation capacity built under the RET will not be required in light of lower demand for electricity, and that the benefits of the scheme, in terms of reductions in CO_2-e emissions, come at high cost per tonne, the Panel concludes that significant reform is required.

In deciding the appropriate extent and nature of the reform that is called for, the Panel considers that the clear aim of such reform should be to avoid, or materially reduce, the cost to the community of this cross-subsidy. In doing so, the effects of potential changes and their impacts on different groups need to be understood and weighed, while the effect of the scheme, and changes to it, on the secure and reliable supply of energy services also needs to be considered. It is crucial that reform achieves a better balance between the interests of the renewable energy sector and those of the economy as a whole than the present legislation delivers.

Recommendation 1: The Renewable Energy Target (RET) should be amended in light of the changing circumstances in Australia's main electricity markets and the availability of lower cost emission abatement alternatives.

6 OPTIONS FOR REFORMING THE RET

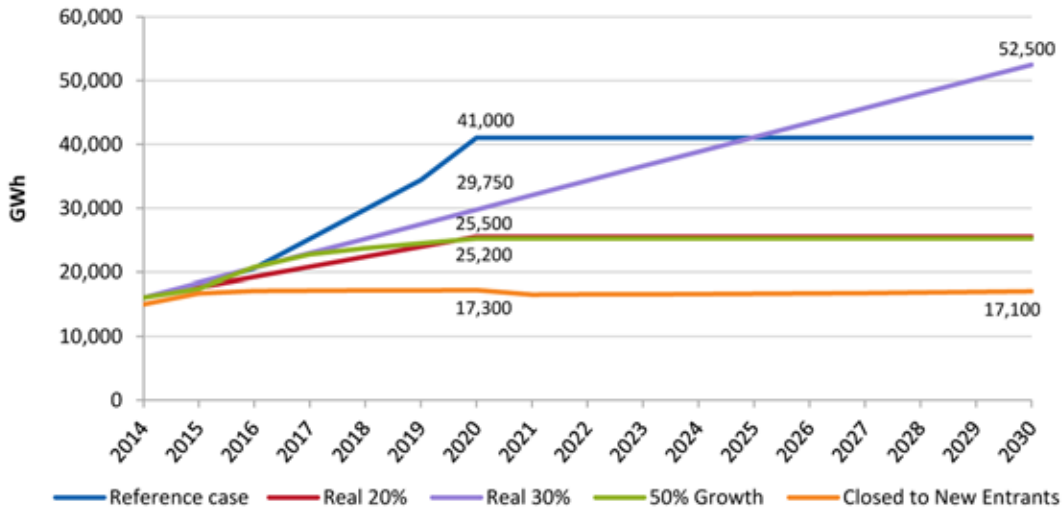
During the course of this review stakeholders advocated potential changes to the RET scheme that broadly fall within the scenarios described earlier in Chapter 4. This chapter examines these five scenarios in turn and sets out the implications of each, as suggested by both the modelling results and stakeholders themselves, in order to assess the ability of each to achieve the significant reform that the Panel has identified is needed. The LRET is addressed in the first part of the chapter and the SRES in the second.

As outlined in Chapter 4, various sensitivities were run against the scenarios to examine how results change with different modelling assumptions. In most cases, the sensitivities did not materially affect modelling outcomes. Instances where a sensitivity makes a material impact on results are noted in the sections that follow. For example, the outcomes of the share of growth scenario are, by design, responsive to changes in electricity demand, and this is discussed in Section 6.1.3.

6.1 Options for reforming the LRET

Figure 25 below shows the profile of targets for large-scale renewable generation under each of the scenarios modelled (noting that under the 'repeal' scenario there would be no formal target profile and the same level of generation would result as in closing the RET to new entrants).

Figure 25 Target profiles for LRET options, 2014 - 2030



Source: ACIL Allen

6.1.1 Extending the LRET to a 'real 30 per cent'

Some environmental groups, community groups and individuals expressed support for ambitious and increasing renewable targets that would achieve a greater share of renewables beyond 2020 than the current RET scheme. For example, 350.org submitted:

> *We believe that it would be appropriate to raise the LRET in a steady, predictable way, and to continue to raise it until renewable energy represents the overwhelming majority of Australia's energy requirements… We suggest that the Australian target be based on a similar objective, with appropriate intermediate targets, such as 35 per cent by 2030 and 45 per cent by 2040. (350.org, p.4)*

Alternatively, some stakeholders suggested reducing the 2020 LRET, but continuing to increase it beyond 2020 as a means of providing long-term support for renewables, while reducing the current impacts of the RET on the electricity market. For example, Snowy Hydro submitted:

> *The current 41,000 GWh target by 2020 is technically feasible. However achieving this may create significant distortions in the energy market due to a combination of low demand and low wholesale energy prices. For this reason, moderating the 2020 target, extending the end date out further beyond 2030, and keeping the total number of LGCs whole may be a more appropriate target and trajectory for the LRET. (Snowy Hydro, p.4)*

In a similar approach, the New South Wales Government supported retaining the 41,000 GWh LRET target, but extending the timeframe to the stage where 41,000 GWh matches 20 per cent of demand:

> *An alternative option then is to keep the existing target, but extend the timeframe for achieving it, until it is consistent with a true 20 per cent level. This would allow a more incremental increase in renewable energy capacity over a period that may be more in line with forecast requirements for new capacity. The timeframe for the target should give consideration to providing industry certainty and a sensible investment period for attracting finance. (New South Wales Government, p.15)*

In a slightly different approach, renewable energy developers, operators and financiers supported the current legislated target of 41,000 GWh by 2020, but proposed retaining the 41,000 GWh target to 2035 or 2040 (rather than 2030) to allow projects to secure PPAs, finance and earn a greater return on investment.

For example Infigen Energy's submission stated:

> *Infigen also submits that maintenance of the present target should also include extension of the requirement to meet the target until at least 2040 because the investment horizons for new generators are at least 20 years. (Infigen Energy, p.28)*

The submission from the Investor Group on Climate Change expressed a similar view:

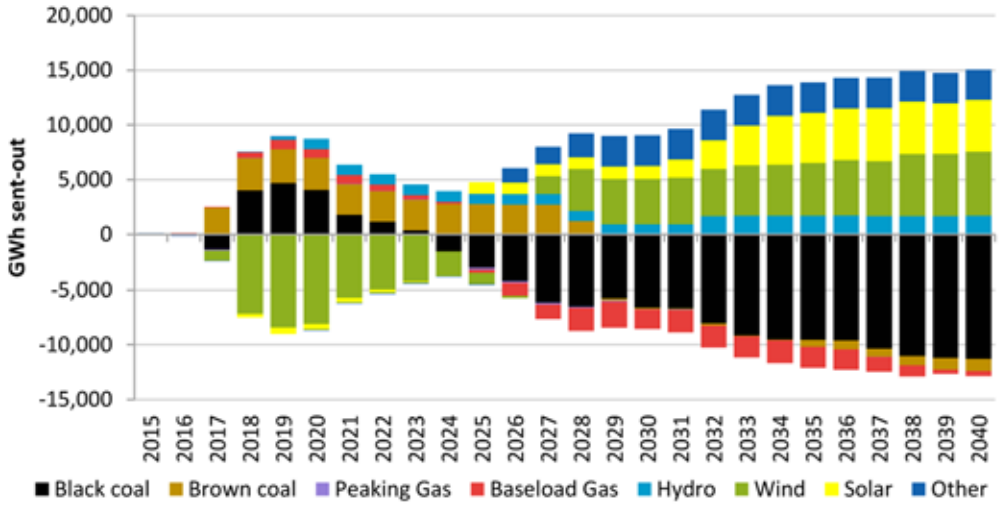
> *To overcome these earnings risks, the Government may consider extending the current flat 41,000 GWh target to 2035. This would improve the economics of current investment opportunities by extending the life of revenue supports for these assets. The effect of such a change would be to improve investor confidence in making generation investments in the short term, leading to an earlier build out of capacity to meet the 2020 target, a smoother project deployment development pipeline and avoidance of bottlenecks in project delivery in the decade. (Investor Group on Climate Change, p.8)*

Generation mix

ACIL Allen modelled a scenario of extending the LRET to achieve a 30 per cent share of generation by 2030 ('real 30 per cent'). Under this scenario, the target profiles were set in a straight line from 2014 to 2030. The modelling shows generation supported by the LRET in 2020 is greater than that achieved in the 'real 20 per cent' scenario discussed in Section 6.1.2. Generation rises to meet the 2030 target.

Figure 26 shows that renewable generation declines between 2014 and 2020 in the 'real 30 per cent' scenario relative to current RET settings. However, from the late 2020s, strong deployment of renewables (mostly wind) leads to an additional 9,000 GWh of renewable generation by 2030. Increased generation from renewables displaces generation from black coal and baseload gas.

Figure 26 Change in generation mix: 'Real 30 per cent' – Reference case, 2015 - 2040



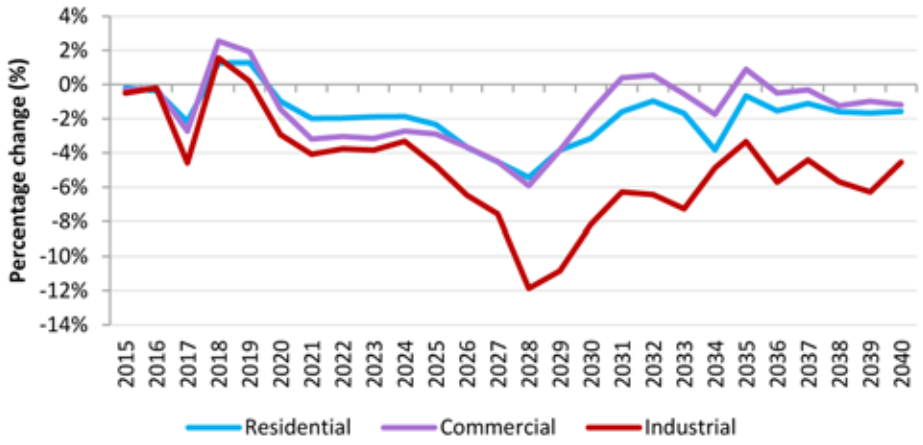
Source: ACIL Allen

Electricity prices

Figure 27 shows the ACIL Allen modelling results of the impact of a 'real 30 per cent' scenario on retail electricity prices compared with the current RET policy. The modelling forecasts average retail prices to fall for the period 2015 to 2040 for all electricity consumers. Average residential and commercial customers will experience similar price reductions of around two per cent while industrial retail prices will fall by an average of five per cent.

The modelling indicates that average cumulative household electricity bills would be $17 lower between 2015 and 2020 in NPV terms. Between 2015 and 2030 the additional renewable generation lowers wholesale electricity prices, resulting in a cumulative saving of $233 in NPV terms for the average household electricity bill over this period.

Figure 27 Change in average retail electricity prices: 'Real 30 per cent' – Reference case, 2015 - 2040



Source: ACIL Allen

The reduction in wholesale electricity prices is in part due to the RET contributing to an oversupply of generation capacity in the market over the period 2015 to 2040. While this may contribute to marginally lower wholesale electricity prices in the short-run, ultimately, renewable generators must recover their long-run marginal costs, which are greater than that of fossil fuel generators. As discussed in Section 5.4, wholesale electricity prices must be high enough in the long-term to allow generators to cover long run marginal costs.

Resource costs

Adjusting the LRET to achieve a 'real 30 per cent' share of generation from renewables would decrease the resource cost to the electricity sector by $1.3 billion in NPV terms from 2015 to 2030 relative to the current RET.

Certificate costs

ACIL Allen estimates that the NPV of cumulative certificate costs for large-scale renewable generation would represent around $6.5 billion between 2015 and 2020 and $15 billion between 2015 and 2030, which is approximately $2 billion and $4 billion lower than continuing with the current policy, respectively. However, as the targets continue to 2040 under this scenario, additional certificate costs would be incurred over the period 2030 to 2040, leading to a total cross-subsidy to renewable generators of $18 billion in NPV terms over the period 2015 to 2040.

CO_2-e emissions[44]

Lower targets from 2015 to 2020 are estimated to result in an increase in cumulative emissions of 28 Mt CO_2-e compared to current settings over this period. However, strong growth in renewables from the mid 2020s leads to higher emissions reductions by 2030 and 2040. Cumulative emissions reductions are estimated to increase by 69 Mt CO_2-e by 2040, compared to the current policy.

[44] Emissions results presented under each scenario arise from the modelled changes to both the LRET and the SRES; the former accounts for almost all of the impact.

6.1.2 Reducing the LRET to a 'real 20 per cent'

This scenario adjusts the targets in line with current projections for electricity demand in 2020 to achieve a 'real 20 per cent' share of generation from renewables. This option is supported by many stakeholders, such as electricity retailers (including EnergyAustralia and Origin Energy), some peak bodies and industry groups (including Major Energy Users, the National Generators Forum, the Energy Supply Association of Australia and the Business Council of Australia). For example, EnergyAustralia's submission stated:

> *In our view recalibration of the RET to equate to the original '20 per cent by 2020' policy commitment is the most balanced approach to addressing the problem for all stakeholder groups. (EnergyAustralia, p.6)*

There are two broad approaches to implementing a 'real 20 per cent' target. The first involves retaining 'fixed' legislated targets in gigawatt hours but recalibrating those annual targets based on current projections of electricity demand, and leaving them at the revised levels for the duration of the scheme. Like the current scheme, the targets would remain flat at the level set for 2020 until 2030. Setting fixed targets provides certainty to the renewable energy industry over the amount of new generation that is required each year. However, if electricity demand in 2020 is higher or lower than currently projected, the share of renewables will not correspond to 20 per cent. If demand is lower than forecast, the additional generation from renewables will exacerbate the existing situation of over-capacity in the electricity market and result in further investment that is not required to meet demand for electricity.

Most stakeholders, particularly in the renewable energy industry, supported retaining fixed gigawatt hour targets in legislation. For example, Snowy Hydro stated:

> *Because demand is difficult to predict and to minimise the risk in having to manage variable targets which could change year on year, we advocate that the LRET should continue to be expressed as a fixed GWh target. (Snowy Hydro, p.5)*

The second approach is to implement 'floating targets' where targets would be regularly updated in line with the most recent projections of electricity demand, ensuring the scheme delivers a 20 per cent share of renewable generation in 2020. Some stakeholders, including the AEMC and the Major Energy Users support this option:

> *The LRET target should be expressed as a percentage of demand, with an indicative percentage target for 2020 and a 'directional' non binding target for 2030 (rather than the capped 41,000 GWh amount to 2030). (Major Energy Users, p.3)*

This approach would result in a degree of uncertainty for the renewable energy industry and liable entities, and there is a risk it may not provide sufficient notice to meet the targets, given the lead time required to build new large-scale projects. Uncertainty over future targets could also mean that retailers purchase higher-cost certificates on the spot market, rather than through PPAs, making it harder for renewable projects to secure finance. However, this approach does provide a mechanism to adjust the targets should market conditions change.

ACIL Allen modelled a 'real 20 per cent' scenario for the Panel. The modelling results apply to both a floating and fixed real 20 per cent target, but actual outcomes would differ between the two approaches if electricity demand outcomes varied from the assumptions used in the modelling.

Generation mix

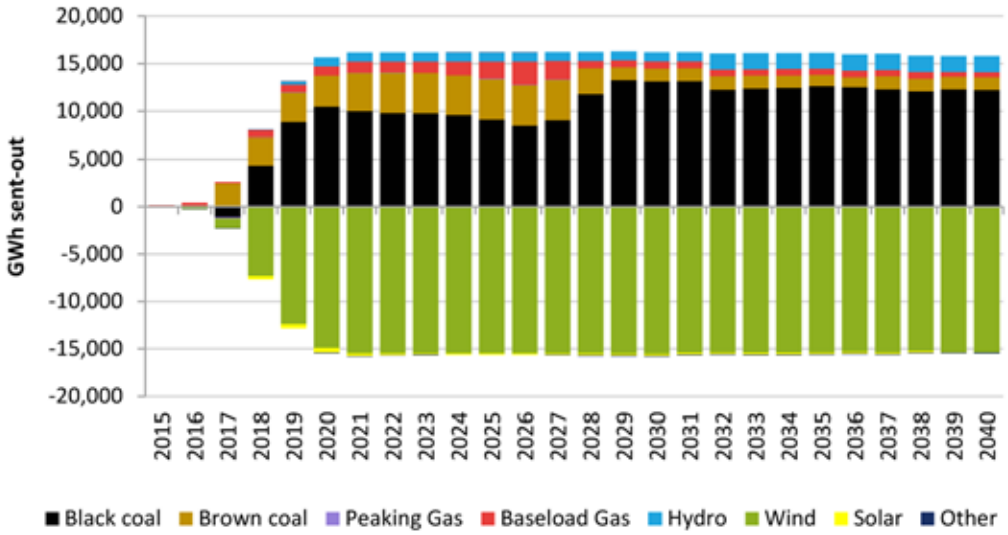
Adjusting the LRET to achieve a 'real 20 per cent' share of generation in 2020 would result in a target of 25,200 GWh of additional large-scale renewable generation in 2020, which is 15,800 GWh lower than the current 41,000 GWh target. A further 2,600 MW of wind capacity and 600 MW of new large-scale solar capacity would be developed by 2020 to meet a 'real 20 per cent' target. The ACIL Allen modelling suggests that, compared to the current policy, the output from wind capacity that would have come online to meet the 41,000 GWh target is offset by increased generation from existing coal fired and baseload gas generators (Figure 28).

Growth in demand is largely met by new wind capacity with some development of large-scale solar in remote grids in the early 2020s. This allows fossil fuel generators to maintain their current level of output (assuming the current demand forecast for 2020 eventuates) and improves the financial position of incumbent fossil fuel generators. In this scenario there is less mothballed fossil fuel capacity than under current settings with some currently mothballed capacity brought back online sooner than would otherwise have been the case.

Some new fossil fuel capacity is projected to enter the market around 2025, mostly baseload and peaking gas generation with a small amount of new coal capacity being developed in the SWIS.

ACIL Allen estimates that a further $6 billion would be invested in the sector to 2030 (in NPV terms) to meet the lower target, about $8 billion less than under current settings. A majority of the decline in expenditure relates to reduced investment in wind capacity.

Figure 28 Change in generation mix: 'Real 20 per cent' – Reference case, 2015 - 2040



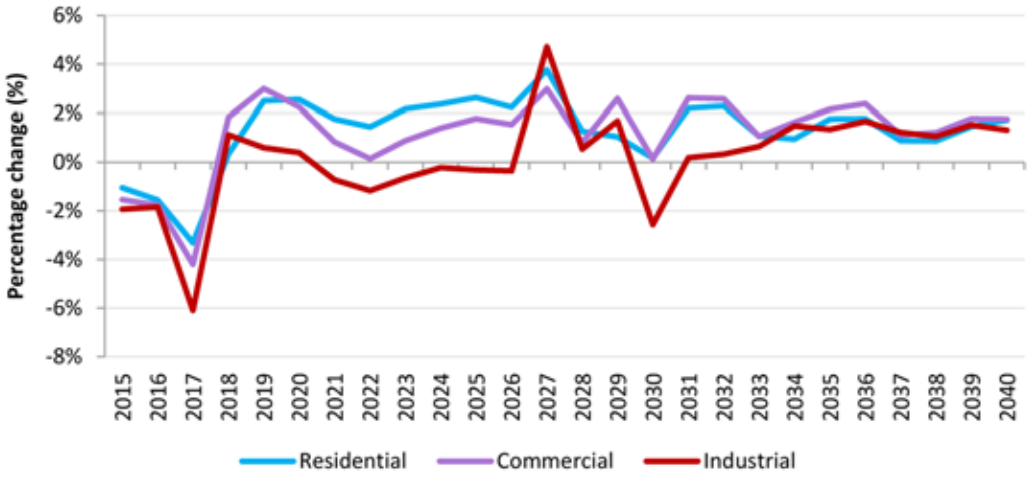
Source: ACIL Allen

Electricity prices

Figure 29 illustrates ACIL Allen's modelled retail electricity prices in a 'real 20 per cent' scenario compared to the current policy. The modelling estimates that reducing the target to a 'real 20 per cent' will initially result in lower retail electricity prices as the cost of purchasing LGCs and STCs is reduced and wholesale prices remain low due to excess capacity in the market. The modelling forecasts average retail prices to remain fairly constant out to 2040 for all electricity consumers. Industrial customers could expect no change in retail prices, whilst residential and commercial customers could expect an increase in retail price of around one per cent.

Average cumulative household electricity bills would be $24 lower between 2015 and 2020 in NPV terms. By 2020, these initial savings would be outweighed by a subsequent rise in wholesale electricity prices due to less renewable generation in the market compared to the reference case. The cumulative increase in average household bills from 2015 to 2030 would be $118 in NPV terms.

Figure 29 Change in average retail electricity prices: 'Real 20 per cent' – Reference case, 2015 - 2040



Source: ACIL Allen

Modelling by Frontier Economics for the AEMC also suggests that a lower target will result in lower retail electricity prices in the short-term, but this reverses between 2020 and 2025 as a rise in wholesale prices offsets the savings from reducing the target. The Deloitte modelling provides different electricity price outcomes. It projects retail electricity prices to remain lower over the period to 2030 if the target is reduced to a 'real 20 per cent' as the increase in wholesale prices is outweighed by the reduction in costs associated with purchasing certificates.

Resource costs

Adjusting the LRET to achieve a 'real 20 per cent' share of generation from renewables would reduce the NPV of resource costs associated with large-scale electricity generation by around $6.5 billion by 2030, compared with the current policy.

Certificate costs

The total cross-subsidy provided to large-scale renewable generation would be around $5 billion over the period 2015 to 2020 and $11 billion over the period 2015 to 2030 (in NPV terms), which is approximately $3.5 billion and $8.5 billion lower than continuing with the current policy, respectively.

CO_2-e emissions

If the target is reduced to a 'real 20 per cent', the ACIL Allen modelling estimates that cumulative emissions would be higher by 39 Mt CO_2-e over the period 2015 to 2020, and 190 Mt CO_2-e over the period 2015 to 2030, compared with the current policy.

6.1.3 Target representing a '50 per cent share of new growth' in electricity demand

If the forecasts of electricity demand adopted by ACIL Allen for this review eventuate, adjusting the target to a 'real 20 per cent' would result in generation from renewables increasing by roughly 10,000 GWh by 2020 over current levels, which is equal to around a 50 per cent share of growth in electricity demand over the period. However, there are risks that this demand forecast will not eventuate. ACIL Allen modelled a 'low electricity demand' sensitivity where demand remains roughly constant between now and 2020. In this situation, a 'real 20 per cent' target would lead to the deployment of renewable generation capacity that is not required, adding costs to the economy and reducing the output of incumbent generators. A fixed gigawatt hour target effectively shields renewable generators from fluctuations in demand (as they can be certain of receiving revenue from the sale of certificates), leaving incumbent fossil fuel generators exposed to most of the risk.

A 'floating' real 20 per cent target was discussed in Section 6.1.2 as a means of providing flexibility in the target. This provides some protection against low demand outcomes, but a risk remains that meeting a 20 per cent target would lead to additional surplus generation capacity if electricity demand is flat or falling.

Another scenario considered by the Panel for addressing the problem of uncertain demand forecasts, is to adopt an approach whereby targets are set annually by the CER that correspond to the previous year's target plus a share of expected growth in national electricity demand over the next year (for example, 50 per cent). If demand is forecast to decline, the target would be maintained at the previous year's level and would only increase when demand is forecast to exceed its previous highest level. The submission from the Australian Industry Greenhouse Network suggested such an approach could be considered:

> *Under this option, expected future demand growth would be explicitly considered in determining expansion in the RET target. If demand growth is expected to be low, then expansion would be low or zero. Where demand growth is expected to be higher, the target could be increased. The practical upshot of this is that there would likely be no expansion of the target in the near term, but it would remain an option over the longer term. (Australian Industry Greenhouse Network, p.14)*

This option links the RET to market needs as it would only support the deployment of additional renewable generation capacity when electricity demand is growing. It also means that renewable investors are subject to more of the risk of uncertain demand outcomes that investors in fossil fuel generators face.

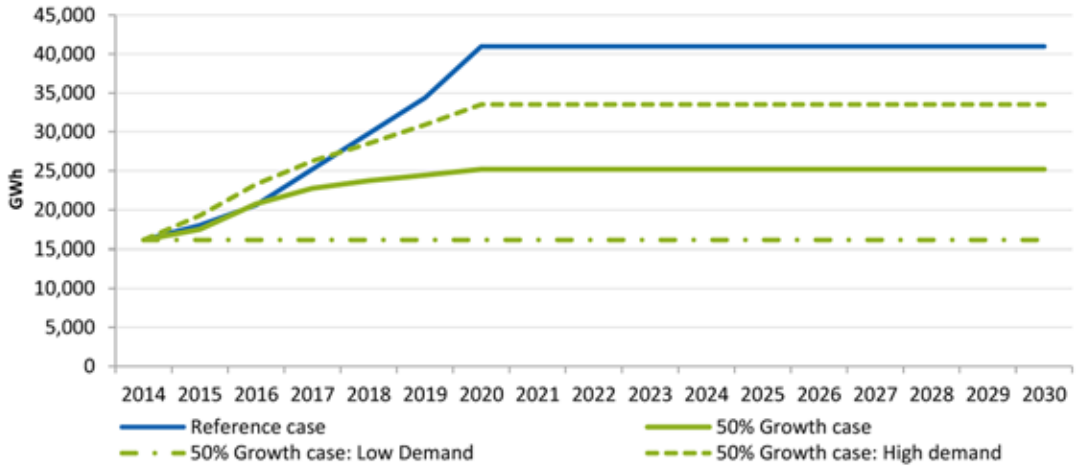
Under the share of growth option, targets would not be mandated for future years. Uncertainty over future targets could make finance harder and more expensive for renewable energy developers to secure, potentially increasing the price of certificates and the overall compliance costs of the scheme. This risk could be partially mitigated by the CER publishing indicative, non-binding targets for future years similar to current practice under the SRES.

Implementation of this option would need to consider approaches for calculating targets and whether additional mechanisms would be required to ensure a stable certificate price in situations of flat or declining demand and hence where there is no growth in the target. These issues are further discussed in Chapter 10.

Generation mix

Based on ACIL Allen's central assumptions for electricity demand, a target that represents a 50 per cent of growth in demand over the period to 2020 would result in a similar level of renewable generation in 2020 to a 'real 20 per cent' scenario with approximately 10,000 GWh of new large-scale renewable generation entering the market. However, the total amount of renewable generation and the percentage share of renewable generation will depend on actual electricity demand each year. Figure 30 shows the profile of renewable generation that would be achieved under high, low and central demand assumptions in the ACIL Allen modelling.

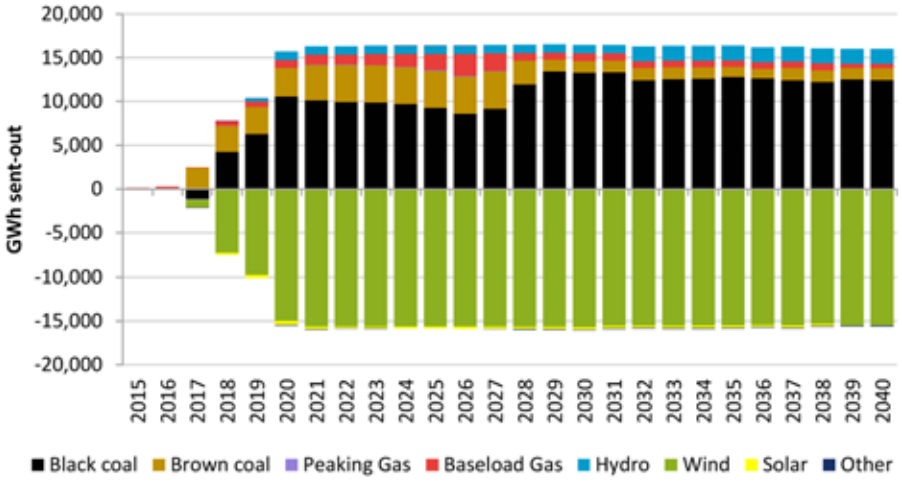
Figure 30 LRET Target profiles: '50 per cent share of new growth', 2014 - 2030



Source: ACIL Allen

Based on the central forecast for electricity demand, the ACIL Allen modelling suggests that scheduled and semi-scheduled wind capacity would more than double on electricity grids from around 2,370 MW in 2014 to 5,400 MW in 2020. This is around 4,900 MW less than modelled under the current policy. The reduction in renewable generation compared to the current target is offset by increased generation from existing coal and baseload gas generators (Figure 31). Fossil fuel generators maintain their current level of output, improving the financial position of incumbent fossil fuel generators.

Figure 31 Change in generation mix: '50 per cent share of new growth' – Reference case, 2015 - 2040



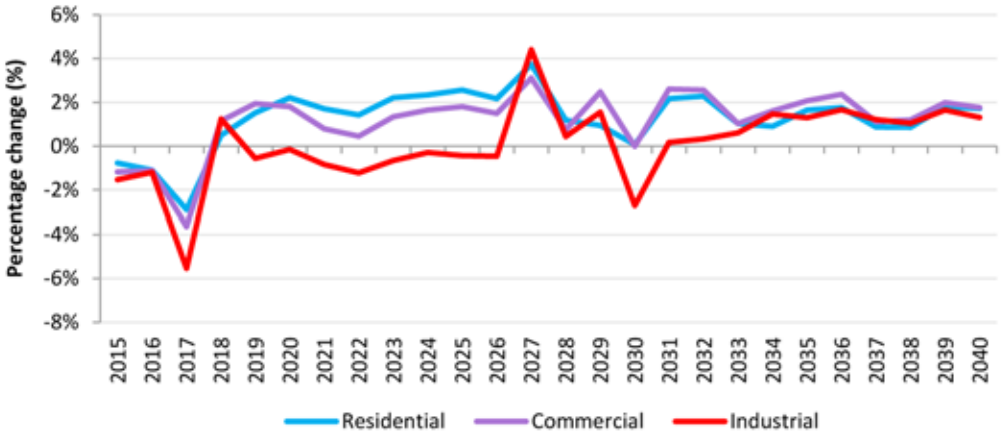
Source: ACIL Allen

Electricity prices

Figure 32 shows that the impacts on electricity prices in this scenario are similar to the 'real 20 per cent' scenario. The ACIL Allen modelling estimates that altering the target to a '50 per cent share of new growth' will initially result in lower retail electricity prices as the costs of purchasing LGCs and STCs is reduced and wholesale prices remain low due to excess capacity in the market. The modelling forecasts average retail prices to remain fairly constant out to 2040 for all electricity consumers. Industrial customers can expect no change in retail prices, while residential, and commercial customers can expect an increase in retail price of around one per cent.

The average cumulative household electricity bill would be $20 lower between 2015 and 2020 in NPV terms. By 2018, these initial savings are outweighed by a subsequent rise in wholesale electricity prices due to less renewable generation in the market. The cumulative increase in average household bills from 2015 to 2030 would be $119 in NPV terms.

Figure 32 Change in average retail electricity prices: '50 per cent share of new growth' – Reference case, 2015 - 2040



Source: ACIL Allen

Resource costs

Reducing the RET to represent a 50 per cent share of growth in demand would reduce the NPV of resource costs by around $6 billion between 2015 to 2030 compared with the current scheme.

Certificate costs

The total cross-subsidy provided to large-scale renewable generation would be around $6 billion by 2020 and $12 billion by 2030 in NPV terms, which is approximately $2 billion and $8 billion lower than continuing with the current policy, respectively.

CO_2-e emissions

The level of emissions abatement achieved under a '50 per cent share of new growth' scenario is similar to the 'real 20 per cent scenario,' assuming the forecast for electricity demand adopted by ACIL Allen eventuates. If the target is adjusted to a '50 per cent share of new growth', the modelling shows that emissions would be higher by 36 Mt CO_2-e over the period 2015 to 2020, and would be higher by 189 Mt CO_2-e over the period 2015 to 2030 compared to the current policy.

Box 2: Implementing a Share of Growth Approach

A share of growth approach would involve the LRET being set on an annual basis. By December each year the CER would announce the target to apply for the following calendar year. The mechanism by which it would do so would follow a published formula such as:

$$T_n = MAX\ (T_0 + ½\ (\ E_n - E_0\ )\ ,\ T_{n-1}\ )$$

Where:

T_0 = Base year target

E_0 = Electricity demand in the base year

T_n, E_n = Target and forecast electricity demand in year n

As electricity demand increases above the level of demand in the base year, the target increases by one half of this growth. Should electricity demand be forecast to fall or to remain flat in any year, the target would not change – and would only increase further when electricity demand exceeded its previous highest level.

The table shows how the target would change if electricity demand follows the most recent forecasts, which form the core demand projection used in the modelling. Over the period to 2020 electricity demand is projected to increase by 17,800 GWh and the target increases by 8,900 GWh.

Year	Year (n)	Electricity demand (GWh)	Change in demand (GWh)	Change in Target (GWh)	Target (GWh)
2014	0	227,500			16,100
2015	1	230,100	2,600	1,300	17,400
2016	2	236,600	6,500	3,300	20,700
2017	3	240,500	3,900	1,900	22,600
2018	4	242,300	1,800	900	23,500
2019	5	243,800	1,500	800	24,300
2020	6	245,300	1,500	700	25,000

Excludes waste coal mine gas and small-scale solar PV

The CER would draw on publicly-available electricity forecasts in calculating the target, including the market operators' most recent forecasts of electricity demand in the major markets.

While the formal targets would be set annually one year at a time, publication of the formula and the CER's use of publicly-available electricity forecasts would allow businesses to make their own projections of the targets for future years to assist in their investment planning and decision making.

6.1.4 Repeal of the LRET

If the RET was repealed entirely, LGCs and STCs would no longer be created and there would be no obligation on liable parties to purchase and surrender these certificates. This would have the effect of immediately removing the costs associated with the RET on electricity prices. A small number of stakeholders advocated this approach. For example, Stanwell Corporation stated:

> *Stanwell's primary concern with the RET is the impact of the RET on electricity prices and the flow on effects of high electricity prices for Australia's productivity and economic growth.*
>
> *Stanwell supports completely removing the RET in order to reduce the impact on electricity prices. (Stanwell Corporation, p.3)*

LGCs make up the difference between the spot price for electricity and the price that renewable generation projects require to be financially viable. Some renewable generators have entered into PPAs with electricity retailers that cover both the cost of electricity and certificates. The effect of abolishing the RET on these contracts is not clear, in some cases electricity retailers may be obliged to continue covering the cost of LGCs even though renewable generators will no longer create these certificates. Contracts could also contain clauses allowing them to be amended in the event of a significant policy change such as abolishing the RET.

Without LGCs or PPAs, the only source of revenue for existing large-scale renewable generators would be the spot market for electricity. These generators would not be competitive with non-renewable generators and there is a strong possibility that the owners of these projects would not remain solvent. As renewable generators typically have high capital costs and low operating costs, it is likely that these assets would be sold at a loss but would then continue to operate under new financing and ownership structures.

Many stakeholders have suggested that repealing or significantly reducing the RET would raise sovereign risk concerns. Sovereign risk traditionally refers to the risk of a government defaulting on loan obligations (sovereign credit risk), though the term is now used more broadly to refer to the effect of changes to government policy on both existing and future private investment. However, the Panel considers that these factors are more correctly characterised as regulatory risk.

Not all stakeholders considered that significant change to the RET should be dismissed on the grounds that it would represent an inappropriate level of risk for investors. For example, the submission from the Australian Chamber of Commerce and Industry stated:

> *The issue of investment risk has been raised by supporters of the RET as a reason for opposing any change to the scheme. Such an approach to economic policy, if applied across the economy, would make it virtually impossible to remedy policy failures or deliver productivity enhancing reform. ACCI believes this proposition should be rejected by the Review Panel. Investors should have been well aware of the risks of ongoing changes to the RET given the legislative requirement that the scheme be reviewed every two years. (Australian Chamber of Commerce and Industry, p.5)*

However, renewable energy project owners point out that they invested in good faith and in accordance with a government policy that had bipartisan support. If the RET legislation is repealed, they argue compensation should be provided for existing investments. For example, Pacific Hydro stated:

> *Of most concern to Pacific Hydro is that a material change to the RET will lead to potential sovereign risk and value destruction that would impact existing projects…. Sovereign risk will affect contracts in place now for operating projects and could see substantial compensation and/or transitional arrangements drawing on government funds for 15 years. (Pacific Hydro, p.34)*

> *There are strong risks to our reputation as an investment destination in the energy sector and in other sectors from materially altering a policy in such a vital sector of the economy. The RET policy uncertainty appears to be damaging Australia's reputation as a stable and safe investment market. (Pacific Hydro, p.36)*

Infigen Energy noted concerns expressed by its global investors:

> *Infigen has over 20,000 security holders of which 99% by number are small retail investors, many of whom have been security holders since the initial public offering in 2005. Infigen also has many large global infrastructure investors that have expressed concern to us about the potential sovereign risk aspects of possible regulatory change and have added their support to Infigen's submission. These investors cite their experience of adverse regulatory change in the renewable energy sector in Europe, noting how this has caused much higher return hurdles to be required for all infrastructure investments in those countries. (Infigen, p.3-4)*

The Australian Industry Group raised concerns about the impact on future investments:

> *Ai Group members have expressed concern that such an about-turn by the Commonwealth would have major implications for international investment in Australia due to perceptions of increased sovereign risk. These negative perceptions would have a lasting impact that might be as significant as any claims for compensation that arise from those who have invested in renewable energy. (Australian Industry Group, p.4)*

The Panel does not consider these arguments to be strong. Certainty of regulatory settings is an important facilitator of investment in long-term infrastructure, but this does not imply that regulations should be set in stone. While it is reasonable for investors to expect that they will not be exposed to arbitrary or capricious regulatory changes, they can have no expectation of government abstaining from regulatory change, even significant change, when circumstances warrant. Any regulatory setting involves a consideration of the balance of its impacts on groups in the community. When circumstances change significantly it is incumbent on governments to reconsider whether the balance of those impacts remains appropriate and to act if necessary.

Generation mix

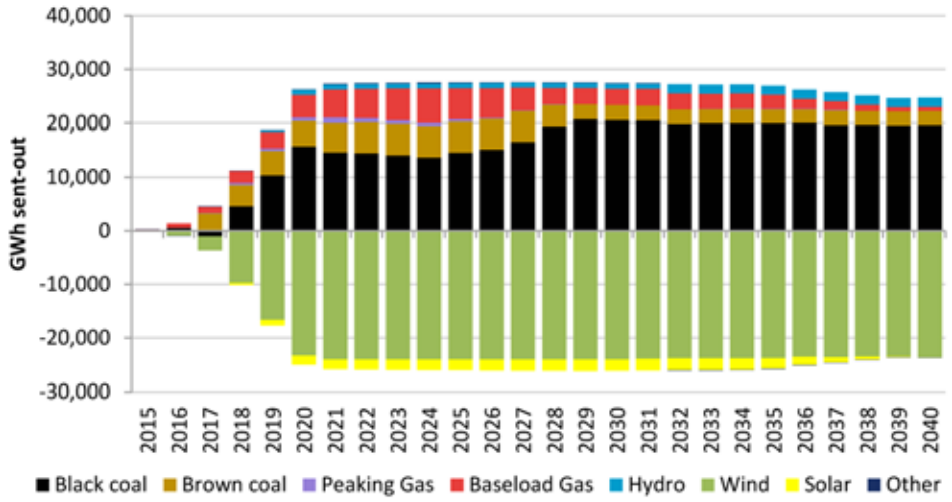
If the LRET were repealed, it is likely that all existing and committed renewable generators would continue to operate although ownership of these assets may change. The share of renewables would remain at around 16 per cent of the generation mix.

ACIL Allen forecasts that very little new generation capacity growth would be required before 2025. Conventional fossil-fuel capacity may enter markets from around 2025 with capacity largely being gas-fired. A small amount of new coal capacity is projected to be developed in the SWIS, the only region in which new coal power stations are likely to be developed if the RET is repealed.

There is likely to be no new wind farm development out to 2040, but some utility-scale solar is forecast to be deployed in regional markets from around 2034, bringing installed capacity to around 1,600 MW by 2040.

Comparing the 'repeal' scenario to current RET policy, there would be a 75 per cent drop in wind generation in 2040. The reduction in renewable generation is offset by increased generation from existing black and brown coal generators (Figure 33). Fossil fuel generators increase their level of output to meet the load growth over the period to 2040, which improves their financial position. In this scenario there is less mothballed fossil fuel capacity than under current settings with some currently mothballed capacity brought back online sooner than would otherwise have been the case.

Figure 33 Change in generation mix: 'Repeal' – Reference case, 2015 - 2040



Source: ACIL Allen

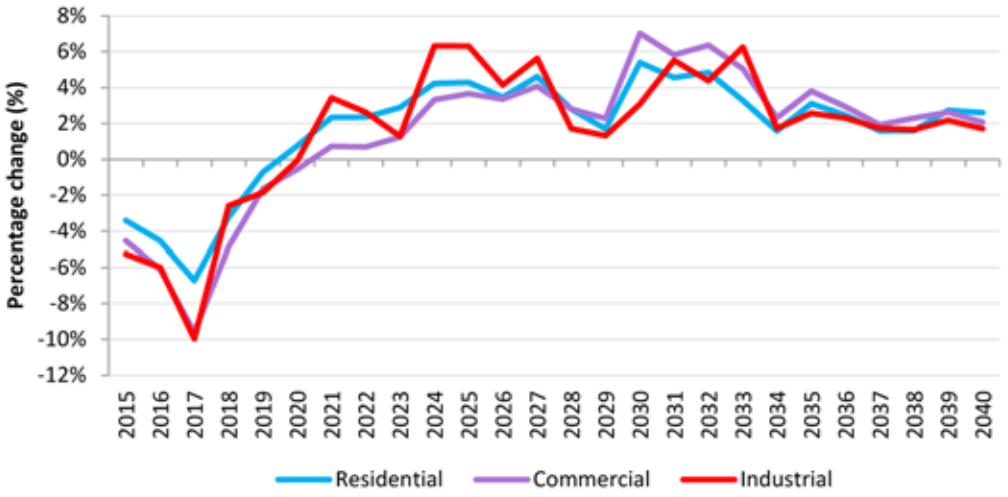
Electricity prices

The impact of repealing the LRET on electricity prices was discussed in Chapter 5, which explained that the ACIL Allen modelling estimates that removing the RET would result in an initial retail price reduction before wholesale prices rise with less renewable generation in the electricity mix.

Figure 34 illustrates the modelled retail electricity prices in a 'Repeal' scenario out to 2040 compared with the current policy. The ACIL Allen modelling estimates that repealing the RET would initially result in lower retail electricity prices, however from around 2021 retail prices would be on average 3.1 per cent higher for residential, commercial and industrial customers.

In the Repeal scenario, the NPV of cumulative average household electricity bills would be $247 lower over the period 2015 to 2020. This reduction is due to lower certificate costs and a lower wholesale price resulting from the return of some mothballed coal-fired generation capacity. However, repeal of the RET eventually leads to higher wholesale electricity prices because of the absence of additional (low marginal cost) renewable generation and less over-supply of generation capacity in the market. The NPV of retail electricity prices over the period 2015 to 2030 is roughly the same as if the RET was left in place. By 2040, under the 'Repeal' scenario, the average cumulative residential bill increases by $115 compared to current policy. It was noted in Chapter 5 that other modelling produced different results, for example the Deloitte modelling estimated that retail electricity prices would be lower over the period to 2030 if the RET is repealed.

Figure 34 Change in average retail electricity prices: 'Repeal' – Reference case, 2015 - 2040



Source: ACIL Allen

Resource costs

Repealing the LRET would reduce the NPV of resource costs by around $9 billion by 2030 compared with the current policy.

Certificate costs

Repealing the LRET would eliminate the LGC costs incurred under the current scheme of $9 billion over the period 2015 to 2020 and $19 billion over the period 2015 to 2030, in NPV terms.

CO_2-e emissions

If the LRET is repealed, the modelling shows that cumulative emissions would be higher by 58 Mt CO_2-e over the period 2015 to 2020 and by 299 Mt CO_2-e over the period 2015 to 2030. By 2040 cumulative emissions would be 520 Mt CO_2-e higher, compared with the current policy.

6.1.5 Close the LRET to new entrants ('grandfathering')

Many submissions suggested transitioning away from the RET, but recognised a need to continue to support investments made on the basis of the current RET legislation in order to address the issues concerning regulatory risk. For example, Alinta Energy proposed that the LRET be capped at the current level and continue to 2020:

> *Alinta Energy is of the view that generators that have committed finance to projects, whether completed or under development, on the basis of the current RET scheme should continue to receive a subsidy. This is important to ensure the risk of policy change does not disincentivise future investment in the market.*
>
> *Therefore, to take account of these considerations, Alinta Energy advocates that the RET continue until 2020, but that the target be capped at current capacity which has been achieved to date based on renewable generation that has already been built or committed to build. (Alinta Energy, p.8)*

The Australian Industry Group stated:

> *If, following this consultation, a recommendation was made that the LRET be abolished or substantially reduced, then industry would expect steps to smooth a transition to the amended policy. At the very least this would include forewarning to allow industry time to prepare for major scheme changes that are being seriously considered by the Government, and security for investments in renewable generation that have already been made. The costs of such security should be taken into account in considering net impacts on energy users and taxpayers. (Australian Industry Group, p.6)*

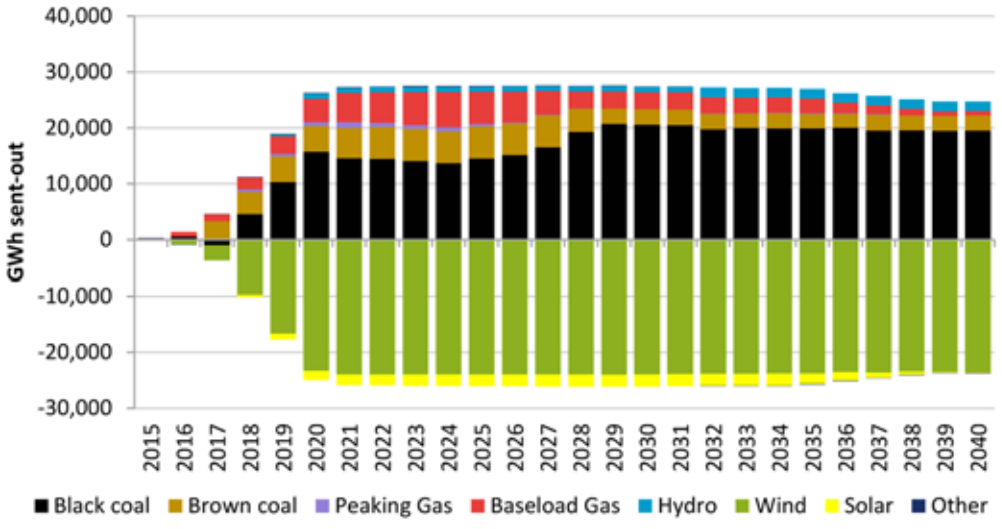
Closing the LRET to new entrants would entail setting targets in line with generation from existing and committed power stations and enabling these power stations to continue receiving revenue through the sale of LGCs. The scenario modelled by ACIL Allen assumes that renewable power stations that are already under construction or can demonstrate that they have reached full financial and contractual commitment (e.g., final investment decision, engineering and procurement contract) would also be entitled to create certificates and participate in the LRET.

Implementing this approach would involve consideration of an appropriate certificate price to support existing projects, and considering whether further mechanisms would be required to ensure price stability. Mechanisms that could be considered include price caps and price floors, or a clearing house that facilitates the sale of certificates at a fixed price similar to the STC Clearing House. These issues are discussed further in Chapter 10.

Generation mix

The modelling results for impact of closing the RET to new entrants on the generation mix (Figure 35) are the same as the results for repealing the RET, as both cases assume that all existing and committed renewable generators continue to operate, but there is no new renewable generation capacity installed between 2014 to 2040, aside from a small amount of solar in regional markets.

Figure 35 Change in generation mix: 'Closed to new entrants' – Reference case, 2015 - 2040



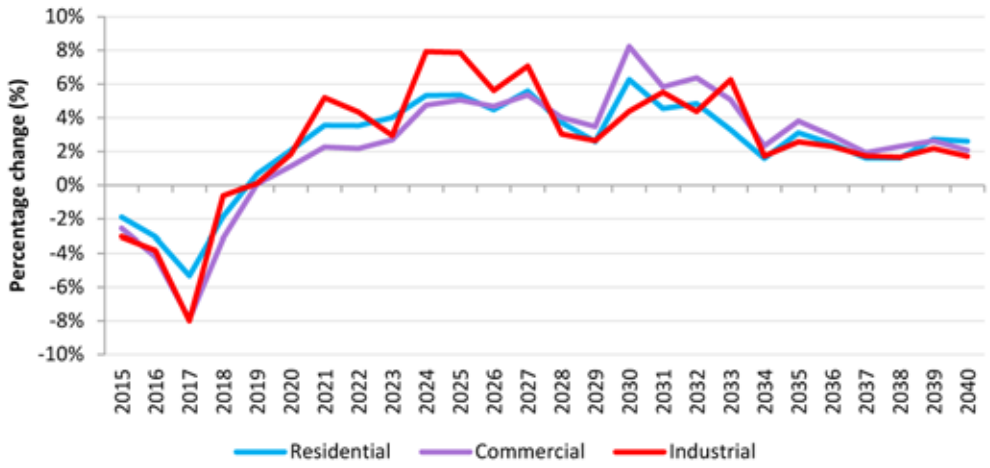
Source: ACIL Allen

Electricity prices

With less renewables in the electricity mix, the wholesale electricity price would initially drop, but would then increase from 2018 onwards and would outweigh the savings from avoided certificate costs by around 2020; causing retail electricity prices to be higher than if the RET remained.

Figure 36 illustrates the ACIL Allen modelled retail electricity prices in a 'closed to new entrants' scenario out to 2040, compared with the current policy. The modelling estimates that closing the RET to entrants would initially result in lower retail electricity prices, however retail electricity prices would be on average three to four per cent higher from 2019 for residential, commercial and industrial customers. The NPV of cumulative average household electricity bills would be $138 lower over the period 2015 to 2020, but $185 higher over the period 2015 to 2030.

Figure 36 Change in average retail electricity prices: 'Closed to new entrants' – Reference case, 2015 - 2040



Source: ACIL Allen

Resource costs

Closing the RET to new entrants would result in a similar reduction in resource costs associated with large-scale electricity generation as repealing the RET. The NPV of large-scale resource costs are expected to be around $9 billion lower by 2030 compared with the current policy.

Certificate costs

Closing the RET to new entrants would provide renewable generators with a cross-subsidy of $3 billion over the period 2015 to 2020 and $5 billion over the period 2015 to 2030 in NPV terms, which is approximately $6 billion and $14 billion lower than continuing with the current policy, respectively.

CO_2-emissions

Closing the RET to new entrants would have the same effect on CO_2-e emissions as repealing the RET. Emissions would be higher by 58 Mt CO_2-e over the period 2015 to 2020 and 299 Mt CO_2-e higher over the period 2015 to 2030, compared with current policy.

6.2 Reforming the LRET: Conclusions

The Panel concluded in Chapter 5 that the RET should not be continued in its current form because the cost of the cross-subsidy and its effects on Australia's national income are not justified by the emission reduction benefits. Adoption of a higher target and/or extension of the scheme beyond its current 2030 timeframe are inconsistent with reducing the cost of the scheme to Australians.

While the Panel does not consider that repeal of the RET constitutes 'sovereign risk', the Panel is of the view that an immediate end to the scheme would create significant adverse financial implications for existing investors in renewable generation. It could also deter future investment in the sector which may be required to meet higher greenhouse gas emission reduction targets in the future.

The Panel therefore recommends that the LRET should continue, but only in a significantly modified form that better balances the interests of existing investors with those of the nation as a whole.

This balance could be achieved by allowing the LRET to continue to operate until 2030 for existing renewable generators, but closing it to new entrants. This would provide investors in existing renewable generation with access to certificates, but importantly it would protect the broader community from the substantial costs of subsidising yet more surplus generation capacity.

This would retain the CO_2-e emissions reductions achieved to date by the LRET, and leave the remainder of Australia's CO_2-e emissions reduction task to other approaches including the ERF.

Alternatively, a suitable balance might also be achieved if the LRET were modified to increase in proportion with growth in electricity demand. This would protect investors in existing renewable generators and would support additional renewable generation when demand is growing. It exposes renewable investors to more of the risks that incumbent generators currently face in terms of uncertain demand forecasts, placing them on a more even footing. If the current forecasts of electricity demand prove accurate, this approach would result in renewables making up approximately a 20 per cent share of electricity demand in 2020, but the share may be different if demand is higher or lower than expected.

A key objective of both options is to support existing and committed investments made on the basis of the current RET policy. The Panel has identified that some additional mechanisms may be needed to ensure certificate prices trade in a range that will provide an appropriate level of support. These are further discussed in Chapter 10.

The Panel does not favour the option of adjusting the current 41,000 GWh target to a lower target that might deliver a 'real 20 per cent' share for renewables because that would risk locking in the cost of billions of dollars of unnecessary capital expenditure if electricity demand proved to be lower than forecast. If the Government wishes to adopt a 'real 20 per cent' target the Panel considers that a 'floating' target should be adopted, where targets are periodically updated in line with electricity demand projections rather than being fixed until 2020. While providing less certainty to renewable investors, it would reduce the risk of the RET forcing in excess generation capacity, but would not eliminate it.

The LRET provides an incentive for the deployment of the most commercial renewable technology and as such it does not promote a range of technologies. In its current form, the LRET is expected to be predominately met by wind generation, which is currently the most competitive form of renewable energy, but it may be that other technologies, such as large-scale solar, become cheaper in the future. A more efficient and lower cost outcome would be achieved if the market were able to select the lowest-cost, best performing options to meet demand when it is needed.

The Panel agrees with the views put by many stakeholders during the review that all parts of the electricity sector will be increasingly affected by innovation in coming years – traditional business and engineering models of energy generation, delivery and use are likely to undergo significant changes. The Panel notes that the combination of rising retail electricity prices, falling technology costs (including solar PV panels), the development of battery storage technologies, and new business models that allow consumers to become more active in managing their energy costs may be beginning to drive a long-term transformation of the electricity sector over coming decades in which renewables play a significant role.[45] Mandating the construction of significant quantities of large-scale renewable generation capacity reflects a 20th century approach to electricity and may hinder rather than assist the transformation of the sector in the first half of this century.

Recommendation 2: The Large-Scale Renewable Energy Target (LRET) should be amended in one of the following two ways:

Option 1 – Closed to new entrants ('grandfathering')

In order to reduce the cost of the LRET and its impact on electricity markets, the Panel recommends that the LRET should be closed to new entrants.

a. The LRET is closed to new renewable energy power stations (subject to limited exceptions described below). The Clean Energy Regulator (CER) should set targets annually based on estimated output from accredited power stations.

b. In addition to those renewable energy power stations already accredited under the scheme, eligibility would be extended to:

    i. Renewable energy power stations already under construction

    ii. Renewable energy power stations to be constructed where project proponents can demonstrate that there is full financial and contractual commitment to the project (e.g., final investment decision, engineering and procurement contract) within one month of the announcement of this approach

c. The last year of the operation of the LRET is 2030.

or

Option 2 – Share of growth in electricity demand

In order to provide support for new renewable power stations and contribute to Australia's emissions reduction target while achieving less reduction than Option 1 in the cost of the LRET, the Panel recommends that the target be set to allocate a share of growth in electricity demand to renewables in the following manner:

a. The target is set annually by the CER, increasing each year to 2020 by an amount equivalent to 50 per cent of projected growth in national electricity demand, ensuring that new renewable energy power stations are only supported under the RET where electricity demand is increasing.

b. Where national electricity demand is projected to remain flat or fall, the target is held at the previous year's level.

c. From 2021 onwards, the target is fixed at the 2020 level until 2030, the last year of the operation of the LRET.

Based on current electricity demand forecasts, this approach would achieve a 20 per cent share of renewables in the electricity generation mix by 2020.

[45] CSIRO *Change and Choice; The Future Grid Forum's analysis of Australia's potential electricity pathways to 2050*, December 2013.

6.3 The current state of the small-scale market

The SRES has been highly successful in promoting small-scale renewable energy. Over 1.2 million rooftop PV systems and around 870,000 solar water heater units have been installed under the RET since 2001.[46] These systems produced the equivalent of around 6,400 GWh of generation in 2013, which is already above the original 4,000 GWh estimate for the SRES by 2020.[47] The sector has received a cross-subsidy of around $4 billion to install rooftop PV systems and solar water heaters since the RET was expanded in 2010.[48]

In the past, the costs of the SRES have been high (comprising 60 per cent of the costs of the RET in 2012-13)[49] and unpredictable, largely due to the high uptake of rooftop PV incentivised by state and territory feed-in-tariffs, the solar credits multiplier under the RET and falling system costs. In response, the scheme has been adjusted several times to bring forward the phase-out of the multiplier. As a result of these adjustments, and the removal of state and territory premium feed-in-tariff schemes, installations of residential solar PV systems have fallen by around 40 per cent in the past 18 months.[50]

System costs for rooftop solar PV installations have declined rapidly since 2009, reflecting the global decline in PV module costs and the strong Australian dollar. Figure 37 shows average solar PV system costs per watt since 2001.

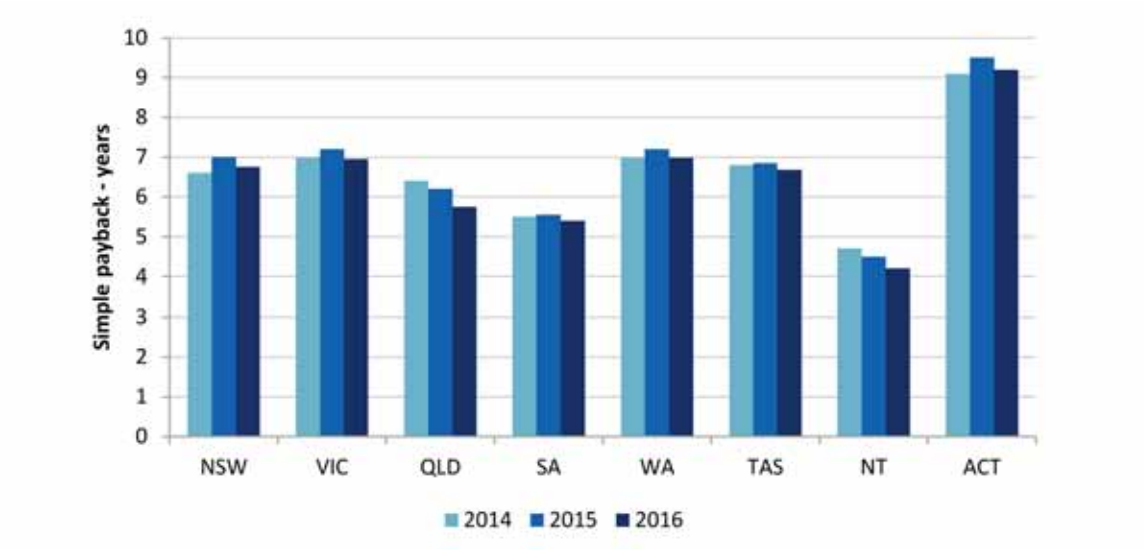
Figure 37 Average solar PV system price

Source: Bloomberg New Energy Finance

[46] Clean Energy Regulator, *Small-scale installations by postcode*, July 2014.
[47] To ensure the overall 20 per cent target would be met, the lower bound estimate for the SRES (4,000 GWh) was deducted from the original (combined) 45,000 GWh 2020 target, giving the large-scale 2020 target of 41,000 GWh.
[48] Calculation by the RET Review Secretariat based on data provided by the Clean Energy Regulator.
[49] Australian Energy Market Commission, *Residential Electricity Price Trends, 2013*, p.12.
[50] Green Energy Markets, *Small-scale technology certificates data modelling for 2014 to 2016, Report to the Clean Energy Regulator*, 2014.

The average cost of installing a 3 kW solar PV system in 2014 is $7,670 and STCs contribute around 30 per cent of this cost.[51] With the RET in place the average payback period is reduced from around 10 years to nearly seven years. Figure 38 shows the simple payback period for a 3 kW solar PV system in the various states, after receiving certificates, as calculated by Green Energy Markets.

Figure 38 Simple payback period by state: 3 kW residential solar PV system



Source: Green Energy Markets, Small-scale technology certificates data modelling for 2014 to 2016

The decline in system costs and continued uptake has led many stakeholders to argue that rooftop PV systems no longer need support through the SRES, and the continuation of the SRES is unnecessarily adding to electricity bills. For example, Major Energy Users submitted:

> *The SRES has been extremely costly and inequitable in its impacts on consumers, such as businesses and those renting. The costs of the SRES have been difficult to control and the scheme has shown that it is vulnerable to distortion by state based policies.*
> *(Major Energy Users, p.4)*

[51] Secretariat calculation based on data in Green Energy Markets, *Small-scale technology certificates data modelling for 2014 to 2016.*

On the other hand, the solar industry points out that the SRES is providing the only remaining policy support for rooftop solar PV and solar water heaters now that premium state feed-in-tariffs have been removed, and the costs of the SRES are falling and will continue to fall through arrangements currently in place. For example, the Clean Energy Council submitted:

> *Costs are forecast to fall by 25 per cent in real terms in 2015-2016 and then stay low out to 2019-2020. In proportional terms the retail price contribution of SRES has already peaked at 3 per cent of the average retail bill in 2012-2013 and will continue to decline to between 0.9 and 1.0 per cent out to 2019-2020. (Clean Energy Council, p.14)*

Similarly, the REC Agents Association suggest that the cost of the SRES will amount to 0.4 cents per kWh in 2014, which is less than half the level in 2012, and that this cost will be offset by a greater reduction in wholesale electricity prices.

Other submissions pointed to potential cost benefits from reducing peak demand and reliance on gas. For example, the REC Agents Association submitted:

> *Solar PV contributed 600MW to meeting the combined South Australia and Victorian peak during the heat wave in January 2014. This amounted to 5 per cent of combined peak demand. Both South Australia and Victoria would have achieved record peak demand if it had not been for the contribution of solar PV. (REC Agents Association, p.8)*

6.4 Options for reforming the SRES

6.4.1 Abolishing the SRES

The Panel received numerous submissions suggesting the SRES should be abolished. Submissions in favour of abolition indicate that the generation supported by the SRES greatly exceeds the amount anticipated and system costs have fallen to the point where they are competitive without a subsidy, and are therefore unnecessarily increasing electricity bills. For example, the Energy Networks Association stated:

> [The] *SRES had already exceeded its aspirational target of 4000 GWh by 2020 in 2012. It is therefore hard to argue that solar water heaters, Photovoltaic (PV) systems and heat pump technologies should continue to require further subsidies at the expense of other electricity consumers. With over 2 million installations in a housing stock of around 9 million private residences in Australia, ENA considers that the market for these systems is mature and these technologies do not require any further support. (Energy Networks Association, p.1)*

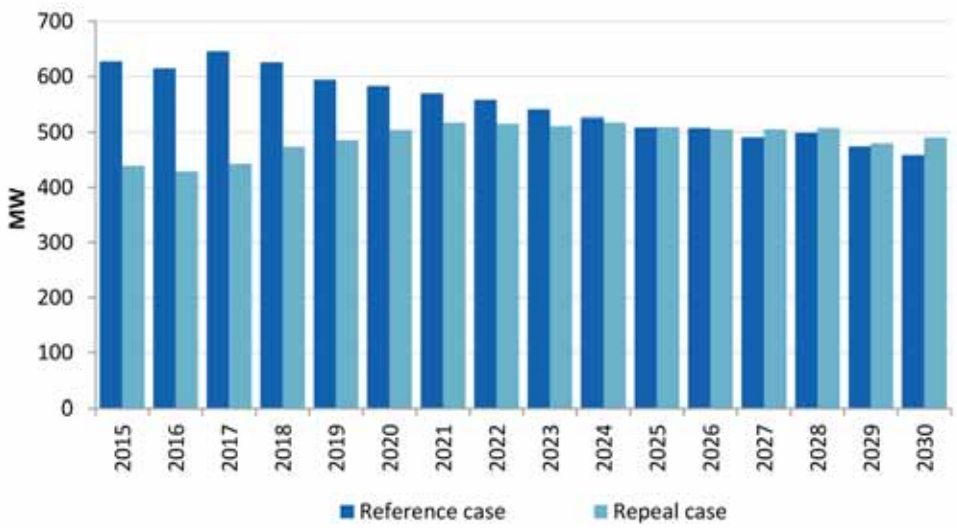
Similarly, the Business Council of Australia argued that:

> *It provides an unnecessary subsidy to rooftop solar, which is now at grid parity, meaning electricity produced by rooftop solar is commercially competitive with retail electricity prices in its own right. The RET… is no longer required to incentivise the uptake of rooftop solar. (Business Council of Australia, p.4)*

Immediate abolition would increase the costs faced by consumers to install solar PV and solar water heaters, subsequently lowering demand for these products and leading to a reduction in income and employment for the small-scale solar industry. If the SRES was removed, the typical payback period for rooftop PV systems would increase by nearly three years to around 10 years for residential systems and around nine years for commercial systems, although this would vary between jurisdictions

Modelling by ACIL Allen indicates that abolishing the SRES would have a short-term impact on the rate of small-scale installations of about 30 per cent compared to continuing with the current scheme. However, the impact falls from 2017 as support under the SRES would have started to decline through reductions in the deeming rate. Installation rates are estimated to recover by the early 2020s as illustrated in Figure 39. ACIL Allen estimates that the total avoided certificate costs from abolishing the SRES would represent $3 billion over 2015 to 2030 (in NPV terms).

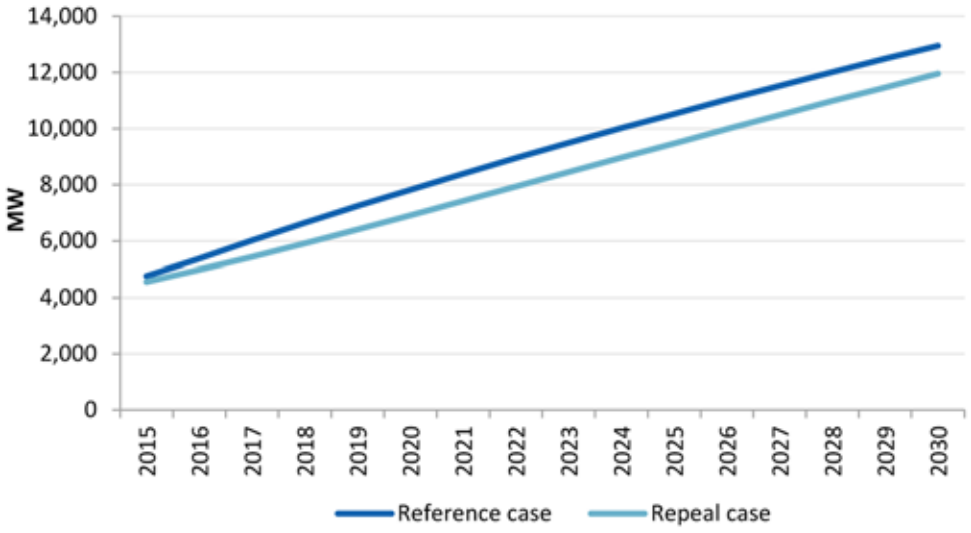
Figure 39 Annual additions to small-scale solar PV capacity: 'Repeal' and Reference case, 2015 - 2030



Source: ACIL Allen

Figure 40 shows the difference in total small-scale solar PV system capacity over time between repealing the SRES and maintaining the current settings.

Figure 40 Cumulative capacity of small-scale solar PV: 'Repeal' and Reference case, 2015 - 2030



Source: ACIL Allen

ACIL Allen also conducted a sensitivity analysis of the effect of high capital costs for solar PV. In this sensitivity it was assumed that the cost reductions projected in the central scenario are achieved up to 10 years later. The results indicate that higher capital costs lead to a lower uptake of small-scale PV, but growth is still robust even under repeal of the SRES. Compared with 4.1 GW of capacity in 2014, capacity in 2020 with higher capital costs is projected to be 7.4 GW under the reference case and 6.6 GW under repeal (compared with 7.8 GW and 6.9 GW under core assumptions).

Modelling by ROAM Consulting (submitted by the Clean Energy Council) includes an estimate from SunWiz that removing the SRES would cause a reduction in annual rooftop PV installations of 40 to 45 per cent by 2017-18, and by 2030 solar PV installations would be 30 per cent lower than under the current scheme.[52] The Clean Energy Council's submission also stated that abolishing the SRES would lead to 3,800 fewer jobs by 2020 in small-scale renewables, compared to continuing with current policy settings.[53]

Modelling of the RET by Bloomberg New Energy Finance suggested that the impact of abolishing the SRES would be less severe, resulting in a reduction in installation rates of 26 per cent over 2015 - 20 for residential systems and 10 per cent for commercial-scale systems.

Tindo Solar's submission highlighted the effects of abolition on its own operations.

> *Tindo Solar as a manufacturer and installer of solar systems nationally would be impacted significantly - which would certainly lead to job losses. This would happen right at a time when the future looks bright for Tindo with imminent expansion of our work force as we continue to win and create new business. (Tindo Solar, p.2)*

A number of submissions pointed out that SRES subsidies are paid upfront through conversion of the expected certificates into a capital subsidy. Abolishing the scheme would not have an impact on existing systems. For example, the Australian Industry Greenhouse Network submitted:

[52] ROAM Consulting report to Clean Energy Council, *RET Policy Analysis*, April 2014, p.23.
[53] Clean Energy Council, *Submission to the Renewable Energy Target Review Issues Paper*, 2014, p.4.

> *Small-scale investments under the SRES are typically provided with full credit in advance; this is substantially different to commercial investments that receive certificates through the LRET as energy is produced. Therefore, the SRES can be abolished at short notice without stranding investments or causing sovereign risk. (Australian Industry Greenhouse Network, p.15)*

Although households that have installed systems have received certificates upfront, businesses operating in the small-scale supply chain may face losses associated with stock-on-order or stranded investments if the SRES was abolished, for example in manufacturing or distribution facilities. As an example, Tindo Solar submitted:

> *…our automated production line in Mawson Lakes, South Australia… would not have been possible without the RET and any change to the RET will put the viability of manufacturing panels in Australia at serious risk. (Tindo Solar p.4)*

The impact of abolishing the SRES may be greater for the solar water heater industry. The Australian Solar Council's submission stated:

> *Solar hot water sales have shrunk by some 70 per cent since 2009, following the removal of a Federal Government rebate. The loss of the RET will completely destroy the market and end Australian manufacturing of solar hot water systems. (Australian Solar Council, p.7)*

Rheem Australia's submission discussed expansion activities undertaken by the company in both the solar hot water and PV business in support of their manufacturing operations and dealer network, and expressed concern over potential changes to the SRES:

> *Rheem is concerned that any change to the SRES component of the RET, that results in a serious reduction in demand for the technologies covered by the SRES, will result in factory closures and job losses amongst both larger manufacturers and the small business community. (Rheem Australia, p.2)*

Alternatively, some submissions argued that solar water heaters should not receive assistance on the basis that they displace rather than generate electricity. For example, the Energy Supply Association of Australia submitted:

> *There is also a strong case to reconsider arrangements for "displacement technologies" such as air-sourced heat pumps and solar water heaters. These technologies do not result in any renewable generation but rather reduce conventional generation. They have more in common with energy efficiency measures than renewable energy generation. (Energy Supply Association of Australia, p.5)*

Similarly, the Energy Networks Association argued that solar water heaters and heat pumps do not meet the objectives of the Act, stating:

> *Solar water heaters and electrically boosted heat pump water heaters do not generate renewable electrical energy. Rather they increase the efficiency with which fossil fuels are consumed by using solar inputs or ambient air temperature to contribute to water heating. (Energy Networks Association, p.3)*

A study by Energy Analysis Engineering, provided to the review by Apricus Australia, indicates that removing the SRES would increase the cost of a residential solar water heater system by

$500 to $1,500 (or 10 to 30 per cent) and the expected payback would increase from around seven years to nearly nine years.[54] Although this is similar to the impact on the cost and payback period for solar PV systems, the industry argues that it will result in a greater reduction in installations, as hot water systems are replaced at short notice and consumers tend to replace 'like with like', particularly if the cost of an alternative is significantly higher or involves a delay in re-establishing access to hot water.

ACIL Allen's modelling suggests that abolition of the SRES could result in around 36,000 fewer solar water heaters being installed between 2015 and 2020 (around 16 per cent less than the number of systems forecast to be installed if the current SRES were to continue), which would have been expected to have displaced around 110 GWh of electricity. It would save energy users approximately $390 million in SRES subsidies.

6.4.2 Accelerating the phase-out of the SRES

As an alternative to immediately abolishing the SRES, the costs of the scheme could be reduced by shortening the duration of the scheme and reducing the level of the cross-subsidy, therefore providing a period of transition for the small-scale renewable energy industry.

There are various ways to reduce the level of the subsidy. Under current settings, installers of small-scale solar PV systems are entitled to receive ('deem') 15 years worth of certificates at the time of installation, while installers of solar water heaters are entitled to receive 10 years worth of certificates. Under current arrangements, the period for which certificates may be created for solar PV systems (the deeming rate) will fall by one year each year from 2017 until the scheme ends on 31 December 2030, when the deeming rate would be one. Similarly, the deeming rate for solar water heaters (which is currently 10 years) falls by one year each year from 2022 to 2030.

The phase-out of the SRES could be accelerated through a faster decline in the deeming rates in combination with bringing forward the end-date of the SRES from 2030 to 2020.

A number of submissions considered that there was a case for winding back support under the SRES. For example, the National Generators Forum submitted:

> *The current deeming provisions provide a 15 year subsidy in an up-front payment to projects installed under the SRES provisions. Changing this provision would not impact on existing projects and would ensure consistent treatment of renewable projects regardless of the size of the facility.*
>
> *Within the context of the objective of the RET as an 'infant industry' subsidy it may be prudent to wind back some of the arrangements for SRES noting that PV units are continuing to fall in price, the PV industry is well established and installations are now price competitive without subsidies (National Generators Forum, p.4).*

The Australian Industry Group submission suggested implementing a formula, as opposed to a fixed timetable, to reflect the increasing competitiveness of solar PV technology that would take account of changes in the consumer cost of small-scale technologies and in retail electricity prices:

[54] Energy Analysis and Engineering, *Policy Impact Analysis: Removal of the RET on the Water Heater Industry*, For: Apricus Australia, May 2014.

> *This… would also be more likely to produce well-calibrated levels of support. This could be done through changes to the deeming period or certificate price, or by applying a discount factor to the number of certificates issued. (Australian Industry Group, p.7)*

A number of submissions suggested that ensuring distributed solar PV received a fair price and connection conditions could obviate the need for the SRES. For example, WestWind submitted:

> *In our view though it would be far preferable to wean off small scale renewable energy systems of any upfront payment support systems and ensure a fair treatment and valuation of their contribution to the overall energy supply instead. (West Wind Energy, p.3)*

Modelling from ACIL Allen suggests that phasing out the SRES by 2020 may provide savings while avoiding some of the adverse impacts that could result from abolition of the SRES. Reducing the deeming rate to 10 years in 2015, followed by further reductions from 2015 to 2020 would save approximately $2 billion (in NPV terms) in cross-subsidies which would have flowed to the sector from 2015 to 2030 under current settings.

Where the reduction in deeming rate is publically foreshadowed, it is likely to cause a surge in system installations followed by a rapid decline. This could be averted through small reductions in the deeming rate of one year at a time.

Similar to abolishing the SRES, the impact of bringing forward the phase-out of the SRES is likely to be greater for the solar water heater industry than the solar PV industry. However, considering solar water heaters represent high cost abatement and displace rather than generate electricity (and therefore are included in some energy efficiency measures), it is questionable whether providing greater assistance to solar water heaters under the SRES could be justified.

Additionally, the submission from Mr Alan Pears from RMIT University and Sustainable Solutions indicated that there may be a case to review the number of STCs allocated to solar hot water systems based on the scale of energy savings they achieve:

> *There is some evidence that average electricity savings for those who install solar hot water are smaller than is estimated by the regulator. For example, a 2011 IPART study suggested a typical solar HWS in NSW reduced electricity consumption by 1400-1500 kWh/year, which is around half of the number of STCs they now create. (Alan Pears, p.15)*

The solar PV industry is starting to develop new products such as solar leasing and battery storage with battery costs declining in recent years. An accelerated phase-out with a period of transition may provide sufficient time for the industry to innovate and develop alternative business models to engage new customers before SRES support is completely removed. It would also provide for a smoother transition to a size that is sustainable in the long term for the industry.

6.4.3 Recombine the SRES and LRET schemes

The RET was separated into the LRET and SRES in January 2011 in response to a large increase in the uptake of small-scale systems. This resulted in an oversupply of certificates which caused the price to fall dramatically to a level that was not sufficient to support large-scale projects, and investment stalled.

As many of these factors are no longer at play, some stakeholders suggest that the schemes should be re-combined. This would cap the total renewable generation supported through the RET, providing certainty to liable entities on the number of certificates required to meet obligations each year. It is also suggested that the cost of the RET would be lower as large-scale projects would be in direct competition with small-scale installations, which require a lower certificate price. The two schemes could be recombined with or without deeming.

Recombining the scheme was not an option supported by many stakeholders, although Origin Energy's submission suggests that recombining schemes without deeming could be considered:

> *We suggest that returning to one simple scheme, with no up-front deeming for any technologies, is the simplest and most equitable solution to retaining the RET. It avoids further messy policy interventions in the SRES and it also avoids the need to predict how much generation may come from small-scale technologies by 2020, which is a difficult task. (Origin Energy, p.11)*

In contrast, a large number of submissions recommended against recombining the schemes, arguing they serve two different markets. For example, the Australian Photovoltaic Institute submitted:

> *…the SRES and LRET schemes target very different types of investment and were separated after a few years of the market operating, due to this fact. Combining the two schemes risks one dominating the other which, regardless of the "winner", would have an overall negative effect, inhibiting the development of optimum solutions. Maintaining both schemes provides the optimum mix of supply and demand, with both large-scale and small-scale solutions. (Australian Photovoltaic Institute, p.8)*

The Energy Supply Association of Australia made a similar point and cautioned against recombining the schemes without considering the potential for up-front deeming to distort the market:

> *The concept of deeming itself is less of a problem; it is that it leads to the up-front provision of STCs equivalent to 15 years of electricity generation for all systems up to 100 kW that is problematic… In contrast, LGCs are allocated to renewable energy generators on a monthly, quarterly or annual basis by the Clean Energy Regulator. If small and large systems fell under the one scheme with up-front deeming provided to small systems, there is a high risk of distorting the market. This is what occurred prior to the split of the RET into the LRET and SRES. (Energy Supply Association of Australia, p.4)*

The Panel considers that there are risks with this approach. Recombining the schemes with deeming for small-scale installations would require adding an estimate of certificates expected to be created by small-scale installations to the annual LRET targets. If the level of installations were higher than predicted, it could oversupply the market and lead to a repeat of the conditions that led to the schemes being separated in the first place. If installations are lower than predicted, more large-scale generation would be required to meet the target, potentially at a higher cost.

The uncertainty over the amount of large-scale generation required in a combined scheme could mean that liable entities are reluctant to enter into PPAs and would meet their obligations by purchasing certificates on the spot market. This could add to the cost of financing projects and subsequently increase the price of certificates. A capped scheme may also create uncertainty for those wanting to install small-scale systems as to whether the cap will be reached early in the period, meaning that certificates would be unavailable.

Alternatively, the deeming arrangements could be ended so that small-scale systems would create certificates annually based on the amount of electricity generated. While this lessens the potential for recombined schemes to distort either the large or small-scale market, it would be less attractive to households, who require the RET to assist with the upfront cost of purchasing a system and the effect may be similar to terminating the scheme all together.

In addition, many residential electricity meters lack the functionality to accurately record total generation from a rooftop solar PV system. The rules governing the relationship between distribution businesses, the metering provider (which may be the same party) and the individual resident vary greatly, making a uniform approach to metering and LGC creation and/or data aggregation extremely difficult. The administrative burden associated with recombining the scheme may be extremely high for both the CER and householders.

6.4.4 Reduce the 100 kW threshold

Under the current arrangements, solar PV systems that have a capacity of up to 100 kW are eligible for the SRES. This compares with 10 kW for small-scale wind and 6.4 kW for small-scale hydro systems. Although average system sizes in Australia have increased, the vast majority of solar PV installations (which are for households) are no more than 10 kW.

According to Bloomberg New Energy Finance, the average system size of commercial installations in Australia in 2013 was 18.1 kW.[55] These larger solar PV units can be deployed on shopping centres, storage facilities, office blocks or farms. The cost and payback period for commercial PV systems has decreased over recent years.

The commercial market is growing in every state in Australia, though it is yet to take off to the extent of the residential sector. With commercial systems eligible under the SRES able to access a 15 year deeming period for STCs, there is a risk that strong growth in the deployment of larger installations on commercial buildings could add substantially to the costs of the scheme. If the threshold were lowered, say to 10 kW, system sizes above this would be included in the LRET without deeming (if the LRET is open to new entrants), reducing the impact on the cost of the SRES.

Commercial-scale systems (between 10-100 kW) made up 14 per cent of the solar PV capacity installed in 2013. The number of installations increased by 123 per cent between 2012 and 2013, representing an increase in installed capacity of 150 per cent. Most of this growth occurred in the 10-30 kW range. This rapid increase in installations was incentivised, in large part, by a number of government grants programs which have since closed. Although the commercial scale sector has experienced steady growth, overall, the uptake of commercial solar PV remains very low.[56]

There are still barriers to uptake which reduce the probability of a significant boom in commercial-scale installations. Generally, commercial and industrial businesses access lower electricity tariffs and frequently lease premises, reducing the incentive to install solar systems. Additionally, it can be difficult for commercial businesses to secure finance, and costs may be incurred to cover network improvements to ensure the new generation does not disrupt local grid voltage and frequency parameters. On the other hand, solar retailers are increasingly targeting this sector as a potential growth market with leasing arrangements likely to assist take-up in this sector.

[55] Bloomberg New Energy Finance, Australia Client Roundtable – RET Review and 20 GW solar future, 6 and 8 May 2014.
[56] Green Energy Markets, *Small-scale Technology Certificates data modelling for 2014 to 2016, Report to the Clean Energy Regulator*, January 2014, p.32-35.

Most market analysis predicts the sector to grow steadily. Green Energy Markets have forecast the installation of commercial-scale solar PV systems to grow by 20 per cent from 2014 to 2015, and by 25 per cent in 2016.[57] Bloomberg New Energy Finance projects that 19 per cent of commercial and industrial premises will have installed rooftop solar PV by 2020, rising to 33 per cent by 2030. This is lower than the penetration rate forecast for residential buildings (53 per cent by 2020), however it still represents a significant increase in capacity.[58]

The Energy Supply Association of Australia supports lowering the threshold, arguing deeming arrangements provide an advantage for larger solar PV systems not available to LRET projects:

> *Another option could be to reduce the 100 kW threshold for eligibility for the SRES to a lower level, providing that the threshold for up-front deeming was moved to the same level. The ESAA considers that this would provide better incentives. It would allow households and businesses installing small systems to continue to receive the benefits of deeming, while ensuring certificates for larger systems were allocated more accurately on actual generation. Moving medium size solar PV (or other) systems into the LRET would also create a more level playing field across the range of renewable technologies as they develop further. (Energy Supply Association of Australia, p.4)*

Origin Energy submitted:

> *We suggest the best solution is to roll the schemes back together into one. However, another plausible option is to reduce the threshold of the system size eligible under the SRES from the current level of 100 kW to about 5 kW. This would mean that larger systems would be part of the LRET, with no deeming. The SRES could then be phased out as panel costs for small-scale systems decrease over time. (Origin Energy, p.13)*

In contrast, the Property Council and Tindo Solar argued for increasing the SRES threshold to 250 kW and 500 kW respectively, to encourage commercial installations. Other businesses with interests in commercial-scale solar systems suggested that lower uptake in the commercial sector could stifle an emerging market that the industry is hoping will help to fill the gap created by lower demand for residential systems. For example, power and automation technology company ABB Australia, argued against reducing the threshold, submitting:

> *ABB's view is that there is no strong economic justification for a reduction in the SRES upper threshold of 100 kW or deeming arrangements, which could negatively affect the adoption of solar PV solutions within the commercial sector. (ABB Australia, p.4)*

Similarly Yingli Solar argued:

> *Lowering the 100 kW threshold for access [to] SRES support would reduce the ability of small and medium businesses to invest in solar – and their ability to take control of their own power bills in the future. (Yingli Solar, p.4)*

Lowering the threshold introduces the compliance costs of the LRET to medium-scale solar PV systems, where generation must be metered and certificates claimed annually rather than upfront.

[57] Green Energy Markets, *Small-scale Technology Certificates data modelling for 2014 to 2016, Report to the Clean Energy Regulator*, January 2014, p.35.
[58] Bloomberg New Energy Finance, *Australia Insight - Solar - Research note: Australia's 20 GW small-scale solar future*, June 2014, p.7.

The Panel considers that a suitable threshold would be around 10 kW, consistent with the threshold for small-scale wind systems. This would mitigate the risk that a potential boom in commercial-scale installations could add substantial costs to the SRES, while enabling households to access deeming arrangements that reduce the upfront cost of a system and avoid administrative costs associated with claiming certificates annually.

6.5 Reforming the SRES: Conclusions

The SRES has already exceeded the original expectation of achieving a minimum of 4,000 GWh of annual generation.[59] System costs for rooftop solar PV installations and out-of-pocket costs for consumers have declined rapidly since 2009 and although the number of new installations has fallen from its peak, installations have continued at high levels despite significant reductions in support.

The cost of reductions in CO_2-e emissions achieved by the SRES is very high, in the order of $100 - $200 per tonne. On this basis its role as an emission reduction tool cannot be justified when other CO_2-e emissions reduction policies are available at much lower cost.

The combination of significant cost reductions and the increase in retail electricity prices means that the industry is becoming commercially viable. Even in the situation where capital costs do not decline as quickly as expected, the modelling suggests that the uptake of small-scale solar PV remains reasonably strong. Given its high abatement costs, and the fact that it adds proportionally higher costs to households and businesses than the LRET, the Panel considers that the SRES should be wound back.

Under the SRES subsidies are provided at the time a unit is installed, unlike under the LRET where the cross-subsidy continues to be paid until 2030. As a consequence repealing the SRES gives rise to no adverse effect on existing owners of small-scale systems.

The ACIL Allen modelling indicates that while repealing the SRES would have an immediate effect on the sector by reducing the annual amount of PV generation capacity being installed by around a third, and the number of solar hot water systems by around 16 per cent, these reductions would be only short-lived. The amount of generation capacity and solar hot water systems being installed each year would recover by the early 2020s. The modelling found that growth in small-scale systems would continue under all scenarios modelled and total investment in small-scale systems over the period to 2040 would not vary by more than 16 per cent under any scenario.

However, the immediate effects of repeal of the SRES on the industry could be significant, including job losses and the possible stranding of investments made by the small-scale industry in manufacturing facilities.

An alternative to immediately ending the SRES would be to adopt an earlier phase-out. This could soften the impact on the industry, allowing it to transition to its long-term sustainable level. While this would delay some of the benefits to the broader community of removing the full cost of the cross-subsidy, it would mitigate the impact of a severe contraction on the interests of those who have invested in parts of the small-scale supply chain (as distinct from those who have invested in the systems themselves). An appropriate transitional approach would be to accelerate the

[59] The Clean Energy Regulator estimates that small-scale generation units supported by the RET generated or displaced the equivalent of 6,400 GWh of electricity in 2013.

currently legislated phase-out of the SRES by bringing forward the end date of the SRES from 2030 to 2020, and reducing the deeming period.

This provides the industry with time to adapt and innovate, developing products to target new customers. It also provides a predictable, smoother transition, and may allow time for energy market reforms to deliver more efficient signals for investment in distributed generation.

There is a risk that the uptake of solar PV in the commercial sector could increase rapidly before 2020. This would reduce the cost savings achieved from the accelerated phasing out of the scheme. To safeguard against this the Panel considers that, if the SRES is to continue, the threshold should be reduced from 100 kW to 10 kW.

Recommendation 3: The Small-scale Renewable Energy Scheme (SRES) should be amended in one of the following two ways:

Option 1 – Abolition

In order to address the cost of the SRES (and its effect on electricity markets), the Panel recommends that it be closed immediately in the following manner:

a. The SRES should terminate upon announcement.

b. Those who contracted before the announcement for the installation of a small-scale system should receive the certificates they would have done.

or

Option 2 – Bring forward the phase-out of the SRES

To reduce the cost of the SRES while providing some support for new small-scale renewable systems, the Panel recommends that the phase-out of the SRES be brought forward in the following manner, to take effect immediately:

a. Bring forward the last year of operation of the SRES from 2030 to 2020.

b. Reduce the period for which certificates may be created for rooftop solar PV systems from 15 years to 10 years, and in each year from 2016 onwards further reduce the period for which certificates may be created, as set out below:

Rooftop solar PV: period certificates may be created

Year installed	Period
Prior to announcement	15 years
From announcement	10 years
2016	9 years
2017	8 years
2018	7 years
2019	6 years
2020	5 years
2021	Scheme closed

c. Reduce system size eligibility threshold for rooftop solar PV systems from no more than 100 kilowatts to no more than 10 kilowatts.

d. Reduce the period for which certificates may be created for solar and heat pump water heaters by one year each year, commencing in 2016, as set out below:

Rooftop solar PV: period certificates may be created

Year installed	Period
Prior to 2016	10 years
2016	9 years
2017	8 years
2018	7 years
2019	6 years
2020	5 years
2021	Scheme closed

7 OTHER ISSUES FOR THE REVIEW

7.1 Exemptions

The RET scheme contains two types of exemptions. The first is a partial exemption for electricity used by businesses conducting EITE activities. The second is a full exemption from liability under the scheme for entities producing and consuming their own electricity, provided certain conditions are met.

The number of certificates required to be surrendered under the LRET and SRES each year is not adjusted for the exemptions granted under the scheme. Consequently, the exemptions have no impact on the level of renewable energy generation supported by the RET. However, this means the exemptions have the effect of increasing the costs of the scheme for non-exempt electricity consumers as certificate costs are borne by a smaller number of electricity consumers than would be the case in the absence of the exemptions.

7.1.1 Emissions-intensive and trade-exposed activities

With the expansion of the RET in 2010, businesses conducting EITE activities were granted a partial exemption from liability on a similar basis to arrangements being developed under the proposed Carbon Pollution Reduction Scheme (CPRS). The Government considered that a partial exemption should be provided in recognition of the combined impact of the higher RET targets and the CPRS on emissions-intensive businesses that are price-takers in a global market.

The exemption is only applicable to the portion of RET liability above the original MRET liability, EITE businesses face the cost of the RET that relates to the original 9,500 GWh of liability under the MRET. At the time the RET was expanded, the Australian Government considered whether the partial exemption should be extended to the MRET component, ultimately deciding to retain the original approach on the grounds that businesses had incorporated MRET costs into their operations and had not faced carbon related costs to that point in time. The Government at the time considered it reasonable to require all businesses to contribute towards the cost of deploying renewable energy.

The exemption is provided through a PEC issued by the CER to EITE businesses. Each PEC represents a volume of electricity, in MWh, to which RET costs will not apply for a given year. EITE businesses exchange the PECs with their electricity suppliers in return for lower electricity costs. The suppliers then surrender these PECs to the CER to reduce the total number of STCs and LGCs that they must surrender to meet their liabilities under the scheme. Where an EITE business is directly liable under the RET, the PEC is deducted from the amount of electricity that would otherwise attract a RET liability.

Highly emissions-intensive businesses are eligible to receive a 90 per cent exemption of their RET liabilities above the MRET amount, while moderately emissions-intensive activities are eligible for a 60 per cent exemption above the MRET amount. Accounting for the MRET component, in 2013 this translated to an exemption rate of around 75 per cent for highly emissions-intensive activities and around 50 per cent for moderately emissions-intensive activities.[60]

[60] Information provided by the Clean Energy Regulator to the RET Review Secretariat.

However, many large energy users argue that the cost of the RET remains significant, with some indicating they have not benefited from any reduction in wholesale prices which may be attributed to the RET due to the nature and duration of their electricity supply contracts.

Stakeholders suggested a number of ways in which the EITE exemption may be increased to reduce or remove the cost of the RET for EITE businesses. A number of stakeholders including Rio Tinto, Alcoa and the Australian Aluminium Council, Australia Pacific LNG, the Cement Industry Federation, the Australian Industry Greenhouse Network, the Business Council of Australia, the Australian Petroleum Production and Exploration Association, the Chamber of Minerals and Energy of Western Australia and the Tasmanian and Queensland State Governments support increasing the exemption for EITE businesses, with some suggesting a 100 per cent exemption. For example the Queensland Government stated:

> *The Queensland Government supports amendment of the application of the RET to assist in alleviating some of the cost burdens being experienced by emissions intensive businesses across Australia. If the Commonwealth decides to retain the RET, Queensland recommends that highly Emissions-Intensive Trade-Exposed businesses be given a 100% exemption from liability. (Queensland Government, p.5)*

As an alternative, some stakeholders suggested that the exemption could be extended to cover the MRET component. This would result in an exemption of 90 per cent for highly emissions-intensive businesses and 60 per cent for moderately emissions-intensive businesses from the full RET liability.

Nyrstar commented that:

> *Nyrstar would also encourage the Expert Panel and the Government to consider extending the PECs to cover the initial 9,500 GWh target on the basis that international competitiveness has significantly eroded through the appreciation of the Australian dollar since the inception of the RET in 2001.(Nyrstar, p.2)*

Additionally, specific industries raised issues relating to the definition of their activities under the regulations. The LNG and cement industries requested the respective definitions be expanded to cover additional aspects of their operations (in addition to increasing the level of partial exemption from 60 to 100 per cent). For example, Australia Pacific LNG submitted:

> *APLNG supports the APPEA submission which recommends that effective assistance be provided for the LNG industry by:*
>
> - *Providing a headline assistance rate of 100%*
>
> - *Refining the definition of the LNG industry so that it incorporates the full LNG process (both upstream and downstream) and applying it so that it takes into account new projects. (Australia Pacific LNG, p.2)*

Extending the assistance provided to EITE businesses increases the volume of liable electricity covered by the exemption. In turn, this transfers a greater share of the cost of the RET to all other electricity consumers. For example, the Independent Pricing and Regulatory Tribunal noted:

> *As the overall RET target is kept constant, these exemptions raise the costs of complying with the scheme for all other electricity customers, particularly as the exempted industries can be large users of electricity and account for a significant proportion of electricity use in Australia. (Independent Pricing and Regulatory Tribunal, p.5)*

These views were supported by the renewable energy industry and consumers groups. For example, Acciona submitted:

> *Any exemption arrangement spreads the cost of compliance over a smaller pool of liable entities. Based on the Review's interest in ensuring the lowest cost outcome for consumers, it seems counterproductive that the Review would consider further increasing the exemptions from the RET. (Acciona, p.18)*

The Australian Aluminium Council noted that recalibrating the LRET to a 'real 20 per cent' with a 100 per cent exemption for EITE businesses could result in reduced costs to both industry and households:

> *This provides the flexibility to reduce RET costs for the aluminium industry and for all other electricity users – other EITE industries, non-EITE industry, commercial users and households. Furthermore, it would not leave existing renewables investments stranded and even achieve 20% renewable electricity generation, if that is desired. (Australian Aluminium Council, p.10)*

Alternatively, some submitters suggested that the portion of electricity covered by the EITE exemption could be removed from the calculation of electricity demand used to establish the targets in order to avoid increasing costs to other electricity users. For example, the Australian Chamber of Commerce and Industry stated:

> *On balance, we would support a continuation of EITE assistance under the RET but recommend that the target be adjusted downwards to exclude the EITE component so that costs to non-EITE consumers are at least contained to a target that matches their electricity consumption. We note that if the RET were to be abolished, no EITE arrangements would be needed. (Australian Chamber of Commerce and Industry, p.18)*

Currently, the portion of electricity that falls under the EITE exemption accounts for around 13 per cent of liable electricity. Extending the exemption to cover the MRET component would increase the portion of electricity covered by the exemption to an estimated 18 per cent and to an estimated 20 per cent if a 100 per cent exemption was provided to all EITE businesses.[61]

It is further estimated that extending the exemption to cover the MRET component would add a further $2 per year and $13 cumulative to 2020 to household bills. Providing a 100 per cent exemption would add $4 in 2015 and $26 cumulative to 2020.[62]

If the LRET was closed to new entrants from 2015, extending the EITE exemption to cover the MRET component is estimated to increase household bills by an extra $2 in 2015 and by around $11 cumulative to 2020. Providing a 100 per cent exemption is estimated to add an extra $2.50 in 2015 and around $15 cumulative to 2020.[63]

[61] Calculations based on ACIL Allen forecast EITE electricity prices, assuming 90 per cent of EITEs are eligible for a 90 per cent assistance rate with average residential consumers using 6,800 kWh per annum.
[62] Ibid.
[63] Ibid.

Other businesses, ranging from small and medium enterprises to large manufacturers, not conducting EITE activities would also face higher electricity costs. These higher costs would vary greatly according to electricity use, but for many the increase in costs would be larger than for households both in dollar and percentage terms. Some of these businesses, in particular in the manufacturing sector, also face international competition even though they fall outside the definition of 'emissions intensive' and currently receive no relief from the RET costs.

The Panel notes the concerns raised by EITE businesses about the cost of the RET. However the rationale for providing the exemption was to reduce the combined impact that a carbon tax and higher RET costs would have on EITE businesses. The repeal of the carbon tax will lower electricity prices for all consumers. If adopted, the Panel's recommendations on both the LRET and the SRES would reduce the costs of the RET faced by EITE businesses in the future compared with current settings. The Panel also notes that changes to exemption arrangements for EITE businesses are likely to have a much smaller impact than factors such as exchange rate movements and global supply and demand conditions for goods produced by EITE businesses, which are likely to be far more important determinants of profitability. Given these factors, it is difficult to justify extending the exemption arrangements for EITE businesses considering the additional cost this would impose on other electricity consumers.

Recommendation 4: The current partial exemption arrangements for emissions-intensive trade-exposed businesses should be maintained.

7.1.2 Self-generation exemption

Self-generators that consume the electricity they produce within one kilometre of the point of generation or via a dedicated line are exempt from liability under the RET. This exemption has been in place since the commencement of the scheme in 2001.

The Panel heard from a number of stakeholders that the operation of the self-generation exemption is arbitrary and poorly aligned with the original intent. Broadly, these concerns fit into two categories:

- The ownership, distance and dedicated line requirements restrict resource projects from qualifying for the exemption.
- The REE Act creates unintended consequences for remote resource projects that provide small amounts of electricity from an otherwise dedicated line to remote communities and for the purpose of supporting public infrastructure such as mobile phone towers that are crucial in providing support to emergency services in remote areas.

A number of stakeholders including the Australian Petroleum Production and Exploration Association, the Chamber of Minerals and Energy of Western Australia, the Australian Industry Greenhouse Network and Rio Tinto requested substantial changes to the exemption arrangements on the basis that the current eligibility requirements unduly restrict self-generators from accessing the exemption. For example the Australian Industry Greenhouse Network submitted:

> *The one kilometre radius restriction for the self-generator exemption is unnecessarily prescriptive and does not take into account the operation of large industrial industries, such as steel manufacturing. For example, a significant amount of Port Kembla Steelworks' manufacturing activities lie outside the one kilometre radius from point of generation used in the self-generator exemption. It is also not always possible for the transmission line from the*

self-generated electricity to be used solely for transmission between the point of generation and point of use. These restrictions are unnecessarily prohibitive for large industries. (Australian Industry Greenhouse Network, p.17)

Rio Tinto suggests amending the self-generation exemption to enable resource projects to expand without penalty, by removing the requirement for a dedicated line and/or removing the one kilometre limit between generation and consumption. Rio Tinto also suggest increasing the 100 MW grid capacity threshold for attracting liability under the RET. The Australian Petroleum Production and Exploration Association broadly supports this position and raised the possibility of resource projects combining to share generation and network infrastructure to avoid duplication if the criteria around the self-generation exemption was relaxed:

A number of contemporary or planned projects may not meet the strict eligibility criteria outlined above. Project proponents may then be forced to make development decisions that are non economic, purely to meet the requirements of the Act. (Australian Petroleum Production and Exploration Association, p.13)

However, not all submissions supported changes to the self-generation exemption. For example, West Wind Energy submitted:

With the low cost of renewable energy options available today for self-generators we do not see the merit in exempting self-generators from the RET. In fact, these generators are most likely to benefit financially from incorporating renewable electricity generation systems. Taking away the current exemption would most likely further encourage them to review their power generation options and help reduce emissions. This would be in line with the objectives of the RET whereas exempting these parties is not. In fact, it raises the question whether self generators using renewable energy sources could on one hand sell LGCs and benefit from the RET whereas on the other hand they are exempt from the obligations under the RET. (West Wind Energy, p.7)

The Panel heard from a number of stakeholders including Alcoa, Telstra and the Australian Industry Group that the dedicated line restriction has created unintended consequences by preventing the supply of small amounts of electricity to third parties who provide essential services. For example, Alcoa supplies self-generated electricity to its refining facilities at Wagerup and Pinjarra but also provides small amounts of electricity to remote community services including a police station and a community radio station. As a result, Alcoa faces a RET liability for the electricity it consumes along these otherwise dedicated lines. Alcoa submitted:

To retain the self-generation exemption, including a dedicated line, the Act requires that the line be used 'solely' for the purposes of transmitting electricity between the two sites. When Alcoa declared this situation to the Clean Energy Regulator, it was advised the exemption no longer applied and Alcoa would need to purchase Renewable Energy Certificates for the relevant usage. The unintended consequence added over $800,000 cost in additional REC purchases in 2013 alone. Options to avoid this high cost include disconnecting the incidental users or seeking amendment to the Act. (Alcoa, p.2)

The Australian Industry Group's submission stated:

These off-takes enable valuable services to be provided to the local communities in which they are based. Those services may otherwise not be provided as the cost of investing in new infrastructure to secure their own, often very small requirement for electricity, would be prohibitively high. (Australian Industry Group, p.9)

Amendments to the self-generation exemption need to balance accommodating the circumstances of different resource projects with the potential for increasing costs to non-exempt parties, including households. Additionally, the EITE and self-generator exemptions interact to the extent that a large energy user may qualify for partial exemption for the portion of electricity that is not covered by the self-generation exemption.

Expanding the self-generation exemption reduces the volume of liable electricity covered by the RET and proportionally increases RET costs faced by all other electricity consumers. However, the Panel considers the current self-generation exemption criteria to be too restrictive and not well aligned to the nature and geographical spread of remote resource projects. To the extent that the application of the strict eligibility criteria has resulted in genuine self-generators facing RET costs through project expansions beyond the one kilometre restriction, amendment to the exemption arrangement is warranted.

The Panel considers that criteria for a dedicated line between the point of generation and the point of consumption (where consumption is outside the distance boundary) should remain in place. Removing this rule and allowing electricity supplied and used by the same legal entity to be exempt, while placing a liability on electricity supplied to third parties potentially creates complicated measurement and reporting arrangements to determine the amount that would be liable. However, the Panel recommends that self-generators should be permitted to supply incidental amounts of electricity to third parties for community services on an otherwise dedicated line while still being eligible for the exemption. Implementation arrangements for the recommendations concerning the self-generation exemption are further discussed in Section 10.3.

Recommendation 5: The self-generation exemption should be amended to extend the one kilometre radius restriction and to permit self-generators to supply incidental amounts of electricity (below a set threshold) to third parties without attracting a RET liability. The Government should consult with affected parties to determine an appropriate distance limit and threshold for incidental off-takes.

7.2 Native forest wood waste

The Terms of Reference for the Review require the Panel to consider the Government's election commitment to reinstate native forest wood waste as an eligible renewable energy source under the RET scheme.

Native forest wood waste was included as an eligible source of renewable energy when the MRET was established in 2001. Eligibility was conditional upon the wood waste being harvested under a Regional Forestry Agreement and complying with relevant government planning and approvals processes. Generators also needed to demonstrate that the wood waste was a genuine by-product of higher value logging activities. The use of native forest wood for the sole or primary purpose of generating renewable electricity has never been eligible to create certificates under the scheme.

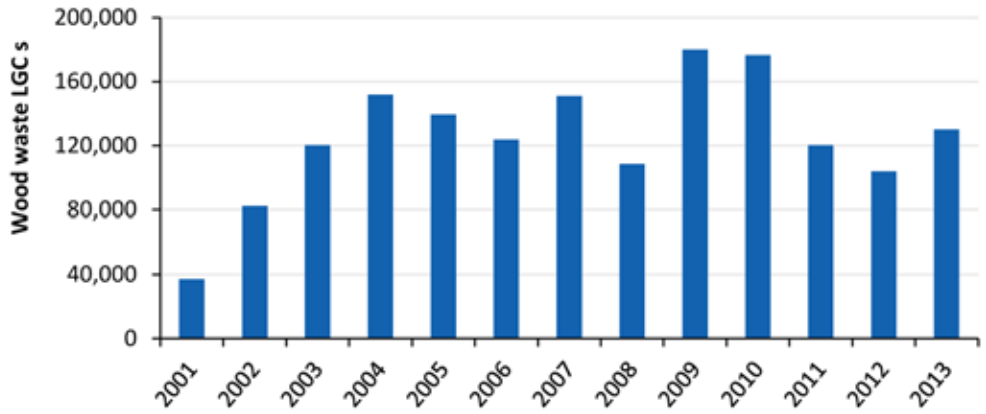
Native forest wood waste was eligible for certificates under four of the five wood waste sub-categories, but only had to be specified as native forest wood waste when classified under the sub-category of 'biomass from native forest waste'. The other eligible sub-categories of native forest wood waste were: manufactured wood product; waste products from construction

or furniture; and sawmill residue. Eligibility under these sub-categories did not require the source (non-native or native forest) to be specified.[64] Between 2001 and 2013, wood waste electricity generation (including native forest waste) created over 1.6 million certificates under the RET scheme.[65]

In November 2011, eligibility for native forest wood waste under the four eligible sub-categories of wood waste was removed from the RET. Transitional measures were introduced for the 22 power stations that listed wood waste as an eligible energy source and are effective until 2020. The transitional measures allow these power stations to create certificates under the superseded regulations for eligible electricity generation from wood waste (including native forest waste), below a contingent annual cap. Generation above the annual cap is considered under the current regulations; meaning it is only eligible if it comes from non native wood waste sources.

The amount of LGCs created from wood waste is illustrated in Figure 41. Except for the years 2009 and 2010, the long-term trend in the number of LGCs from wood waste has remained relatively stable despite the removal of native forest wood waste in 2011. LGCs created from wood waste often trade at a discount compared to certificates created from other renewable energy sources. Fluctuations in the number of certificates created from wood waste are more likely to be dependent on specific industry trends (like domestic and international demand for forestry products) as the wood waste is a by-product of higher value forestry activities.

Figure 41 LGCs created for wood waste generation, 2001 - 2013



Source: Clean Energy Regulator Register of Large-scale Generation Certificates.

As part of its election commitments, the Government announced that it would reverse the exclusion of native forest sourced wood waste as an eligible source of energy for RECs.[66] The Panel's *Call for Submissions* paper asked stakeholders to comment on the administrative and regulatory arrangements that should be in place to ensure that the reinstatement of native forest wood waste is consistent with the sustainable management of native forests.

There were 46 submissions in response to this question. In general, these submissions focussed on the framework for the sustainable management of forests and whether native forest wood waste should be considered an "ecologically sustainable" renewable energy source in the RET, rather than the regulatory arrangements that could be in place to support its reintroduction.

[64] The fifth category, "non-native environmental weeds harvested for control or eradication", has never included native forest wood waste.
[65] This includes wood waste from both native and non-native sources. Of the four eligible categories for native forest wood waste; only one certificate was created from the category "biomass from native forest wood waste" between 2001 to 2011.
[66] The Coalition's Policy for a Strong and Sustainable Forestry Industry, September 2013.

Forestry bodies, the Australian Sugar Milling Council, and state governments (New South Wales, Victoria, and Tasmania) supported reinstatement for a number of reasons. The Australian Forest Products Association noted that the:

> *Existing high standards and regulatory arrangements operating in Australia more than adequately deal with:*
>
> - *the sustainable environmental management of wood waste used for renewable energy; and*
> - *the use of wood waste as a by-product of existing logging practices rather than as an additional primary activity. (Australian Forest Products Association, p.7)*

The Australian Sugar Milling Council noted that:

> *Given that the product is wood waste, that is currently incinerated or decomposed, it is unclear why the handling or inclusion of the resource has been considered problematic. (Australian Sugar Milling Council, p.14)*

The regulation of logging activity is managed by state and territory governments through forestry plans, such as Regional Forestry Agreements, and requires harvesting to be conducted in accordance with ecological sustainability requirements. The Tasmanian Government noted in its submission:

> *Tasmania considers that there is a strong case for the reinstatement of renewable energy derived from native forest wood. Approval under a Regional Forest Agreement (RFA) should be accepted as sufficient evidence of sustainable management. (Tasmanian Government, p.3)*

The New South Wales Government submitted that:

> *It is considered that concerns regarding forest biomass utilisation are best addressed through alignment of State-based regulations. There is agreement between State and Commonwealth Governments in relation to forest operations (especially with respect to sustainability) through processes such as the Regional Forest Agreements. (New South Wales Government, p.20)*

In contrast, environmental and community groups raised concerns about the potential impacts of reinstatement on native forests. The Conservation Council of South Australia argued that:

> *There is a real danger that the move by the Federal Government to reinstate biomass from non-plantation native forests to be eligible under the RET, will again drive unsustainable practices, and prolong unsustainable forestry practices. (Conservation Council of South Australia, p.18)*

The WA Renewable Energy Alliance stated in its submission:

> *We believe that such a reinstatement would be an unnecessary distraction to the RET. It would also risk the loss of the significant mainstream community support for and confidence in renewable energy as a whole. (WA Renewable Energy Alliance, p.34)*

Other interested parties, such as the Clean Energy Council, Keppel Prince Engineering and Acciona were impartial to reinstatement of native forest wood-waste provided that implementation arrangements are consistent with the sustainable management of native forests.

The Panel has not been presented with any evidence that, under the previous arrangements, eligibility of native forest wood waste promoted unsustainable logging activities. Concerns about sustainable logging of native forests more broadly are outside of the scope of this review. In contrast to disposing of native forest wood waste by either incineration or allowing the waste to decompose, utilising the wood waste in a power station may be a more efficient use of resources and lead to lower CO_2-e emissions by reducing the use of gas or coal.

State and territory governments have responsibility for ecologically sustainable management of forests and control the amount of logging activity that can occur in native forests. This acts as a safeguard to limit the amount of eligible wood waste that is available for electricity generation. If states or territories change the regulations regarding harvesting native forests, the wastes from native forests could increase and be subsequently burned for electricity generation. However, no evidence has been provided to the Panel that demonstrates eligibility under the RET would create an incentive for ecologically unsustainable logging practices in native forests. Reintroducing an appropriate accreditation mechanism, as was in place between 2001 and 2011, would provide a further safeguard for potential unintended consequences.

In conclusion, the Panel supports the reinstatement of native forest wood waste as an eligible renewable energy source under the RET and considers that this should be based upon the regulations that previously governed its eligibility. As mentioned above, the previous regulations provided eligibility on the condition that native forest wood waste was being harvested under a Regional Forestry Agreement, complied with relevant government planning and approvals processes, and were demonstrated to be genuine waste. The superseded regulations would also provide for consistent accreditation rules between existing accredited wood waste generators and newly accredited generators.

Recommendation 6: The Government's commitment to the reinstatement of native forest wood waste as a renewable energy source under the LRET should be implemented through the reintroduction of the relevant regulations in force prior to 2011.

7.3 Frequency of reviews

Section 162 of the REE Act requires that the Climate Change Authority (CCA) review the scheme every two years. The Government is committed to abolishing the CCA and a CCA abolition bill is currently before the Parliament. This bill would amend the REE Act so that the biennial reviews are conducted by a body or person nominated by the Minister for the Environment.

The Panel heard evidence from a wide range of stakeholders across the energy sector that frequent statutory reviews undermine investor certainty and hinder the achievement of the scheme's objectives, For example, IFM Investors stated:

> *Consistent with our views around the importance of taking a long term view in an environment of investment certainty, the potential for changes to the scheme every two years is counter-productive as it introduces uncertainty and increases risk. Investment in Australian infrastructure is a long term investment, and it is not possible to make long term decisions if the rules change every two years. (IFM Investors, p.4)*

A common suggestion from stakeholders was that reviews should be no more frequent than four or five years. However, others recognised that simply reducing the frequency of reviews would not remove the risk that a statutory review would lead to significant changes to the scheme and suggested that the scope of such reviews also needs to be constrained. Hydro Tasmania stated:

> *We believe that the RET should be reviewed no more frequently than every four years and ideally less frequently than that. Further, for investor certainty to return to the RET, it is essential that future reviews can only increase annual targets and not recommend significant negative changes to the measure.(Hydro Tasmania, p.14)*

The broad nature of the statutory reviews and the possibility that they may lead to significant change to the scheme also leads participants to divert attention and resources to engaging with the reviewer to ensure that their interests are taken into consideration. The Victorian Department of State Development, Business and Innovation considered the two yearly review cycle burdensome on participants and suggested the review period be extended or removed.

A number of other stakeholders, including the Clean Energy Council, also favoured disposing of statutory reviews altogether. Vestas Wind argued:

> *It is utterly counterproductive to review a policy every two years when that very same policy is aimed at attracting investment in power stations with effective lives of more than 20 years.*
>
> *While we understand and accept that any government can review any of its policies any time it likes, the existence of a legislative requirement to review the RET every two years is a cumbersome and counterproductive provision and it should be removed.*
>
> *We believe the RET should not have statutory reviews in the interest of providing certainty to both renewable and conventional energy markets and reducing the cost of capital for both. The existence of statutory reviews merely prevents all players in the industry from getting on with the job in front of them and the current review process has effectively a form of paralysis by analysis, and has made the achievement of the annual LRET targets more difficult. (Vestas Wind, p.19)*

The legislated requirement for biennial reviews was not present in the original 2001 legislation, but was introduced with other changes in 2010. In practice the institution of biennial reviews has resulted in the scheme operating under the shadow of constant review since 2010. The ongoing speculation that the next review could lead to significant or material change to the scheme has had a detrimental effect on investors' willingness to make binding investment decisions and is likely to have led to higher financing costs because of heightened perceptions of increased regulatory risk. Any feature that generates such uncertainty undermines the scheme's primary purpose of encouraging investment in long-life assets.

Moreover, the provision is redundant as it is always open to the Government to initiate a review at any time when it considers that circumstances warrant one. As the Clean Energy Council acknowledged, this point in time is very difficult to predict and therefore legislate in advance.[67]

Recommendation 7: The requirement for statutory reviews of the scheme should be removed from the *Renewable Energy (Electricity) Act 2000.*

[67] Clean Energy Council Submission to RET Review Issues Paper, p.26.

8 INTERACTION WITH OTHER POLICIES AND MEASURES

The Terms of Reference require the review to consider the interaction of the RET scheme with other Commonwealth and state/territory policies and regulations, including the Direct Action policies under development.

A range of national and state based climate change and energy policies affect the renewable energy sector and potentially have an impact on the operation and effectiveness of the RET. This chapter focusses on the following Commonwealth and state/territory policies:

- The Government's Direct Action Plan, specifically the ERF
- State, territory and local government renewable energy targets
- State and territory feed-in-tariffs, and energy efficiency and GreenPower schemes
- State and territory general planning regulations
- Reforms to energy markets and electricity pricing

8.1 Direct Action and the Emissions Reduction Fund (ERF)

The ERF is central to the Government's Direct Action Plan, which aims to meet Australia's CO_2-e emissions reduction target of five per cent below 2000 levels by 2020.

Through the ERF, the Government intends to purchase CO_2-e emissions reductions at the lowest available cost and has allocated $2.55 billion over four years from 1 July 2014. A reverse auction process will be established whereby confidential bids will be submitted to the CER, specifying emission reductions at a nominated price, with auction rounds beginning in late 2014 and running quarterly.[68]

The ERF will be designed to link the existing Carbon Farming Initiative, supporting emission reductions from agricultural and forestry activities, with new projects such as industrial and commercial energy efficiency and emissions avoidance projects. The Government will only pay for emission reductions after they have been delivered and measured and that are genuine, additional reductions.

The ERF will also include a CO_2-e emissions safeguard mechanism. This mechanism will apply to a small number of large facilities and will be designed to ensure that CO_2-e emissions reductions paid for by the ERF are not displaced by significant increases in CO_2-e emissions elsewhere in the economy.[69] The safeguard mechanism is scheduled to begin in July 2015. Details of its design, operation, and how it might affect the electricity sector are still to be determined. Given the significance of electricity to Australia's CO_2-e emissions profile the Government has committed to consulting with the sector on the specific application of the safeguard mechanism and its interaction with the RET.[70]

[68] Commonwealth of Australia, *Emission Reduction Fund White Paper*, 2014, p.11.
[69] Ibid, p.12.
[70] Ibid, p.57.

8.1.1 The relationship between the ERF and the RET

Both the RET and the ERF have the potential to contribute towards meeting the Government's stated CO_2-e emissions target following the abolition of the carbon tax.

The ERF White Paper states:

> [The] *ERF will operate alongside existing programs that are already working towards reducing Australia's emissions growth, such as the Renewable Energy Target and energy efficiency standards on appliances, equipment and buildings.*
> *(Commonwealth of Australia, Emission Reduction Fund White Paper, p.7)*

Many in the renewable energy industry, such as the Clean Energy Council and Hydro Tasmania, consider that the two schemes can work in parallel. For example, Hydro Tasmania considers that:

> *In particular, the long-term design of the RET makes it an appropriate mechanism to support energy sector investments which may not be supported under Direct Action's Emissions Reduction Fund, due to its shorter five-year abatement contracting window. (Hydro Tasmania, p.2)*

A number of stakeholders have further argued that in the absence of a specific price on carbon, both the RET and the ERF are needed to meet the Government's CO_2-e emissions reduction target. These stakeholders generally argue that reducing or removing the RET would mean more emissions reductions are needed through the ERF which may require additional funding.

The Grattan Institute, for instance has argued that:

> *Under the Direct Action Plan, there is a target for emissions reduction, but no binding cap. Therefore the two primary mechanisms, the Emissions Reduction Fund (ERF) and the RET will both contribute to emissions reduction. Other things being equal, changes to the RET change the emissions reduction load that would have to be delivered by the ERF.*
> *(The Grattan Institute, p.5)*

On the other hand some stakeholders such as the Business Council of Australia suggest that the ERF should be the primary mechanism to reduce emissions:

> *The government's stated objective in the Emissions Reduction Fund Terms of Reference is to "invest in technologies that will reduce our emissions at lowest cost". Given that the RET is an expensive form of abatement, the government should seek to meet the bipartisan commitment to reduce Australia's emissions by five per cent by 2020 on 2000 levels through its primary mechanism the Emissions Reduction Fund. (Business Council of Australia, p.14)*

This view is supported by the Australian Industry Greenhouse Network:

> *The new policy environment poses some serious questions as to how the RET can be reconciled with broader climate policy. The cost of abatement under the RET will be considerably higher than under the Emissions Reduction Fund. On this basis, it is very hard to maintain a case for the continued existence of the RET, given that it will impose much higher abatement costs on one sector of the economy than are acceptable elsewhere.*
> *(Australian Industry Greenhouse Network, p.12)*

8.1.2 Eligibility of projects

It seems clear that the ERF and the RET could both contribute toward the Government's CO_2-e emissions reductions targets and there is some potential for duplication between the two schemes. The Panel is of the view that projects should not be eligible for funding under the ERF if they are eligible for support under the RET.

Recommendation 8: Projects, or components of projects, receiving support under the RET should be excluded from participating in Emissions Reduction Fund auction processes.

8.2 Other Commonwealth policies that support renewable energy

8.2.1 The Australian Renewable Energy Agency (ARENA) and the Clean Energy Finance Corporation (CEFC)

ARENA was established to support the research, development and demonstration of renewable energy technologies. ARENA has two broad objectives: to improve the competitiveness of renewable energy technologies; and to increase the supply of renewable energy in Australia. ARENA is supporting more than 190 projects, worth close to $2.5 billion, with around $1 billion of funding from ARENA.[71] These projects span the innovation chain, but most are at the research and development stage and have a value under $10 million. At the point of writing, the Government has introduced legislation to transfer ARENA's commitments to the Department of Industry. Support for projects with funding agreements in place will continue.

The CEFC was established to help overcome capital market barriers that hinder the financing, development and commercialisation of renewable energy, low emission technologies and energy efficiency. The CEFC generally finances projects and technologies at the later stages of development that have a positive expected rate of return and the capacity to service and repay capital. Its focus is on improving the risk understanding of co-financiers and using financial aggregation to attract investment in clean energy.[72] It is funded through the provision of $2 billion per annum in investment funds provided by the Australian Government. The Australian Government has introduced legislation to abolish the CEFC.

Ultimately, the future of ARENA and the CEFC is a matter for the Australian Government and the Parliament to determine. The Panel notes that ARENA and the CEFC are directed at increasing the range of technologies that could become competitive with already established renewable energy technologies, and to this extent these programs serve a different purpose to the RET.

However, the Panel notes that the CEFC has also provided support for established renewable energy technologies – specifically wind farms – through debt financing or re-financing contributions. Should the CEFC continue to operate, the Panel is of the view that projects that have received support under the RET should not receive further assistance from the CEFC. In addition,

[71] Australia Renewable Energy Agency at a glance infographic http://arena.gov.au/about-arena/.
[72] Clean Energy Finance Corporation *Submission to the Review of the Renewable Energy Target*, May 2014, p.2.

the provision of non-commercial finance creates a risk of undermining investments based solely on support through the RET.

Similarly, ARENA is also able to provide support to a wide range of renewable projects, some of which may also receive support under the RET. The Panel is of the view that ARENA should focus on funding research and development and demonstration projects and should not fund proven technologies. Therefore, projects eligible to receive support under the RET should not receive further assistance from ARENA.

Recommendation 9: Projects that receive support under the RET should not be eligible to receive further assistance from the Clean Energy Finance Corporation or the Australian Renewable Energy Agency.

8.2.2 Solar Towns program

As part of the 2014-15 Budget, the Government committed to establish the Solar Towns program which will provide $2.1 million over three years to community groups to support the uptake of solar technologies.[73] The program will provide grants to support the installation of solar PV and solar water heater systems and reduce energy costs. It is likely that systems receiving assistance under the program would also be eligible to receive assistance under the RET. The Panel suggests that the Government consider the level of assistance available under the RET when designing the rules for the Solar Towns program to ensure that installations under the program are additional to what would have otherwise been achieved.

8.3 State, territory and local government policies

Most jurisdictions have at various times introduced polices that support the development and deployment of renewable energy. These policies have taken many forms including: state or local government renewable energy targets; direct subsidies or capital grants to deploy renewable energy; solar feed-in-tariff arrangements; regulations mandating particular technologies; and funding for research and development. In recent years most of these programs have been wound back as a result of concerns about their impacts on electricity prices, budgetary impacts and the introduction of national climate change policies. However some significant polices still remain in place as described below.

8.3.1 State and territory renewable energy targets

South Australia

The Government of South Australia has a number of commitments in relation to renewable energy including:[74]

- South Australia's Strategic Plan target of 33 per cent of the State's electricity production to be from renewable energy sources by 2020.
- South Australia's Strategic Plan target to limit the carbon intensity of total South Australian electricity generation to 0.5 tonnes of CO_2/MWh by 2020.
- An investment target of $10 billion in low carbon generation by 2025.

[73] Commonwealth of Australia, *Budget Measures Budget Paper No.2 2014-15*, p.130.
[74] The Government of South Australia, *Submission to the RET review*, p.1.

In 2012-13, renewables accounted for around 31 per cent of South Australia's energy production. The Panel notes that the targets stated by the South Australian Government largely rely on the RET in order to be met, rather than specific South Australian Government policies.

The Government of South Australia noted in its submission that there is a need for complementary jurisdictional policy in the area of renewable energy to ensure that the RET is achieved and considers that its renewable energy targets have also provided investors with assurance that renewable energy investment will be supported.

The Australian Capital Territory (ACT)

The ACT Government has established a target of 90 per cent of all electricity consumed in the ACT to be from renewable sources by 2020.[75] The ACT Government estimates that around 490 MW of additional large-scale generation capacity will be required to achieve this target, which it intends will be made up of 91 MW of solar, 382 MW of wind and 17 MW of energy from waste to energy projects. This is additional to capacity that will be installed under the RET.

In order to meet the target the ACT Government will issue large-scale feed-in-tariffs through a reverse auction process. Under this process the large-scale feed-in-tariffs will guarantee revenue for a maximum of 20 years through contract for difference based payments (i.e. the difference between the wholesale electricity prices and the agreed feed-in-tariff). As a condition of receiving the feed-in-tariff, any LGCs awarded will be surrendered to the ACT Government who will in turn surrender these to the CER under the GreenPower scheme, to ensure that the renewable energy generated is additional to the RET. Under the first solar auction the average feed-in-tariff price was $183/MWh, with the net cost to ACT electricity consumers being the difference between the feed-in-tariff and the wholesale electricity price. The first auctions for wind feed-in-tariffs are expected to be held in late 2014 and will result in additional wind capacity being constructed in the surrounding regions. The cost of meeting the ACT target will be passed on to ACT consumers through their electricity bills with total costs per household expected to peak in 2020 at around $5 per household per week.[76]

New South Wales (NSW)

In September 2013, the NSW Government released its Renewable Energy Action Plan. This Plan supports the achievement of the national goal for 20 per cent renewable energy by 2020.

The Plan has three overarching goals, namely to:

- attract renewable energy investment;
- build community support; and
- attract and grow renewable energy expertise.

[75] Minister for the Environment and Sustainable Development (ACT), *ACT Sets 90% Renewable Energy Target In Law*, 4 November 2013). http://www.cmd.act.gov.au/open_government/inform/act_government_media_releases/corbell/2013/act-sets-90-renewable-energy-target-in-law7.
[76] ibid.

The NSW Government has established a working group (chaired by the NSW Renewable Energy Advocate) to deliver 24 actions outlined in the plan. The plan will operate alongside the Energy Efficiency Action Plan, the Regional Clean Energy Program and the Energy Savings Scheme. The NSW Department of Planning and Environment is in the process of finalising planning guidelines to give greater certainty and consistency to the renewable energy wind industry, communities and investors.

The NSW Government has announced it will supplement ARENA funding for the deployment of large-scale solar in Broken Hill and Nyngan, and will provide continued support for small-scale renewable technology including rooftop solar PV. The NSW Government has requested IPART determine a fair and reasonable solar feed-in-tariff each year to ensure the resulting uptake of residential PV does not increase electricity prices and lead to a boom and bust cycle for the industry.

8.3.2 Local government targets

A number of local governments have set targets for renewable energy for their respective areas, for example:

- The City of Sydney has set a target of 70 per cent reduction in CO_2-e emissions by 2030 compared to 2006.[77] This target includes:
    - No reliance on coal fired generation.
    - 30 per cent of electricity from renewables by 2030.
- Marrickville Council (in inner Sydney) has a 25 per cent CO_2-e emissions reduction target by 2025. Five solar PV installations are planned to assist in achieving this objective.[78]
- The City of Melbourne has a target to obtain 25 per cent of the municipality's electricity from renewable sources by 2018
    - In its submission the City of Melbourne noted that a reduction in the RET will reduce its ability to meet community expectations and risks the achievement of their renewable energy and zero net CO_2-e emissions targets.[79]

8.3.3 State and territory feed-in-tariffs

Feed-in-tariffs were introduced by state and territory governments between 2008 and 2010 to support consumers in installing solar PV. In most jurisdictions these tariffs were set considerably higher than the wholesale price of electricity. Some jurisdictions also operated generous gross feed-in-tariff schemes for each kWh produced by a solar power system regardless of how much surplus power was exported to the grid. These factors along with the RET Solar Credits multiplier led to much higher solar PV installations than anticipated and significant costs for other consumers without solar PV. In recent years, governments have opted to wind back support and close premium feed-in-tariff schemes to new entrants. Nevertheless, there are still significant numbers of households receiving legacy tariffs, the costs of which are passed through to all electricity users as higher tariffs.

[77] City of Sydney, Submission to Review of the RET, May 2014.
[78] Marrickville Council, Submission to Review of the RET, May 2014.
[79] City of Melbourne, Submission to Review of the RET, May 2014.

For most jurisdictions feed-in-tariffs for new or upgraded solar PV are now much lower and operate as solar buy-back schemes generally reflecting the value of the avoided cost of wholesale electricity and value to the retailer of avoided costs at peak periods. In some states it is compulsory for retailers to offer a feed-in-tariff, based on a value, or range of values, determined by state regulators, while other jurisdictions leave it to the discretion of individual retailers.

Table 4 below provides an indicative guide for the current feed-in-tariffs available in states and territories. Actual rates may vary subject to retailer policies and reviews by jurisdictional price setting authorities.

Table 4 Overview of current state feed-in-tariff or solar buy back schemes

Jurisdiction	Scheme Name	Rates c/kWh	Details of operation or scheduled changes
ACT	Solar buyback scheme	7.5	ActewAGL tariff. A very small number of customers may be with other retailers.
NSW	Feed-in-tariffs for surplus generation	4.9 – 9.3 (2014-15)	The benchmark range, determined by IPART, is a guide to retailers and customers on the likely value of electricity exported to the grid by customers from their solar PV and is not compulsory. Electricity retailers in NSW have the flexibility to set their own feed-in-tariffs.
NT	Gross feed-in-tariff	27.13	Maximum connection size is 4.5 kW.
QLD	Feed-in-tariff	8	Mandated feed-in-tariff for customers in regional Queensland (outside the Energex supply network) set by the Queensland Competition Authority based on the market value of the electricity exported. For South East Queensland (covering the Energex supply network), electricity retailers can set and pay their own feed-in-tariffs.
SA	Minimum retailer payment	7.6	All residential and small business PV customers can receive a minimum retailer-paid feed-in-tariff from their retailer for the calendar year 2014. Rate will decrease to 6 c/kWh upon the repeal of the carbon tax.
TAS	Feed-in-tariff	6.1	This rate is from 1 July 2014 and is set by the Tasmanian Economic Regulator.
VIC	Feed-in-tariff	8	Must be offered as a minimum tariff by all retailers with more than 5,000 customers. The rate will decrease to 7.4 c/kWh upon the repeal of the carbon tax, and to 6.2 c/kWh from 1 January 2015. The tariff is available to solar and other eligible forms of renewable energy, such as wind, hydro or biomass, with a system size less than 100 kW. The tariff will also be open to other low emission technologies, but at the time of writing these technologies have not been announced.
WA	Renewable Energy buy back scheme	8.85	Mandated scheme for customers in the SWIS.

8.3.4 State and territory planning regulations

Planning regulations imposed by jurisdictions that apply to the development of particular renewable energy technologies such as wind farms are summarised in Table 5 below. Victoria has implemented strong restrictions on the siting of wind farms which ban development in certain areas and give residents power to veto developments within two kilometres of their homes. Other states, such as NSW and Queensland have proposed changes to their planning codes or guidelines, which strengthen the rights of local communities to challenge wind farm developments or impose stronger assessment conditions.

Table 5 Overview of planning requirements affecting wind farms[80]

State	Minimum distance from existing dwelling	Consent of all residents required within minimum distance	Restrictions for areas of potential population growth	Noise monitoring requirements – decibels (db)
NSW	0.8-1.5km (current)	Yes (proposed)	No	35db proposed or max of 5db above background noise
VIC	2km	Yes	Yes	Yes, 40db
QLD	N/A	No	No	Yes, 35db
WA	No fixed rule but WA Planning commission suggests distance should be 1km (based on guidelines released in 2004)	No	No	35db proposed or max of 5db above background noise
SA	1km dwellings, 2km townships	No	No	Yes, 40db

[80] Specific planning requirements for wind farms in Tasmania, the Northern Territory and the ACT were not identified.

The NSW Department of Planning and Infrastructure released Draft Guidelines for wind farms in December 2011. At the time of writing these guidelines have not been adopted. Adoption of these guidelines would impose additional requirements for wind farm developments.

Under the proposed guidelines wind farms with a capital cost of more than $30 million (or $10 million in an environmentally sensitive area) will be considered as State Significant Development and assessed in most cases by the independent Planning Assessment Commission (PAC) rather than local councils.

Specific *NSW Wind Farm Noise Guidelines* are currently under development. For a new development, the predicted equivalent noise level should not exceed 35 decibels or exceed the background noise by more than five decibels, whichever is greater. According to the draft guidelines, these criteria are the most stringent in Australia and amongst the most stringent in the world and also include some ongoing noise monitoring requirements.

In Victoria, there is a ban on wind turbines within two kilometres of residences unless there is a written agreement with the relevant landowners. For NSW, where there is no written agreement from the relevant landowners within two kilometres, the development can still be assessed via a 'gateway' process. This process allows the state department to assess the proposal, undertake public consultations, and make a recommendation to a Joint Regional Planning Panel.

The effect of planning restrictions on wind farms in particular jurisdictions is to reduce the potential number of sites available for development. This could lead to developments in less desirable locations with lower output or higher costs, potentially making it more costly to meet the RET targets.

8.3.5 State-based energy efficiency schemes and rebates

Energy efficiency schemes operate in NSW, SA, Victoria and the ACT. These schemes support projects in the household, industrial, commercial and small business sectors. They place obligations on energy retailers to find and implement energy savings or to purchase certificates that have been created by accredited agents who have implemented approved energy efficiency projects.

The Victorian Energy Efficiency Target (VEET) scheme

The VEET commenced on 1 January 2009 and was legislated to continue until 2030. The purpose of the VEET scheme is to reduce CO_2-e emissions, encourage the efficient use of electricity and gas, and to encourage investment, employment and technology development in industries that supply goods and services, which reduce the use of electricity and gas by energy consumers.

The scheme places a liability on large energy retailers in Victoria to surrender energy efficiency certificates, each representing a tonne of greenhouse gas abated, every year.

Certificates are created when accredited persons under the scheme assist consumers to make selected energy efficiency improvements to their homes or businesses. Revenue generated through the sale of certificates is used to reduce the cost of undertaking these energy efficiency improvements.

Activities covered under the scheme include the installation of high efficiency hot water systems, air heaters and coolers, lighting, draught proofing and window treatments and the purchase of high efficiency appliances like refrigerators and televisions.

The Victorian Government has recently announced that it will close its energy efficiency scheme at the end of 2015.[81]

[81] Minister for Energy and Resources Victoria, *Energy Saver Incentive (ESI) Review 2013/2014*, 7 July 2014.

The South Australia Residential Energy Efficiency Scheme (REES)

The REES requires larger energy providers to help households to save energy by offering energy audits and energy efficiency activities such as installing energy efficient light globes and stand-by power controllers to consumers. Each year the government sets a target for the number of energy audits and energy efficiency activities each energy provider must offer and it is up to the provider to decide how they will meet that target.

On 29 November 2013, the SA Government announced that the scheme will be extended to 2020 and expanded to include small businesses.

Activities included under the scheme include replacing or upgrading water heaters, installing draught proofing, window upgrades, installing efficient air conditioning, replacing inefficient pool pumps, and installing energy efficient lighting.

The NSW Energy Savings Scheme

The Energy Savings Scheme aims to reduce electricity consumption in NSW by creating financial incentives for organisations to invest in energy savings projects. Energy savings are achieved by installing, improving or replacing energy savings equipment. The scheme places a mandatory obligation on electricity retailers to obtain and surrender energy savings certificates, which represent energy savings.

Activities included under the scheme include draught-proofing, window upgrades, installing efficient air conditioning, replacing inefficient pool pumps, and installing energy efficient lighting.

ACT Energy Efficiency Improvement Scheme (EEIS)

The EEIS commenced on 1 January 2013 and will run until 31 December 2015. Energy retailers are required to provide incentives for ACT households to achieve greenhouse gas reductions. Twenty five per cent of retailers' obligations must be met through activities in priority low-income households.

Activities eligible under the scheme include upgrades to appliances and lighting, replacement of energy intensive water and space heaters, weather sealing, installation of thermally efficient windows, and installation of standby power controllers. The scheme is paid for through electricity bills.

8.3.6 GreenPower

GreenPower operates nationally as a voluntary program for consumers to support the generation of renewable power. It is a joint initiative of the governments of NSW, Victoria, Queensland, South Australia and the ACT.

GreenPower is a government accreditation program that facilitates energy retailers to purchase renewable energy on behalf of their customers. Consumers pay a premium of 5-8 c/kWh on their electricity bills, which retailers then use to purchase LGCs to demonstrate compliance with the scheme.

Annual GreenPower purchases increased rapidly from 2005 to 2011, peaking at 2,094 GWh in 2011. However, sales have since declined to around 1,800 GWh in 2012 due to a number of factors including increased uptake of solar panels by households, and consumer responses to the introduction of the carbon tax and higher electricity prices. Annual sales of GreenPower accredited electricity remain at less than one per cent of the demand in the NEM.

Although GreenPower providers purchase and surrender LGCs for each megawatt hour of generation sold as part of a GreenPower product, these LGCs are not able to be used by energy suppliers to meet their RET obligations. This ensures that the renewable generation under GreenPower is additional to the RET.

The Panel notes that as the GreenPower program currently utilises LGCs as a basis for compliance, the Australian Government and relevant state and territory governments may need to consider the potential interactions between the RET and GreenPower in light of the Australian Government's preferred approach to the LRET. Should either of the Panel's recommended options for the LRET be adopted, it may be appropriate to include some allowance for GreenPower LGC purchases in the setting of targets under the LRET. The Panel considers that the market for voluntary renewable energy programs is mature and other options, if required, for the measurement and verification of renewable energy under the GreenPower scheme could be developed.

8.4 Electricity market reform

The RET operates in a very different environment to that which prevailed when it was first introduced. The Government is developing an Energy White Paper outlining its overall approach to energy policy and there is an ongoing process of electricity market reform. Both of these have the potential to interact with the RET.

Priorities arising from the Council of Australian Governments (COAG) energy reform agenda and being progressed through AEMC rule change and other processes include:

- Strengthening electricity network regulation to ensure network expenditure is efficient, including the setting of network prices.
- Improved demand side participation to assist in minimising peak demand and associated infrastructure investment.
- The promotion of retail competition and retail price deregulation.
- Strengthening regulatory arrangements, including access arrangements for renewable generators and small-scale solar PV.

8.4.1 Strengthening network regulation

Reforms to the economic regulatory framework were introduced in November 2012. These reforms strengthen the ability of the Australian Energy Regulator (AER) to achieve efficient outcomes in setting revenues and prices for consumers in a number of areas, including how the regulated rate of return is set, and changes to the limited merits review arrangements which reduce the power of network companies to appeal against regulatory determinations. These changes are now being used by the AER as part of its regulatory processes.

The AEMC is considering a rule change which would alter the way in which network prices are determined. This change aims to provide better price signals to consumers by making prices more cost reflective, particularly around peak usage times. Although this rule change may not immediately reduce the overall cost of the network to consumers, it should reduce cross subsidies between different consumers inherent in flat pricing arrangements that favour users who place high demand on networks at peak times.

8.4.2 Retail competition and National Energy Customer Framework

State and territory governments retain responsibility for retail energy pricing. All jurisdictions have committed to remove retail energy price regulation where effective competition can be demonstrated. Effective competition in retail energy markets promotes customer choice. As has been demonstrated in jurisdictions with effective competition and price deregulation, competition has provided benefits for consumers through greater innovation in retail pricing and choice for consumers in their energy services and prices, and leads to more efficient decisions on future network expenditures.

Victoria, South Australia and NSW have already deregulated retail electricity prices and the Queensland Government intends to remove electricity price regulation in the South East Queensland electricity market and replace it with price monitoring by 1 July 2015, subject to certain preconditions. All other jurisdictions continue to regulate retail electricity prices for small customers on standing offer contracts. In Queensland, Tasmania and the ACT, prices are regulated by independent regulators. In the Northern Territory and Western Australia regulated electricity prices are set by the respective governments.

There are a series of customer protection measures that remain in place to provide support to small customers in jurisdictions where price regulation is removed. These include jurisdictional and national protection measures. In particular, the National Energy Customer Framework (NECF) is a national regime for retail customers of electricity and gas. The NECF deals primarily with the relationship between retailers, customers and distributors and the associated rights, obligations and consumer protection measures.

The NECF facilitates an increase in retail competition by reducing regulatory complexity and lowering barriers for energy retailers to enter into the market across participating states and territories.

8.4.3 Power of choice reforms and demand side participation

In March 2011 the then Ministerial Council on Energy directed the AEMC to identify market and regulatory arrangements that would enable the participation of both supply and demand side options in achieving an economically efficient demand/supply balance in the electricity market. The AEMC's report, titled *Power of Choice*, was considered by Ministers in November 2012. Significant progress has been made on recommendations made in the Power of Choice reforms including consumer protection. These changes encourage more efficient use of generators and electricity networks and services and manage costs in the long term. Key rule changes include support for the business-led competitive roll out of smart meters, formalising consumer access to their own metering data, improved incentives for networks to engage with consumers, and allowing innovative tariffs to be offered to provide incentives for more efficient electricity use.

Some of the reforms that are under consideration include:

- Changes to promote competition in metering to promote greater opportunities for demand response at times of network peaks.
- Allowing customers to have more than one electricity retailer for different services at the same site (for example one retailer for normal electricity supply and a different retailer for solar PV or electric vehicle charging).
- Reforms to improve competition and remove barriers to the provision of energy related services by parties other than retailers or distributors.

8.4.4 National distribution connections contestability framework

Energy Council officials are currently considering the benefits of the development and implementation of an opt-in national contestability framework for electricity and gas distribution connections.

Identified benefits include greater competition in connection service provision, particularly through the possibility of inter-state trade, which is expected to lead to lower costs, improved timeframes for connection and more customer-focused services.

An Energy Council rule change proposal is expected to be submitted to the AEMC for consideration in mid-2015.

8.4.5 Embedded generation and other reforms

In April 2014, the AEMC completed a rule change, proposed by industry stakeholders, which will improve the processes for connecting larger-scale embedded generators, including renewables, to distribution networks. The AEMC is currently considering a similar proposal regarding the connection process for smaller scale embedded generators in the NEM.

Recent reforms in the Northern Territory, which have resulted in the breakup of the Government owned Power and Water Corporation, could lead to changes in arrangements for embedded generators.

Similarly in Western Australia the Government has announced a review of the SWIS electricity market. The first phase of this review will assess the strengths and weaknesses of the current industry structure, market institutions and regulatory arrangements, including arrangements for embedded generators and will examine options for reform. The first phase is due to report at the end of October 2014.

8.5 Findings: Interaction with other policies and measures

The Panel is supportive of the continuing development of a nationally consistent energy market framework. This framework should minimise differences between jurisdictions and eliminate excess regulation and duplication. The Panel urges jurisdictions to speed up the process of reform that would be to the long-term benefit of consumers.

The Panel also supports reforming network regulation to better reflect the costs of providing electricity to different consumers and at different times. This will minimise cross subsidies between different customers and lead to more efficient investment and energy choices, including whether to invest in solar PV systems.

The Panel also notes that some projects that receive support under the RET may also be eligible for assistance from the CEFC and ARENA. The Panel considers that projects or components of projects that receive support under the RET should not be eligible for additional funding from either the CEFC or ARENA.

In relation to state and territory measures and policies, the Panel considers that in general these should not overlap with the RET. The Panel makes the following additional observations in terms of state and territory measures:

- Although premium state based feed-in-tariffs are now largely closed to new entrants there is still a considerable, though declining, cost to consumers from legacy schemes. Feed-in-tariffs in most jurisdictions are now much lower and generally reflect the value of the avoided cost of wholesale energy and value to the retailer of avoided costs at peak periods.
- Jurisdictions operating schemes which support solar water heaters should consider the level of assistance available under the SRES to ensure that installations are additional to what would have otherwise been achieved under the SRES.

State and territory governments should adopt a consistent set of planning principles that minimise regulatory burden and apply to all forms of electricity generation, while recognising that different generation technologies have varying degrees of environmental, economic and social impacts.

The Panel notes that the GreenPower program currently utilises LGCs as a basis for compliance. Should the Panel's recommendations on the LRET be adopted, it may be appropriate to include some allowance for GreenPower LGC purchases in the setting of targets under the LRET. The Panel considers that the market for voluntary renewable energy programs is mature and other options, if required, for the measurement and verification of renewable energy under the GreenPower scheme could be developed.

9 REDUCING THE REGULATORY BURDEN OF THE RET

The Terms of Reference ask the Panel to consider the Australian Government's commitment to reduce red and green tape. The Panel has investigated opportunities to reduce administration and compliance costs of the RET scheme while allowing it to meet its objectives. The majority of the submissions to the review indicate satisfaction with the administration of the scheme with only a few proposals for improving administrative arrangements.

9.1 Reducing reporting requirements and improving data availability

The CER requires stakeholders to complete a number of forms and activities to demonstrate compliance with requirements in the Act. Power and Water Corporation, Stanwell Corporation and LMS Energy requested that forms and assessments be simplified and available online. For example, Power and Water Corporation stated that:

> *The introduction of registering, completing and submitting returns online with the option to revise the returns up until the return date would be helpful. (Power and Water Corporation, p.4)*

The Energy Retailers Association of Australia requested more functionality with the information that is available in the REC Registry:

> *The CER's REC Registry (the Registry) creates issues for retailers as information on STCs in the Registry may differ and not reconcile with internal systems. Therefore, unclear data on the availability of STCs in the Registry, creates issues for retailer's purchase and surrender decisions. Improving the accuracy of the publication of data in the Registry will improve the operational efficiency of retailers. (Energy Retailers Association of Australia, p.3)*

The CER has advised the Panel that these concerns will be addressed when the CER releases its redesigned REC Registry in August 2014. The REC Registry is a secure web-based application that facilitates the creation, trade and surrender of LGCs and STCs. It also provides access to a number of public registers containing data about the RET.

The redesigned REC Registry will have an improved user interface and enhanced functionality for scheme participants and the CER. Stakeholders will be able to access a number of simplified forms online and have more options for managing their certificate activities. Data analysts will also have the ability to download bulk data from public registers. A number of the CER's assessments will move online, which will allow more efficient processing times and visibility for stakeholders.

9.2 Setting the Renewable Power Percentage and the Small-scale Technology Percentage

The LRET places a legal requirement on liable entities to purchase LGCs equivalent to a proportion of wholesale electricity acquisitions, called the Renewable Power Percentage (RPP). Similarly, the SRES places a requirement on liable entities to purchase an amount of STCs each year, calculated using the Small-scale Technology Percentage (STP). The STP is based on modelled estimates of the number of STCs expected to be created in that year, adjusted for any surplus or deficit of certificates from the previous year. The STP and RPP are published annually by the CER by 1 March of each compliance year.

Five stakeholders suggested bringing forward the date of setting the STP and RPP to the December prior to the compliance year to which they relate. This would provide liable entities with greater certainty over their RET liability, allowing them to manage it with a greater degree of accuracy. For example, Hydro Tasmania stated:

> *This is an important change which could be easily made that would ensure that retailers can pass through costs at an appropriate rate to consumers and are not left out of pocket. This has the potential to reduce the costs of the measure for some consumers. (Hydro Tasmania, p.13)*

The STP is more complicated to calculate than the RPP and bringing forward the publication of the STP involves a trade-off between timeliness and accuracy of the estimate. However, the small-scale market has been relatively stable and predictable over the past two years and the CER has been estimating the uptake of small-scale installations with a reasonable degree of accuracy. The Panel considers that the benefits of publishing these figures prior to the commencement of the compliance year would outweigh the possible loss of accuracy.

9.3 Opt-in for large energy users

The RET places a legal requirement on liable entities (typically electricity retailers) to purchase and surrender LGCs and STCs to comply with obligations under the Act. The cost of purchasing LGCs and STCs are passed on to electricity consumers. This approach minimises the number of entities subject to RET liabilities, compared to a scheme in which all electricity consumers are directly liable, thereby reducing compliance and administrative costs.

A small number of respondents proposed amending the RET legislation to allow large electricity users to opt-in and manage liability under the RET for the electricity they consume. This is to reduce costs and improve flexibility for electricity users and provide greater market liquidity by increasing the number of buyers in the RET. For example, Pacific Hydro stated:

> *Historically most energy users have managed the RET cost through their retail electricity supply agreements. More recently, we have seen an increasing number of large energy users choosing to include the option to "self-source" Large Generation Certificates (LGCs) into their retail tender documents. This process sees energy consumers purchase LGCs from a third party and then transfer them to the retailer to surrender on their behalf.*
>
> *Self-sourcing has seen larger volumes of LGCs sold directly from LGC generators to energy users – and gives flexibility and choice to energy users to manage their costs in the manner of best fit for their individual business. For example some businesses may wish to fix a long-term LGC price as part of a strategy to fix their long-term input costs – this is best enacted with a direct contract between the energy user and the LGC generator.*
>
> *The further extension to this process is allowing energy users to "opt-in" themselves and self-manage their RET liability end to end. (Pacific Hydro, p.23)*

The Australian Sugar Milling Council supports allowing liable parties to acquit their own liability in cases where they are able to generate renewable electricity:

> *Sugar mills import electricity during mill start up, and outside of the crushing season, when electricity is not being generated at the mill. Consequently, all mills encounter a liability. Currently, unless a mill is in a direct wholesale relationship (a quasi-retailer), it has no capacity to acquit its liability against its own certificates, and is therefore locked into the price passed forward by its electricity retailer.*

ASMC suggests that these arrangements could be simplified by enabling an opt-in process that enables significant liable parties to acquit their own liability, whether through stored certificates or purchase from the market. (Australian Sugar Milling Council, p.12)

However, such an arrangement is likely to be complex to implement and could significantly increase the cost of administering the RET scheme. The complexity of opt-in arrangements for liquid fuels under the previous carbon tax is instructive in this regard. The Panel's broader recommendations for reforming the LRET and the SRES will lower the cost of the RET for electricity users compared to continuing with the current scheme, and therefore the Panel does not consider that the likely costs associated with implementing opt-in are justified.

The Panel notes the potential for an opt-in arrangement to improve the efficiency of the LGC market. Section 10.1 addresses implementation issues relating to the Panel's recommendations for reforming the LRET, including mechanisms to support the stable and efficient functioning of certificate markets. Such mechanisms may reduce the need for an opt-in arrangement to improve market efficiency.

The Panel also notes the submission from Pacific Hydro quoted above, stating that in some instances electricity customers have entered into voluntary agreements with their retailer to buy certificates in return for a reduction in the RET costs that would otherwise be passed through. The Panel encourages stakeholders interested in an opt-in mechanism to pursue opportunities for voluntary arrangements.

9.4 Aligning LRET and SRES acquittal obligations and shortfall carry-over provisions

Stakeholders raised two issues concerning the alignment of obligations and liability under the SRES and LRET schemes. These relate to the frequency of acquittal of LRET and SRES obligations and allowing liable entities to carry-over a shortfall of STCs to the following year, consistent with provisions under the LRET.

Liability is currently acquitted (that is, certificates are surrendered to the CER) on an annual basis for the LRET and on a quarterly basis for the SRES. Quarterly acquittal for the SRES was introduced to improve the cash flow for small to medium sized businesses in the solar PV and solar water heater industries. However, some stakeholders suggested that this may no longer be necessary as the STC market and the businesses operating in it are now mature and proposed that STCs be surrendered annually to reduce administrative costs. For example the Energy Retailers Association of Australia stated:

Surrendering certificates quarterly is administratively onerous on retailers and creates additional financial risks each quarter if the required number of STCs is not surrendered. This pattern of surrender is unique to SRES as no other environmental scheme has this imposition. As the SRES has matured as a component of the RET scheme, the participants sophistication should also have increased. The moving to a uniform approach with all other environmental schemes warrants further exploration.
(Energy Retailers Association of Australia, p.3)

Alternatively, some stakeholders in the large-scale renewable industry proposed that the LRET liability be acquitted quarterly, in order to improve the market liquidity of LGCs. For example, Powershop Meridian submitted:

> *Currently, LGCs can be traded at any point after their creation up until they are surrendered. Liable entities only need to surrender LGCs once a year, in February. Given the high cost of cash for many liable entities, this acts to suppress demand for LGCs immediately after the surrender date, with demand rising in the period immediately preceding the surrender date.*
>
> *More importantly, liquidity tends to follow demand, so that liquidity in LGCs for most of the year is negligible, apart from the short window coinciding with LGC surrender dates (Powershop Meridian, p.46).*

The LRET allows liable entities to carry forward a 10 per cent shortfall in liability to the following year without incurring a penalty, however there is no corresponding provision in the SRES. Two respondents (EnergyAustralia and the Energy Retailers Association of Australia) suggest that this provision should also apply to the SRES in order to provide liable entities with more flexibility in managing RET costs and prevent them from incurring a penalty for minor errors in SRES liability calculations. The Panel considers that this proposal has merit, however it would need to be implemented in a way that prevents the quarterly surrender periods from allowing a shortfall of greater than 10 per cent to be carried forward in one calendar year.

The Panel recognises the potential for greater alignment in acquittal provisions to provide efficiencies to liable entities and renewable generators. The Panel considers that biannual surrender of LGCs and STCs may provide an appropriate balance between reducing compliance costs and ensuring liquidity in LGC and STC markets and recommends that the Government give this further consideration.

9.5 Arrangements for Partial Exemption Certificates (PECs)

Section 7.1 explained the function of PECs provided to EITE businesses. EITE businesses that receive a PEC can only negotiate its value with the retailer that supplies their electricity. Theoretically, the reduction in RET costs passed on to the EITE should be equal to the reduction in the retailer's liability from receiving the PEC. However, stakeholders claim that this may not necessarily be the case as the value of the PEC is negotiated as part of an electricity contract and may be influenced by other factors in the negotiation. A small number of stakeholders including the Chamber of Minerals and Energy of Western Australia and the Australian Industry Group propose allowing PECs to be 'tradeable' (able to be sold to any liable entity) as a method for dealing with this issue. For example, the Australian Industry Group stated:

> *PECs are not tradeable certificates and can only be used at present by liable entities. Problems have been created for both EITE businesses and retailers as a consequence of the negotiation process. These problems arise because there is an information asymmetry between retailers and customers on gross costs of the RET. The current approach also makes it more difficult for an EITE business to change energy retailer during a calendar year as PECs are issued in the current retailer's name for the whole of the year. PEC tradability would streamline the application process for EITE assistance under the RET by reducing the need for EITE businesses to negotiate the value of their PECs with their energy retailers. (Australian Industry Group, p.7).*

While such an arrangement would provide greater flexibility to EITE businesses there would be administrative costs associated with implementation and administration. The Panel does not consider that the additional flexibility would justify the increased administrative complexity and cost.

EnergyAustralia raised an additional concern regarding notifying liable entities of PECs issued to EITE businesses:

> *Currently, when a PEC is issued to an Emissions-Intensive Trade-Exposed (EITE) company, notification is only provided to the EITE and not the liable entity. However, it is the liable entity's responsibility to ensure that it has obtained all the relevant PECs from its customers for the annual RET return and liability calculation.*
>
> *Obtaining a PEC relies on the EITE providing it. To ensure that all PECs are obtained the liable entity must contact all customers that have potentially been issued a PEC. There is a risk, despite best efforts, that a liable entity may not obtain all the PECs issued in its name. (EnergyAustralia, p.9)*

Legislation stipulates that the name of the prescribed person to whom a PEC is issued and the EITE activity that the PEC relates to is published. The Australian Government may wish to consider amending legislation to include the publication of the RET liable entity with whom the EITE business will negotiate the provision of the PEC.

9.6 Bringing forward the date of registering LGCs

Accredited renewable power stations have until 31 December of the year following the year that generation occurs to create LGCs, which can allow up to two years for LGC creation. Infigen Energy submitted that LGC registration be required to occur within 12 months:

> *This extended registration period (up to 23 months) has the potential to distort the market view of supply and demand, which can result in less efficient investment decisions. (Infigen Energy, p.33)*

However, it is difficult from an administrative perspective to have LGCs created and registered within one year from the generation to which they relate. Power stations may generate at different times of the year and generation data may be updated or amended. For this reason, accredited power stations provide finalised annual generation data by 14 February in the year following generation. The CER requires at least six months to conduct assessments of these returns to ensure all accredited power stations create their LGC entitlement based on eligible generation.

9.7 Small-scale generation unit safety inspection program

The CER is required to conduct inspections of a sample of small-scale solar panel, wind and hydro installations that have had STCs created against them in the REC Registry. The inspections ensure that selected installations meet the legislated requirements for the creation of STCs. These include applicable Australian standards and industry guidelines in force at the time the unit was installed and state and territory and local government requirements.

The inspection program provides some reassurance, beyond that provided by state and territory regulations, that the extra demand for small-scale installations that results from the RET does not lead to any lessening of safety standards.

Keppel Prince Engineering raised a concern about the cost associated with ensuring compliance of small-scale generation units and considers that this function should be undertaken by relevant state and territory authorities:

> *It is our understanding that largest resource demand at the CER is required to oversight the regulatory compliance of the 500,000 new Small Generation Units that are being installed in Australia each year~a task that KPE believes could, and should, be accomplished at a*

significantly reduced cost within the existing inspection and compliance systems operated and/or administered by the relevant "Energy Safe" agencies operated by State Governments and Territories. It should be possible to include the relevant compliance statements for all relevant legislation into a SGU specific version of the electrical safety certificates required by every state before a system can be registered. (Keppel Prince Engineering, p.19)

Alternatively, the Solar Energy Industries Association Inc. considers that the inspection program should be increased:

If a strong regime of auditing is not in place then the chances of poor quality and unsafe installation is increased and the potential for fatal accidents could result. SEIA would like to see an increase in funding for system inspections to ensure that quality is maintained throughout the industry. (Solar Energy Industries Association Inc., p.5)

The CER has now conducted the inspection program for four years. Inspection data show a slight decline over time in the number of unsafe systems being installed and of unsafe installations consistent with the overall rate of safety issues with electrical work. The data also show a significant decrease in substandard installations owing to the installation industry responding to feedback from the program after it was first rolled out.

The Panel has recommended either abolishing the SRES or bringing forward the close of the SRES from 31 December 2030 to 31 December 2020. The Panel considers that it would be prudent for the Australian Government to discuss safety and installation standards for both solar PV and solar water heaters with the relevant state and territory authorities to ensure appropriate arrangements are in place, if necessary, before the SRES ends.

9.8 Update eligibility guidelines for Municipal Solid Waste (MSW)

The combustion of MSW is listed in the Act as being eligible as a renewable energy source. Waste streams contain both renewable and non-renewable components, and therefore, eligible components need to be determined. The CER has guidelines in place for determining the eligible renewable components of municipal and commercial wastes for use by electricity generation plants that are utilising waste as a fuel source and want to create certificates.

Phoenix Energy (an Energy from Waste (EfW) company) stated in its submission:

Under the Guidelines, EfW generators are required to carry out sampling of the waste stream to determine the renewable component of their waste stream, and therefore the fraction of the waste stream that is an eligible source. This is a costly and time-consuming process, involving the engagement of professional external auditors to sample and audit the waste stream every six months.

The complexity and cost of sampling requirements acts as a deterrent for municipal councils considering whether to make the transition from landfilling to alternative waste treatment. The proposal to remove the sampling requirement, and to replace it with a qualitative test around recycling processes, would be a more efficient way of measuring the success of community recycling efforts and would reduce the administrative and cost burden on councils and facility operators. (Phoenix Energy, p.12)

Phoenix Energy has suggested that the Act should be amended to include all components of MSW and similar mixed waste streams as an eligible fuel source subject to meeting recycling standards. This would reduce the administrative burden for proponents of EfW facilities. Phoenix Energy has also suggested:

> *To implement this regulatory change the CER Guidelines would need to be replaced with a set of recycling standards that must be met in order for RECs to be issued for MSW. These standards could be updated as recycling technology improves over time. (Phoenix Energy, p.14).*

The legislation stipulates that the fuel source must be a renewable energy fuel source. Components that are non-renewable are not eligible for certificates. The Panel recognises the complexity in determining the eligible renewable components of municipal and commercial wastes and recommends that the Government consider updating the guidelines in order to reduce the administrative burden for stakeholders.

Recommendation 10: To further reduce the costs of the RET the Government should consider the following proposals to improve the operation of the scheme:

a. Bring forward the dates for setting the Small-scale Technology Percentage and the Renewable Power Percentage from 31 March in the compliance year to a date prior to the commencement of the compliance year (e.g, 1 December).

b. Align the acquittal of LRET and SRES obligations so that both are acquitted six monthly, and allow liable entities to carryover a shortfall of STCs (as is currently the case for LGCs).

c. Publish the RET liable entity with whom an EITE business will negotiate the provision of the Partial Exemption Certificate.

d. Update guidelines for determining the renewable components in waste for electricity generation.

10 IMPLEMENTATION OF RECOMMENDATIONS

10.1 Implementation of LRET Recommendations

10.1.1 Ensuring a stable and functioning certificate market

The Panel has recommended that the Government consider two options for reforming the LRET. The first is to close the LRET to new entrants, otherwise known as 'grandfathering', and the second is to implement a target that increases each year by half of the projected growth in electricity demand.

A key objective in implementing either option is to ensure that the RET continues to support projects already established under the scheme in a sustainable and orderly manner.

The options favoured by the Panel for the LRET both entail lower targets than are currently in place. There are several factors that are more likely to contribute to volatility in the LGC market under a scheme with reduced targets. These include:

- The current pool of excess LGCs, equivalent to roughly one and a half times the LRET target in 2014. These excess certificates resulted from the large uptake of small-scale generation units prior to the split of the RET into the LRET and SRES schemes.
- The high concentration of ownership of the surplus of certificates.
- Variability in the generation of electricity from hydro power stations, and to a lesser extent wind farms.

Ideally, the market would deliver an appropriate LGC price to support investments. However, the factors above may drive significant price volatility in the spot market for LGCs. Market participants could face either an excess or a shortage of LGCs, depending on the circumstances that prevail, and hence the LGC price could fall below a level that would sustain renewable energy businesses or rise so high it reaches the level of the LRET shortfall charge. If such conditions were to persist, achieving the key objective of supporting existing projects would be put at risk.

Identifying options for addressing potentially extreme LGC price outcomes involves giving some consideration to the LGC price, or range of LGC prices, that would be appropriate to support renewable generators accredited under the RET. Renewable generators argue for a return equivalent to what would have been achieved under the current trajectory of LRET targets, which formed the basis of their investment decision. For example, Infigen Energy submitted:

> *These arrangements should replicate the expected trajectory of LGC prices based on the original LRET target. This could be achieved by setting a regulated floor price for LGCs to be paid by the liable parties. In such an event Infigen would welcome an expert independent economic and corporate finance analysis of a suitable "compensating" floor price for this purpose. (Infigen Energy, p.3)*

On the other hand, some electricity users and energy market incumbents consider there are grounds for a lower level of support as investments were not made in a risk-free environment and financial contracts may provide project owners with some protection from downside LGC price risk. For example, CS Energy stated:

> *Existing renewable investments should be grandfathered and provided with a price equivalent to that traded today. (CS Energy, p.16)*

Options the Government could explore for ensuring price stability (once an appropriate price or range of prices is determined) include:

- Increasing the LRET targets for immediate years to absorb an appropriate amount of the prevailing surplus of certificates, noting this could place some upward pressure on electricity prices in the short term. (Some surplus level of certificates is desirable to ensure there is sufficient liquidity in the LGC market).
- Setting a fixed LGC price for the remainder of the scheme (this is most relevant to the option of closing the RET to new entrants, where it is not necessary to establish a price or price range to support new investments).
- Setting a price cap and a price floor within which certificates could trade.
    - A price cap could be implemented by establishing a clearing house or "central broker" function to help match certificate buyers and sellers by trading LGCs at a fixed price, as is currently the case under the SRES.

In order to improve market liquidity, the Government could also consider introducing an auction process, where all certificates required to meet the legislated LRET target for that year are traded through a central agency. Parties holding certificates (renewable energy generators, retailers, traders, etc.) could bid in any volume of LGCs that they own or expect to be able to deliver and liable parties would be required to purchase LGCs to meet its obligation from the central agency. This would establish a market clearing price for the entire supply volume required for that year.

The most appropriate mechanism will depend on if, and how the Government decides to amend the LRET. The Panel recommends that the Government consult further with stakeholders and the CER to determine an approach to implementation that will ensure the objectives of the preferred option for the LRET are met.

10.1.2 Setting targets

Closing the RET to new entrants

There are two broad methods available for setting targets in an LRET that is closed to new entrants. Targets could be set in advance for the duration of the scheme, based on expected generation from existing and committed power stations, plus an additional component to clear the market of excess certificates.

Alternatively, targets could be set annually, in an approach similar to the current SRES. Each annual LRET target would be set at the beginning of the year based on a modelled estimate of certificates to be created for the year and adjusted to offset the error in the previous year's estimate.

Target representing a share of new growth

Box 2 in Section 6.1.3 explains how a target could be set that allocates a 50 per cent share of growth in demand for electricity to renewable generators.

The target would be set by the CER each year (for example, by September) to apply to the following calendar year. A formula for calculating targets could be set out in legislation along the lines of the example contained in Box 2, and a legislative or regulatory framework would be established to guide the CER. Should electricity demand be forecast to fall or to remain flat in any year, the target would not change and would only increase further when demand exceeds its previous maximum level.

10.2 Implementation of SRES recommendations

The Panel recommended two options for reforming the SRES: abolishing it immediately or phasing it out by 2020.

If the recommendation to abolish the SRES is implemented, some transitional arrangements may be required to cater for people holding certificates at the time of abolition. This would include investors, banks and people holding certificates in the STC Clearing House. Likewise, those in the process of installing systems, or who have signed a contract to do so, may have a reasonable claim to certificates. Therefore the Government may wish to continue SRES obligations for liable entities for a period after the scheme is closed in order to provide a market for certificates from these systems.

If the Panel's option for phasing-out the SRES is implemented, the Panel considers that the reduction in the deeming from 15 years to 10 years for solar PV systems and the reduction in the size eligibility threshold from 100 kW to 10 kW should take effect from the date of announcement. This is to eliminate the potential for a foreshadowed change to create a spike in system installations, and a corresponding increase in the cost of the SRES, between the date of announcement and the date that the changes take effect. However, the Panel acknowledges that there will be some contracts for the installation of systems that were entered into on the basis of the current policy and for which certificates have not yet been created. It is reasonable that these installations receive 15 years of certificates as allowed for under current arrangements.

The Panel's recommendation to reduce the deeming for solar and heat pump water heaters would not take effect until 1 January 2016, where the deeming would change from 10 to 9 years. Systems installed on or after this date would be subject to the new arrangements.

10.3 Implementation of recommendations regarding the self-generation exemption

The Panel has recommended that the self-generation exemption be expanded to accommodate a broader range of circumstances. This would involve relaxing the one kilometre boundary for supplying and using self-generated electricity and allowing incidental off-takes of electricity for community purposes in a remote location on an otherwise dedicated line.

In terms of the one kilometre boundary, submissions to the Review indicated that it should be relaxed, but did not suggest what would be an appropriate restriction.

A boundary could be set as a defined distance, or in the form of some definition of a 'site' similar to the definition of a single site used in the National Greenhouse and Energy Reporting (NGER) scheme legislation. A boundary defined by distance, while arbitrary to an extent, has the advantage of being easily measured and would provide less ambiguity over the electricity that would fall under the exemption. A site boundary would be more complex to administer as other legal entities could be operating on the same site and determining the self-generated electricity could involve complicated calculations of electricity imports and exports. The Panel considers that the Government should consult with affected parties to determine an appropriate kilometre restriction for the self-generation exemption.

For electricity consumed outside the kilometre boundary by the same legal entity that generated it, the criteria for a dedicated line between supply and use would remain. However, the Panel recommends that incidental amounts of electricity should be able to be supplied to third parties for community services without disqualifying all the electricity supplied on that line from the exemption. Implementing this change involves defining the community benefits for which an off-take would be permitted and defining what amount constitutes an incidental off-take.

The definition of community services should be limited to entities that provide essential community services and to not-for-profit organisations. Essential community services could be defined to include:

- Health and safety operations (e.g., hospitals, ambulance).
- Municipal services (e.g., water, and sewerage).
- Fire services.
- Emergency services.
- Police stations.
- Ongoing maintenance of key infrastructure.
- Community radio and telecommunication services.

Not-for-profit organisations could be defined using the Australian Taxation Office definition.

Incidental supply would mean that supplying a third party is not the primary purpose of generating electricity, and that the amount supplied is not a significant proportion of total generation. To define incidental supply to third parties, a threshold could be set either as a percentage of total electricity generated, or as a fixed GWh amount. Given that some self-generators produce very large amounts of electricity, a limit set as a percentage of total generation would need to be quite small (possibly around one per cent) in order to avoid substantially increasing the amount of electricity that could be exempt. This may disadvantage some of the smaller generators. Alternatively, a fixed GWh amount limit could be set, placing a cap on the amount of electricity able to be supplied. The Government should consult further to determine an appropriate threshold.

Recommendation 11: The Government should consult with affected parties on implementation of the Panel's recommendations for the RET including:

a. Measures for ensuring that large-scale generation certificates trade in a suitable price range that provides an appropriate level of support for accredited power stations.

b. Methods for setting targets.

c. Setting the distance limit and threshold for third party off-takes for the self-generation exemption.

Recommendation 12: The Panel's recommendations for progressively reducing the deeming rate for solar PV installations and reducing the size eligibility threshold from 100 kW to 10 kW should take effect from the date of announcement. Transitional arrangements should be provided for parties that have entered into contracts on the basis of the current policy at the date of announcement.

APPENDIX A: TERMS OF REFERENCE

Renewable Energy Target Review

Background

The Renewable Energy Target (RET) scheme, comprised of the large-scale and small-scale schemes, is aimed at increasing renewable energy generation and reducing greenhouse gas emissions from the electricity sector. It is designed to deliver the equivalent of 20 per cent of Australia's electricity from renewable sources by 2020.

Scope of the review

The review is to examine the operation and costs and benefits of the *Renewable Energy (Electricity) Act 2000* ('the Act') and related legislation and regulations, and the RET scheme constituted by these instruments. This includes considering:

1. the economic, environmental and social impacts of the RET scheme, in particular the impacts on electricity prices, energy markets, the renewable energy sector, the manufacturing sector and Australian households;

2. the extent to which the formal objects of the Act are being met; and

3. the interaction of the RET scheme with other Commonwealth and State/Territory policies and regulations, including the Commonwealth Government's commitment to reduce business costs and cost of living pressures and cut red and green tape, and the Direct Action policies under development.

The review should provide advice on:

1. whether the objective of the RET scheme, to deliver 41,000 gigawatt hours (GWh) and small-scale solar generation by 2020, is still appropriate;

2. the extent of the RET's impact on electricity prices, and the range of options available to reduce any impact while managing sovereign risk;

3. the operation of the small-scale and large-scale components of the RET and their interaction;

4. implications of projected electricity demand for the 41,000 (GWh) target; and

5. implementation arrangements for any proposed reforms to the RET, including how to manage transition issues, risks and any adjustment costs that may arise from policy changes to the RET.

The review is also to consider the Government's election commitment to reinstate native forest wood waste as an eligible renewable energy source.

Process

The review is to be led by a panel of experts appointed by the Ministers for Industry and the Environment, supported by a secretariat in the Department of the Prime Minister and Cabinet.

The panel is to undertake public consultations, seek submissions and provide a report to the Prime Minister, the Treasurer and the Ministers for Industry and the Environment by mid-2014.

APPENDIX B: STAKEHOLDER CONSULTATION

Throughout the review, the Panel has consulted with a wide range of stakeholders representing a diverse range of views. This included energy users, electricity retailers, environmental groups, consumer groups, the renewable energy industry and state and territory ministers and officials.

On 5 April 2014, the Panel called for submissions on issues relevant to the review and released a paper to assist the preparation of submissions. The submissions can be found on the published submissions page <https://retreview.dpmc.gov.au/published-submissions>, unless a submission was marked as confidential or an author specifically requested otherwise.

The Panel also organised over 100 meetings in state capitals which were collectively attended by over 200 participants. In addition to this, the Panel conducted a number of site visits to energy facilities including hydroelectric power stations in Tasmania, a community wind farm in Victoria, a wind farm in New South Wales, a solar PV manufacturer in South Australia and a solar power installation in the Australian Capital Territory.

APPENDIX C: EXECUTIVE SUMMARY FROM ACIL ALLEN MODELLING REPORT

The Commonwealth Government has appointed an Expert Panel to conduct the 2014 review of the Renewable Energy Target (RET). The Expert Panel is supported by a secretariat in the Department of the Prime Minister and Cabinet (the Secretariat).

The RET is comprised of two separate, but related schemes, namely: the Large-scale Renewable Energy Target (LRET) and the Small-scale Renewable Energy Scheme (SRES).

ACIL Allen Consulting (ACIL Allen) has been engaged to undertake detailed electricity market modelling of the RET impacts on Australia's electricity markets and emissions from electricity generation. The modelling and analysis is designed to support the Expert Panel's deliberations and inform the Government's response to the Review.

Case and sensitivities

ACIL Allen has been tasked with modelling a range of policy scenarios and sensitivities as required by the Expert Panel. These are:

Reference case: This case provides projections for the status quo where legislation underpinning the LRET and SRES schemes remains unchanged and the market develops in accordance with baseline assumptions in terms of demand and supply. All subsequent policy scenarios are compared against this Reference case.

Repeal case: This case assumes that the SRES and LRET schemes cease to operate from 1 January 2015 with 2014 being the last compliance year. This scenario assumes that any mechanism introduced to compensate investments made under the RET (if any) does not affect wholesale or retail price outcomes.

Closed to New Entrants: This scenario assumes that the LRET scheme continues to operate, but is closed to new installations from 1 January 2015. The SRES, which operates under a deeming arrangement whereby installations receive certificates upfront, does not continue to operate and is closed from 1 January 2015. Under the LRET, installations receive certificates annually based on generation. Closure of the scheme to new entrants (new accredited generators) means that creation of LGCs is limited to existing or committed generators.

Real 20% case: The Real 20% scenario involves two significant changes to the current policy: Reducing the LRET 2020 target to 25,500 GWh (a level which, when evaluated using the Panel's methodology, represents a 'Real 20%' of expected demand in 2020); Closing the SRES after 2020 and reducing the period of deeming for solar PV from 15 years down to 10 years from 1 January 2015 (deeming period is constant at 10 years through to the end of 2020).

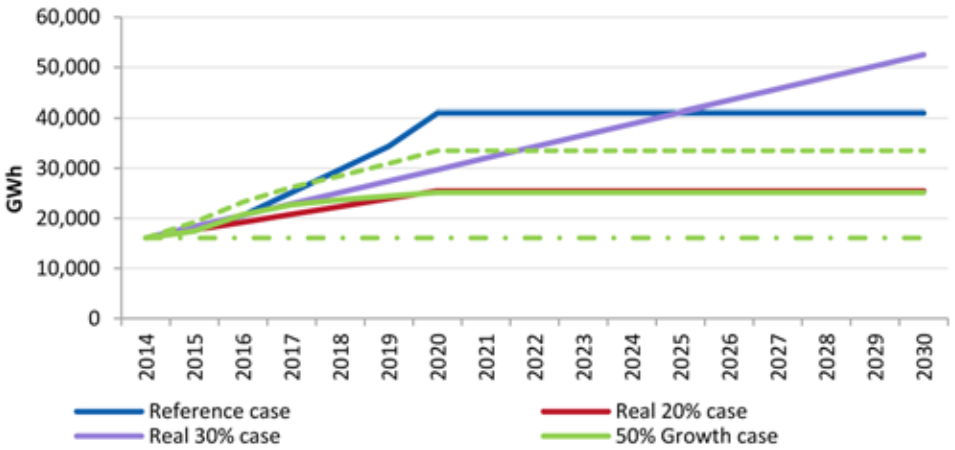
Real 30% case: This scenario involves modifying the LRET target level to 30% of anticipated demand in 2030 and extension of the scheme to 2040. Annual targets from 2015 to 2030 follow a linear trajectory, reaching 52,500 GWh and are held constant at this level until 2040. There is no change to the current SRES, with the scheme terminating in 2030.

50% Growth case: This scenario was undertaken after the stakeholder workshop in late June where preliminary modelling results were presented. It involves moving the LRET away from fixed annual targets to floating targets with each year reset based on forecast demand growth for the year ahead. The LRET target would be increased each year based on 50% of the anticipated growth in market-facing demand; i.e. demand growth net of that absorbed by behind the meter solar PV. The scenario assumes SRES modifications as follows:

- A reduction in deeming for Small Generating Units (SGUs) to 10 years from 1 January 2015, with the deeming period for both SGUs and Solar Water Heaters (SWHs) declining by one year each year and the scheme terminating at the end of 2020.
- A reduction in the maximum size eligibility of small generating units for inclusion under SRES down from the current 100 kW to 20 kW (systems above 20 kW would be eligible for the LRET).

Figure ES 1 summarises the LRET annual targets across the policy cases. In the 50% Growth case, the LRET annual targets are a function of demand growth and therefore vary across the demand sensitivities examined. The Real 30% case also includes an extension of the scheme to 2040 with targets held constant at the 2030 level until 2040 (not shown in the figure). Table ES 1 summarises the SRES settings under each policy scenario.

Figure ES 1 LRET annual targets under the various policy scenarios



Note: Under all scenarios the LRET terminates in 2030 except for the Real 30% which extends out to 2040.
Source: ACIL Allen based on input settings provided by the Expert Panel

Table ES 1 SRES settings under the various policy scenarios

Policy scenario	Scheme end	Treatment of SGU	Treatment of SWH
Reference case	End of calendar year 2030	15 years upfront, with deeming period declining by 1 year each year from 2017	10 years deeming upfront, with deeming period declining by 1 year each year from 2022
Repeal case	2014 last compliance year	No further subsidies	No further subsidies
Closed to new entrants case	2014 last compliance year	No further subsidies	No further subsidies
Real 20% case	End of calendar year 2020	10 years deeming from 1 January 2015 (10 years available until scheme end)	No change to Reference case
Real 30% case	End of calendar year 2030	No change to Reference case	No change to Reference case
50% Growth case	End of calendar year 2020	10 years from 1 January 2015, with the deeming period declining by one year each year	10 years from 1 January 2015, with the deeming period declining by one year each year

Source: ACIL Allen based on input settings provided by the Expert Panel

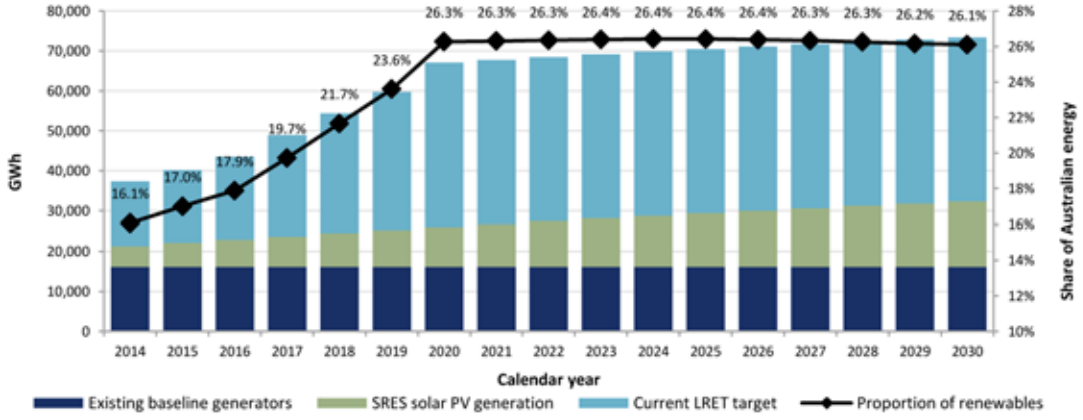
Input assumptions for the modelling have been sourced from a range of publicly available sources including AEMO and the Independent Market Operator for demand and BREE for capital costs and learning rates. These have been supplemented by ACIL Allen's own in-house assumptions for other key inputs. Sensitivities have also been completed to test the effects of changes for a number of the key input assumptions where they are subject to considerable uncertainty. These include high and low demand growth; the potential introduction of other abatement policies modelled through a shadow carbon price from 2021; high capital costs for renewable energy technologies; and permanent retirements for incumbent generators which mothball capacity.

Analysis and findings

Currently renewable generation accounts for an estimated 16.1% of generation (at the end of calendar year 2014). Under the Reference case where the RET remains unchanged, renewable energy is projected to reach 26.3% by 2020 as shown in Figure ES 2.[82]

Under the Reference case assumptions, ACIL Allen's modelling projects the renewable energy target can be met by new renewable developments with the LRET fully subscribed throughout the period to 2030. Much of the anticipated large-scale renewable development occurs over the period 2016 to 2021, with around 7,650 MW of wind developed throughout the NEM and SWIS regions and around 1,400 MW of utility-scale solar PV developed in the regional grids of the North-west Interconnected System (NWIS), the Darwin-Katherine Interconnected System (DKIS) and Mt Isa. Owing to the subdued demand conditions in electricity markets, the introduction of large volumes of renewable capacity results in a mothballing of generating plant by incumbent operators, with much of this capacity returning to service over time as demand grows.

Figure ES 2 Proportion of renewables in Australia's energy mix: Reference case



Note: Proportion of estimated total Australian electricity demand
Source: ACIL Allen

Across Australia, a total of $26.8 billion (real 2014 dollars) or $15.9 billion (in present value terms) in capital expenditure on new generating capacity is projected to occur over the period to 2040. Wind investment is projected to account for around 62% ($16.4 billion in real 2014 dollars or $12.1 billion in present value terms) of new large-scale generation investment in the period to 2040.

[82] This assessment has been undertaken using a formula provided by the Expert Panel and excludes the displacement from solar water heaters (SWH). If displacement from SWH was to be added to both the renewable energy component (the numerator), and to aggregate electricity demand (the denominator), aggregate renewables would be around one percentage point higher at 27.3% by 2020.

Gas-fired peaking plant and utility-scale solar PV each account for around 11% of the total ($3 billion in real 2014 dollars). In present value terms, solar accounts for $1.8 billion compared with $0.7 billion for peaking gas as adoption times differ. Several categories of fossil fuel generation collectively account for the remaining 16% ($4.3 billion in real 2014 dollars or $1.3 billion in present value terms).

Small-scale systems (solar PV and solar water heaters) under the SRES are projected to see strong growth with solar PV capacity rising from 4,133 MW at the end of 2014 to just under 13,000 MW by 2030. Cumulative SWH installations are projected to increase from an estimated 915,000 at the end of calendar year 2014 to over 1.5 million systems by 2030. A total of $30.4 billion (real 2014 dollars) or $18 billion (present value terms) of new investment is projected to occur in relation to solar PV and SWHs over the period to 2030. The majority of this is solar PV ($20.6 billion in real 2014 dollars or $12.6 billion in present value terms).

However, the subsidies paid to the renewable energy industry through the RET to bring about this investment are high. Over the period to 2030, the projected total direct RET cost (projected number of certificates multiplied by price) is $37.8 billion (real 2014 dollars) or $22.4 billion in present value terms, of which over 80% is associated with the LRET.

The modelling also shows that much of this additional capacity developed under the LRET is surplus to market needs. Under the Repeal scenario, the modelling projects a net reduction in the development of generating capacity of around 8,500 MW. Given the current levels of oversupply in most electricity grids and muted demand growth, the existing generation fleet is almost sufficient to meet expected demand for the foreseeable future.

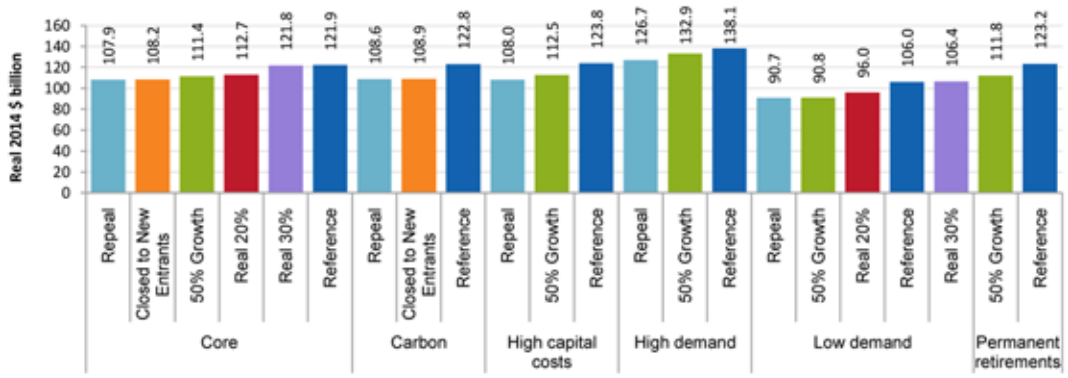
Generation sector resource costs

Figure ES 3 below presents a summary of the present value of aggregate generation sector resource costs over the period 2015-40 across each of the scenarios and sensitivities modelled. This measure can be interpreted as the cost to society of generating electricity for consumption by consumers and provides an indication of the sector's labour and capital productivity under each scenario and sensitivity when viewed on a per MWh basis.

For the Reference case (under core assumptions) costs total $121.9 billion in present value terms over the period to 2040 using a discount rate of 7% pre-tax real. Under the core assumptions, all of the policy variants examined resulted in a reduction in sector resource costs, indicating capital and/or labour productivity gains for the economy. The Real 30% scenario has almost the same aggregate cost as the Reference case because the deferral of wind development early is offset by an overall larger amount of renewable development in the longer-term.

The Repeal case has the lowest projected resource costs, as expected, as there are no RET subsidies distorting supply costs and competitive wholesale electricity markets are left to determine the most efficient, least cost plant mix to meet demand. This was one of the fundamental intentions in the establishment of the NEM, with its rules and principles being deliberately technology agnostic. Another reason for the development of the NEM was to impose competitive disciplines on participants in order to avoid the large oversupply in generation that had occurred through state governments using electricity supply to support other industries and policies. In a market with little or no demand growth, the RET is creating the same oversupply in generation that the NEM was designed to correct. In the absence of the RET policy, the market determines the optimal level of generation investment, rather than having arbitrary targets imposed upon it. In a market environment where capacity is already oversupplied and demand may continue to decline, it is desirable (and efficient) for no new investment in capacity to occur.

Figure ES 3 Aggregate generation sector resource costs (NPV 2015-2040): All scenarios/sensitivities

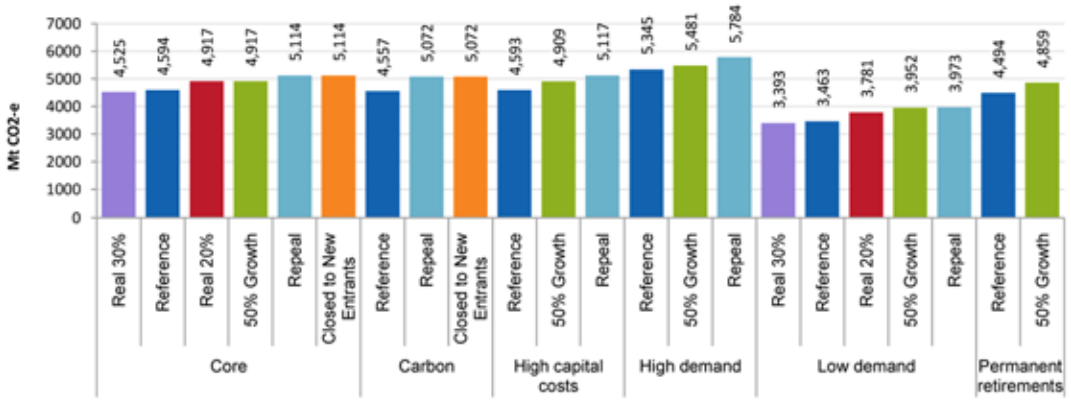


Note: Measure includes capital expenditure (on both generating capacity and any interconnector expansions/augmentations); refurbishment of existing and new generators for life extension beyond initial economic life; fixed operating costs (fixed costs associated with normal operation and stay in business capital expenditure associated with existing and new generating capacity); variable operating costs (fuel costs and variable O&M costs for existing and new generation) and unserved energy. NPV calculated using a 7% real discount rate.
Source: ACIL Allen

Emissions and cost of abatement

The RET policy delivers emissions abatement through displacing fossil fuel based generation with renewable generation. The level of abatement achieved is projected to be higher under the current market conditions relative to previous assessments because of the reduced role of gas-fired plant (increasing gas prices) and the repeal of the carbon price, both of which increase the competitiveness of coal fired plant within the generation mix. Figure ES 4 below shows that the policy scenarios which include the RET or an expansion to the RET (the Real 30% case) consistently result in the lowest emissions outcomes across assumption sets. Conversely the Repeal of the RET is projected to lead to higher emissions; between 8% and 14% relative to the Reference case over the period to 2040.

Figure ES 4 Aggregate emissions from electricity generation: 2015-2040: All scenarios/sensitivities



Note: Excludes non-scheduled generation in NEM regions, own-generation in the SWIS and off-grid generation 'Other' category includes cogeneration, liquid fuels, CCS-equipped technologies, biomass and geothermal.
Source: ACIL Allen

As with any Government expenditure or program, an important consideration is whether the policy offers value for money relative to alternatives. Two methods for calculating the cost of abatement from the policy have been used. Method 1 calculates abatement costs as the present value of the change in resource costs divided by the discounted change in abatement. Method 2 is the same, except the emissions in the denominator are not discounted.[83] Using method 1, estimated abatement costs for the RET range from $59/tonne under the 50% growth case (core assumptions) to $77/tonne (Reference case High capital costs).[84] Under method 2, these costs are lower, ranging from $30/tonne to $40/tonne under the same scenarios. Whilst the policy is somewhat effective in the abatement of emissions, it is at high cost compared to current global pricing and is therefore not the most efficient means of emissions abatement. There is also a large difference between calculated abatement costs for the LRET and SRES components, with the abatement costs for the SRES being at least 2 to 3 times higher than the LRET. Therefore policy scenarios which tend to reduce subsidies provided for solar PV will tend to lower the overall RET abatement cost.

Impacts on retail prices

The public analysis of the costs and benefits of the RET scheme has been dominated by views on the net benefits that the RET scheme provides to electricity consumers. These net electricity consumer benefits are generally calculated by assessing wholesale electricity price (pool) and RET certificate price changes for the market with and without the RET scheme (i.e. the modelled impact of the subsidised renewable generation on wholesale electricity market prices). Assessing the net consumer benefits limited to a specific economic sector cannot be considered to be either a social cost benefit analysis or an economy wide assessment of the RET scheme. Considering only the benefits that flow to consumers ignores the opportunity costs of the capital and labour involved and the other welfare effects of the policy.

Figure ES 5 below shows the projected aggregate cost for an average Australian household on electricity over the period 2015-40 in NPV terms. In most cases, moving from the Reference case to the Repeal case (the most extreme policy variant) results in projected household electricity costs rising in net terms (the reduction in direct compliance costs is outweighed by increases in wholesale electricity prices). This indicates that wealth transfers are occurring from existing generators to both new renewable energy projects and consumers.

Interestingly, this pattern of price changes does not hold under low demand conditions. This is because new renewable generation is incapable of supressing wholesale prices below levels which are sustainable for incumbent generators to keep operating. Under these conditions, removal of the direct compliance costs is not offset by any increases in wholesale prices and consumers are better off under a Repeal scenario.

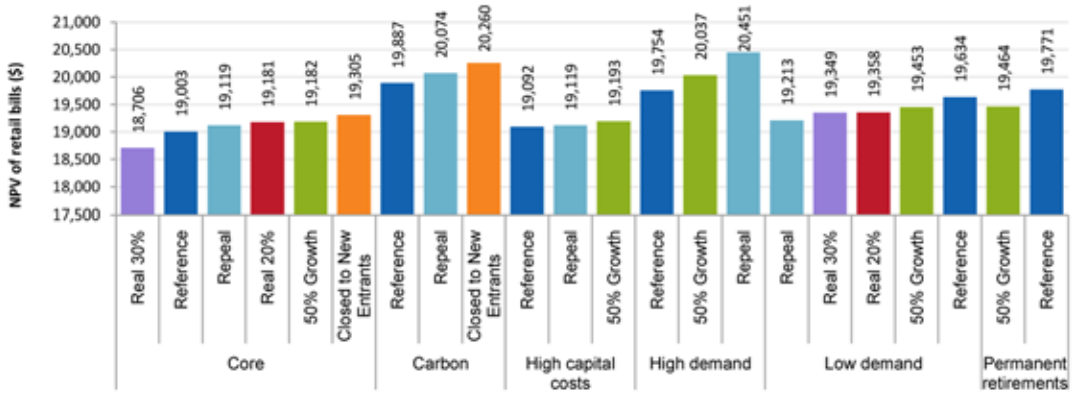
The impact on retail electricity prices is subject to uncertainty in the modelled components. Pool prices are inherently uncertain. This is because many of the drivers of pool prices are uncertain, such as:

- Weather driving demand is unpredictable and highly variable
- Plant performance (outages) is also stochastic (random)
- Fuel prices may vary over time although most fossil fuel fired plant tend to contract over several years and so these prices tend to be reasonably certain on an annual basis
- Participant behaviour (mothballing, plant retirement, strategic bidding, etc.) may swamp other effects over time.

[83] ACIL Allen has used the second method to calculate abatement costs at the request of the Expert Panel. However, ACIL Allen considers that the second method does not appropriately reflect the costs of emissions abatement on an inter-temporal basis.
[84] This range excludes the 50% Growth low demand case which is an outlier with a much higher cost of $164/tonne.

A key factor in the uncertainty around future electricity prices is participant behaviour. As electricity demand has fallen in recent years, an increasing willingness of participants to mothball or close generation plant has been observed. Closing or mothballing plant can cause a significant rebound in pool prices and may fully offset any downward pressure from renewable plant. While we have incorporated some mothballing of plant in the analysis, participants may have different objectives and take quite different views to mothballing and plant closure than we have taken. This could substantially change the net benefit to electricity consumers through net changes in retail prices. The Permanent retirement sensitivity, which includes a larger amount of incumbent capacity withdrawal, demonstrates that the impact on retail electricity prices can easily be reversed, with consumers benefiting from moving from the Reference case policy to a 50% Growth scenario. Directionally, the same outcome would also be seen if the scheme was closed to new entrants or fully repealed.

Figure ES 5 NPV of average household total expenditure on electricity (2015-2040): All scenarios/ sensitivities



Note: NPV of annual residential bills for average household over the period 2015-40. Uses a 7% real discount rate
Source: ACIL Allen

Regardless of direction, the impact on retail electricity prices is small, even when considered over the period to 2040. Under the core assumptions, moving from the Reference case to a complete repeal of the scheme is projected to increase a typical household's expenditure on electricity over the period to 2040 by 0.6% in present value terms. By comparison, moving from the Reference case to a Repeal case under low demand conditions is projected to reduce a typical household's expenditure on electricity (over the same period) by 2.1% in present value terms. In all cases examined, the benefits or costs are a very small percentage of the total electricity bill and could easily be swamped by the range of uncertainties in pool prices, especially the changes in the behaviour of generation participants.

Assessing the RET's impacts on retail electricity prices in isolation does not provide a solid basis for economically evaluating the RET policy. That the RET may lower electricity prices for consumers does not mean that its benefits outweigh its costs when considered in society wide terms. The diversion of capital and labour from other productive activities to the electricity sector imposes real costs on other sectors of the economy. Other policies such as subsidising fossil fuels or fossil fuel generators would also likely have the effect of lowering costs to electricity consumers and probably at significantly lower resource costs, yet few would advocate these as being good policy positions. An economic evaluation of the policy would not normally include wealth transfers where either producers or consumers benefit at the expense of each other. This makes projected changes to retail electricity prices mostly irrelevant in any economic assessment of the policy.

In ACIL Allen's view, the main focus of any evaluation should be on the cost of abatement achieved through the policy and whether this represents an efficient means of achieving abatement objectives.

APPENDIX D: CALCULATING THE PERCENTAGE SHARE OF RENEWABLE ENERGY

Calculating the percentage share of electricity generation attributable to renewables, for example in 2020, serves two purposes:

- It informs the evaluation of the effectiveness of the RET in achieving the previously stated policy goal for 2020 of a 20 per cent share; and
- It is used to calculate possible LRET target profiles to deliver a particular target share of renewables – for example a policy option to achieve a real 20 per cent in 2020 based on current energy forecasts.

The percentage calculation is made by adding estimates of the various components of renewable energy (the numerator) and dividing by an estimate of total Australia wide electricity (the denominator). While straightforward in concept, in practice methodological issues arise as to how components of these two numbers are defined and measured.

For consistency, measurements or estimates should refer to the same point in the electricity supply chain. For example, generation from rooftop PV should be adjusted upwards to account for distribution and transmission losses in order to be consistent with large-scale generation which is reported as 'sent-out' energy (that is, the energy that leaves the power station).

More broadly, forecasting the various components of renewable generation and overall national electricity is inherently uncertain, and can vary between forecasters/modellers and over time depending on methodologies and underpinning assumptions. This uncertainty increases with the time horizon.

Components of the calculation

There are four key components of the renewable energy estimate (the numerator) that need to be accounted for:

$RE_{LRET\ eligible}$	Generation from LRET-accredited power stations – (for power stations in operation prior to the MRET (the precursor to the RET) only generation above their annual baselines is included here).
$RE_{Pre\text{-}RET}$	'Below-baseline' generation from pre existing (i.e. pre-MRET, mainly hydro) renewable power stations, which is not eligible to create certificates under the RET.
RE_{SRES}	Generation from SRES-eligible small-scale renewables installations (mainly rooftop solar PV). As small-scale solar water heaters (SWH) are also eligible under the RET, the energy (mainly electricity and gas) they displace in heating water is often counted as well.
$RE_{Other\ non\text{-}RET}$	Additional generation supported by voluntary schemes (e.g. GreenPower), which is ineligible under the RET.
$E_{Total\ electricity}$	The national electricity figure used in the denominator combines amounts for large-scale and small-scale electricity generation, whether supplied on regional transmission networks, embedded in local distribution networks, self-generated or generated and used off-grid.

For future years, these amounts are based on annual forecasts by the operators of the main NEM and SWIS grids, as well as estimates by BREE and other expert analysts for the smaller grids and off-grid.

The formula below shows the various components of the calculation:

$$\%\ RE\ (year) = \frac{(RE_{LRET\ eligible} + RE_{SRES} + RE_{Pre\text{-}RET} + RE_{Other\ non\text{-}RET}) * 100}{E_{Total\ electricity}}$$

The formula can be rearranged to calculate the LRET target that would achieve a particular share in a particular year (for example, a 20 per cent share in 2020):

$$RE_{LRET\ eligible}\ (2020) = (0.2 * E_{Total\ electricity}) - (RE_{SRES} + RE_{Pre\text{-}RET} + RE_{Other\ non\text{-}RET})$$

In addition to the uncertainty inherent in forecasting the components, three key issues need to be considered when calculating the percentage share and setting an LRET target to achieve a particular percentage share. These issues and their potential impacts are outlined below.

Treatment of the output from solar water heaters (SWH)

While the RET scheme is mainly focused on raising the share of renewables-based electricity, certificates may be created under the SRES component for the renewable energy produced by SWH.

Inclusion of this heat energy as part of the RE_{SRES} component in the calculations has been justified on the grounds that while not generating electricity, the heat produced by SWHs displaces electricity – which assumes SWH buyers would otherwise have bought an electric water heater.

The energy displaced by SWH has been eligible to contribute towards the annual targets legislated under the old MRET scheme and under the expanded RET as legislated in 2009. It was also included in analysis undertaken to inform the 2012 RET review.

However, some in the renewable energy industry argue this energy is not consistent with the electricity focus of the RET and its inclusion in setting targets would reduce investment in large-scale renewable projects encouraged under the LRET.

It can also be argued that householders buying SWH may otherwise have bought gas water heaters rather than electric ones. If the uptake of renewables (the numerator) is extended to the renewable energy produced in domestic water heating, then for consistency the denominator should be extended to include the total energy used nationally in domestic water heating.

Consequently, there are several ways of treating the renewable heat from SWH in calculating the renewables percentage. The following approach separates out the generation ($RE_{Small\ gen}$) and displacement (RE_{SWH}) components of the SRES term in the numerator, and adds a term for the non-electric energy used in domestic water heating ($E_{Hot\ water}$) to the denominator, to address a range of viewpoints:

$$\%\ RE\ (year) = \frac{(RE_{LRET\ eligible} + RE_{Small\ gen} + RE_{Pre\text{-}RET} + RE_{Other\ non\text{-}RET} + [RE_{SWH}]) * 100}{E_{Total\ electricity} + [E_{Hot\ water}]}$$

$RE_{Small\ gen}$	The small-scale renewable electricity component (predominantly solar PV) of the SRES.
$[RE_{SWH}]$	Energy produced by solar water heaters. If included, this energy could be total SWH production or some proportion of that, which can be taken as displacing electricity.
$[E_{Hot\ water}]$	The non-electric energy used to heat water. If included, this could be focused narrowly on SWH or more broadly on domestic water heating.

ACIL Allen estimates that under the current settings, around 3,500 GWh of energy will be displaced by SWH in 2020, which is around 600 GWh above the level in 2014.

The ACIL Allen modelling indicates that if the energy displaced by SWH is added to the numerator of the calculation (and depending on how energy used in heating water is treated in the denominator), its inclusion could:

- raise the calculated share for renewables in 2020 by up to around 1.4 percentage points or reduce the calculated share by around 0.2 percentage points); and/or
- reduce the size of an LRET target calibrated to achieve a particular renewables share in 2020 by around 3,500 GWh. This would:
    - reduce the potential wind energy capacity stimulated by the LRET by around 1,200 MW; and
    - for a 20 per cent share, reduce the RET cost in 2020 of the additional certificates to households and businesses by around $200 million based on ACIL Allen's modelling.

Treatment of generation from voluntary schemes

Renewable energy is also generated by LRET accredited generators for use under voluntary schemes, the main one being GreenPower. The energy from these schemes is intended to be additional renewable energy beyond that encouraged through the RET.

Including renewable electricity supplied under such schemes would more accurately represent the share of renewables in Australian electricity. However, its inclusion in setting a 2020 LRET target to achieve a particular percentage share for renewables would undermine the 'additionality' objective of these schemes.

Generation from voluntary schemes was not included in setting the annual RET targets in 2009 or in analysis by the 2012 RET review.

ACIL Allen has estimated generation through these schemes to be in the order of 1,700 GWh in 2020. If added to the numerator, this would raise the calculated renewables share for 2020 by around 0.7 percentage points. If used in setting an LRET target for 2020 it would have around half the impact of including the energy displaced by SWH.

Below-baseline generation from pre-existing power stations

The variable and unpredictable nature of the hydro resource makes it difficult to forecast accurately the total below-baseline generation in any future year by pre-existing power stations.

Each pre-existing power station is able to create certificates for annual generation above its historical baseline set by the CER. However, for a variety of operational and resource-related reasons, not all power stations achieve their baselines in a particular year. Therefore, the sum of the baselines (around 16,600 GWh) is an upper limit for total below-baseline generation.

A range of estimates have been made for this component of total renewables in 2020. For example, in setting the annual targets for the expanded RET in 2009, an estimate of 15,000 GWh was used. Analysis for the 2012 RET Review used a lower value of 14,300 GWh reflecting a downward revision of long-term hydro capability. Industry analysis suggests that total below-baseline generation has historically averaged in the order of 14,000 GWh although the amount has varied from year to year.

For its modelling, ACIL Allen has recognised the potential for below-baseline generation in 2020 to be below the maximum, but based its forecast less on historical levels and more on recent longer-term energy forecasts for the large hydro systems in NSW/Victoria and Tasmania. ACIL's estimate used in the modelling was 16,150 GWh.

The ACIL Allen modelling indicates that reducing the forecast estimate for below-baseline generation by 2,000 GWh to reflect historical levels would:

- Reduce the calculated renewables share by around 1 percentage point; and/or
- Increase the size of an LRET target calibrated to achieve a particular renewables share in 2020 by 2,000 GWh. This would:
    - increase the potential wind energy capacity stimulated by the LRET by around 700 MW; and
    - for a 20 per cent share, increase the RET cost in 2020 of the additional certificates to households and businesses by around $120 million based on ACIL Allen's modelling.

The approach adopted by the Panel for the ACIL Allen modelling

The Panel adopted the following approach for calculating the renewables percentage in 2020 and estimating a 'real 20 per cent target' for modelling purposes:

- A 2020 forecast of Australia-wide renewables-based electricity which:
    - reflects ACIL Allen's estimate of 16,150 GWh for below-baseline generation from pre-existing generators;
    - reflects ACIL Allen's modelling which indicates the LRET target of 41,000 GWh of additional generation from RET-accredited power stations would be achieved;
    - uses ACIL Allen's estimate of underlying small-scale solar PV generation of 9,920 GWh in 2020 for current settings and 9,673 GWh under the modelled 'real 20 per cent in 2020' scenario;
    - does not include generation under schemes designed to encourage renewable energy that is additional to the RET; and
    - does not include the energy produced by solar water heaters.
- A forecast of total Australia-wide electricity, including metered and unmetered supply in the NEM, SWIS and smaller grids, as well as off-grid electricity using the latest central electricity demand estimates from AEMO and the Independent Market Operator, along with BREE and ACIL Allen estimates for smaller grids, self-generation and off-grid electricity.

- This approach yields a 26.3 per cent renewables share in 2020 under the current design and a 2020 LRET target of 25,200 GWh to achieve a 'real 20 per cent' share in 2020.

$$\% \text{ RE } (2020) = \frac{41{,}000 \text{ GWh} + 9{,}920 \text{ GWh} + 16{,}150 \text{ GWh} + 0) * 100}{255{,}300 \text{ GWh}}$$

$$= 26.3 \%$$

$$RE_{\text{LRET eligible}} (2020) = 0.2 * (255{,}300 \text{ GWh}) - (9{,}673 \text{ GWh} + 16{,}150 \text{ GWh})$$

$$= 25{,}200 \text{ GWh (rounded)}$$

The implications of adopting the various approaches

Based on the analysis above, application of the various approaches to calculating the renewables percentage in 2020 would yield the following:

- An upper estimate for the renewables share - based on the inclusion of energy produced by SWH, the ACIL Allen estimate of below-baseline generation and including additional generation under voluntary schemes is 28.3 per cent.
    - This approach would yield a lower estimate for an LRET target in 2020 to achieve a 20 per cent renewable share: 20,000 GWh.
- A lower estimate for the renewable share - based on exclusion of SWH and generation under voluntary schemes and a lower (14,000 GWh) estimate of total below-baseline generation is 25.4 per cent.
    - This approach would yield an upper estimate for an LRET target in 2020 to achieve a 20 per cent renewable share: 27,400 GWh.

The calculated percentage share and 2020 LRET target used in the modelling lie between these upper and lower estimates.

Changes to the Panel's adopted approach to the treatment of SWH and estimation of below-baseline generation would not be material to the Panel's preferred options for the LRET (grandfathering or a share of growth model).

However, should the Government choose a policy option that involves setting LRET targets to achieve a specific share for renewables in a particular year, these issues, along with the electricity demand and small-scale renewables forecasts, could significantly impact on desired outcomes and would need to be further considered in implementing changes.

APPENDIX E: INTERNATIONAL RENEWABLE ENERGY POLICIES

Internationally, renewable energy is supported through a wide range of policy measures. According to the Renewable Energy Policy Network for the 21st Century (REN21), 144 countries have renewable energy targets. Of those, 138 countries have policy measures in place to support those targets being met, including regulatory settings, public financing, fiscal incentives or tax settings, tendering and feed-in-tariffs (FiTs). While FiTs are the most prevalent support mechanism, many countries are moving away from FiTs to more competitive market arrangements including reverse auctions. Each country's domestic energy policy is determined by a range of factors, including natural resource endowment, economic conditions, existing energy infrastructure, international or regional obligations, energy security and industry development objectives.

Comparing the ambition, nature and progress of a particular country's environmental or renewable energy policy is fraught as each country may express their targets differently, for example, as a percentage of electricity generation or final energy consumption. Information in Table 6 below is indicative of the variety of drivers influencing renewable energy policy internationally. In Europe, new state aid rules released by the European Commission will require all European Union (EU) member countries to transition away from FiTs to market driven arrangements. Domestic energy policy reviews recently completed or underway in a number of member states have outlined new renewable energy policy settings to comply with the new state aid rules. For example, recent policy reviews in Germany and the United Kingdom have left the existing targets unchanged but endorsed new policy measures aimed at reducing costs, improving grid integration and transitioning to more competitive support mechanisms.

In some countries, the support for renewables has been in decline for a number of reasons including high levels of penetration, the impact of climate and renewable energy policy on electricity prices, changes in the generation mix and broader fiscal circumstances. Spain, for example, has achieved high levels of renewable energy penetration at relatively high cost with the government electing to minimise future support for renewable installations to repair a long standing electricity tariff deficit.

The International Energy Agency (IEA) ranks renewable energy as the world's fastest growing energy source, forecast to overtake natural gas and reach double the output from nuclear energy by 2016. By 2018, renewables are expected to reach 2,350 GW, or 25 per cent of gross electricity generation. Onshore wind is forecast to be deployed in 75 countries and large-scale solar in 65 countries by 2018.[85] Analysis by Bloomberg New Energy Finance and the IEA suggests that the areas of largest renewable growth to 2030 will be China and other developing economies. New fossil fuel capacity will be built to provide baseload support to the growing penetration of renewable generation and decentralised grids. Ambitious renewable energy policies and targets continue to drive investment in a number of major economies including China, Japan, India, France, California, Brazil, Mexico and Portugal.

Table 6 provides a brief overview of renewable energy targets and policies in a selection of counties.[86]

[85] International Renewable Energy Agency, 'Medium-Term Market Report 2013: Market Trends and Projections to 2018 Executive Summary,' 2013, p.3
[86] Prepared by the RET Review Secretariat for the Panel.

Table 6 Overview of renewable energy policies in selected countries.

Country/Region	Renewable Energy Target[87]	Policy/Mechanisms	Additional information
China	15% 'non-fossil fuel' energy by 2020, targeting 420 GW of hydro, 50 GW of solar, 200 GW of wind, 30 GW of biomass	Renewable energy portfolio standard, PV subsidies, and FiTs for solar, wind and biomass.	Energy policy is being driven by the need to meet growing energy demand while reducing particulate pollution. In 2013, China's new renewable capacity surpassed new fossil and nuclear capacity for the first time (REN21) generating nearly 10 per cent of total electricity demand. China has the largest installed renewable energy capacity and was the largest investor in clean energy technology in 2013.
Canada	-	Clean energy tax incentives, provincial targets and policies	Canada has the fourth largest installed renewable capacity, mainly hydro, in the world. Canada has the fifth largest installed wind capacity and is the third largest biofuel producer in the world. Provinces have deployed different renewable policies, including competitive tendering and portfolio standards.
European Union	20% final energy from renewables by 2020	Each member state negotiates domestic targets to contribute to EU wide targets.	Member states agreed to 2020 targets for renewable energy, emissions reductions and energy efficiency improvements to support the European Union Emissions Trading Scheme. 2030 targets are under development. The European Commission recently amended state aid rules to transition away from FiTs to other market mechanisms.
France	23% final energy from renewables by 2020	FiTs indexed for inflation. Periodic renewable power project tenders	In June 2014, the French government released a new energy bill setting targets for renewable energy, energy efficiency, transport and generation from nuclear sources. The energy market will transition to a capacity market and a range of financial and regulatory settings have been announced to meet the target of halving total energy consumption on 2012 levels by 2050. Direct tendering will be used instead of FiTs.
Germany	45% share of electricity generation from renewables by 2035	Competitive tendering for all new projects larger than 5MW, transitioning away from FiTs. Installation caps will apply with reduced support for onshore wind and PV and a self-generator surcharge to cover network fees.	Energy reforms recently announced in light of declines in electricity demand, rising electricity prices to account for high PV uptake and the need to expand network services, closure of nuclear fleet and greater cost sharing between all sectors. FiTs will transition to competitive tendering with technology specific caps on new installations in particular growth corridors. Network co-payments will be required from all self-generators and energy intensive industries.

[87] Bloomberg New Energy Finance, Country Profiles

Country/Region	Renewable Energy Target[87]	Policy/Mechanisms	Additional information
India	20% electricity consumption of final energy from renewables by 2020 20 GW of solar by 2020	FiT, tax incentives, capital subsidies and renewable power purchase obligations and certificate trading scheme.	India has a rapidly growing demand for energy and a diverse energy mix, with coal the main source of generation followed by large-scale hydro, renewable energy, gas and nuclear energy. In 2008, India adopted a National Action Plan on Climate Change which has led to the adoption of renewable energy and biofuels targets, a tax on coal exports, aspirational solar installation targets and energy intensity reduction targets for nearly 500 industrial facilities.
Japan	28 GW of solar by 2020	FiTs funded by consumer surcharge, tax incentives	With limited domestic resources and the closure of all nuclear facilities in 2012, Japan imports over 90 per cent of its energy requirements. However, the recently announced new energy plan will likely see nuclear generation recommence and an expansion in installed renewable capacity. The plan includes emissions reduction targets but not renewable energy targets.
Republic of Korea	11% of final energy from renewables by 2030	Increasing annual renewable energy targets, FiTs and portfolio standards.	In 2010, Korea embarked on a new energy policy to stimulate the economy and secure energy independence. An Emissions Trading Scheme is scheduled to commence in 2015, renewable portfolio standards apply and a national smart grid initiative is intended to be deployed by 2030.
Spain	20% of final energy from renewables by 2020	In 2012, Spain temporarily suspended FiTs. A new formula to calculate returns for renewable projects has recently been released.	In 2013, Spain generated more electricity from wind capacity than any other generation source. Spain's energy policy has been contributing to rising electricity prices after 15 years of tariff freezes without cost recovery for the Government subsidy of renewable projects.
United Kingdom	15% of final energy from renewables by 2020	Renewable Energy Obligation transitioning to Contracts for Difference reverse auction mechanism in 2017.	Recent energy market reforms have been announced due to the retirement of ageing coal fired generators and rising electricity prices. Reverse auctions will support large-scale renewable projects while small-scale renewable energy continues to receive FiT support.

United States of America	State based targets, e.g. California aiming for 33% of renewables in final energy by 2020. New York aiming for 30% of final energy from renewables by 2015.	Renewable Energy Portfolio Standards, federal and state tax incentives and public/ private programs.	Renewable energy investment, deployment and manufacturing remain strong with a combination of federal and state policies and tax incentives in operation. More than half of states have renewable portfolio standards with nine states involved in a regional greenhouse gas cap and trade scheme. In 2012, federal vehicle emissions standards were introduced followed by emissions intensity limits for new and existing power stations released in 2014, with state based emissions targets set by the Environmental Protection Authority.

[87] Bloomberg New Energy Finance, Country Profiles

ABBREVIATIONS AND ACRONYMS

Abbreviation	Term
ACT	Australian Capital Territory
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
ARENA	Australian Renewable Energy Agency
BREE	Bureau of Resources and Energy Economics
CCA	Climate Change Authority
CEFC	Clean Energy Finance Corporation
CER	Clean Energy Regulator
CO_2	Carbon dioxide
CO_2-e	Carbon dioxide equivalent
CoAG	Council of Australian Government
CPRS	Carbon Pollution Reduction Scheme
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DKIS	Darwin-Katherine Interconnected System
EEIS	Energy Efficiency Improvement Scheme
EITE	Emissions-intensive trade-exposed
ERF	Emissions Reduction Fund
ESAA	Energy Supply Association of Australia
FiT	Feed-in-Tariff
GDP	Gross Domestic Product
GW	Gigawatt
GWh	Gigawatt hour
IPART	Independent Pricing and Regulatory Tribunal
kW	Kilowatt
kWh	Kilowatt hour
LGC	Large-scale generation certificates
LNG	Liquefied natural gas
LRET	Large-scale Renewable Energy Target

MFP	Multi-factor productivity
MRET	Mandatory Renewable Energy Target
Mt CO_2-e	Million tonnes carbon dioxide equivalent
MW	Megawatt
MWh	Megawatt hour
NECF	National Energy Customer Framework
NEM	National Electricity Market
NER	National Electricity Rules
NSW	New South Wales
NPV	Net Present Value
NWIS	North West Interconnected System
PEC	Partial Exemption Certificate
PPA	Power Purchase Agreement
PV	Photovoltaic
REC	Renewable Energy Certificate
REE Act	*Renewable Energy (Electricity) Act 2000* (Cth)
RET	Renewable Energy Target
RPP	Renewable Power Percentage
SGU	Small Generating Unit
SRES	Small-scale Renewable Energy Scheme
STC	Small-scale Technology Certificate
STP	Small-scale Technology Percentage
SWH	Solar Water Heater
SWIS	South West Interconnected System
VEET	Victorian Energy Efficiency Target
WCMG	Waste Coal Mine Gas

GLOSSARY OF TERMS

Term	Abbreviation	Explanation
Australian Energy Market Operator	AEMO	AEMO was established in 2009 and is responsible for the operation of the National Electricity Market which includes the east and south east regions of Australia (Queensland, New South Wales, Victoria, Tasmania and South Australia).
Australian Renewable Energy Agency	ARENA	ARENA is an independent statutory authority established under the *Commonwealth Authorities and Companies Act 1997* (Cth), tasked with the objectives of improving the competitiveness of renewable energy technologies and increasing the supply of renewable energy in Australia.
1997 baseline		During the process of accreditation for a power station under the Renewable Energy Target, the CER determines a baseline value for generation prior to 1997 (when the scheme was first proposed). The baseline is generally calculated by using the average amount of annual electricity generated from eligible renewable energy sources in 1994, 1995 and 1996. Accredited power stations are only able to create LGCs for generation above its baseline.
Clean Energy Finance Corporation	CEFC	The CEFC is an independent statutory authority established by the Clean Energy Finance Corporation Act 2012, tasked with the objectives of the financing, commercialisation and deployment of renewable energy, energy efficiency and low emissions technologies.
Clean Energy Regulator	CER	The CER is an independent statutory authority that administers regulatory schemes relating to the Renewable Energy Target, the National Greenhouse and Energy Reporting scheme and the Carbon Farming Initiative.
Clearing House (for Small-scale technology certificates)		The small-scale technology certificate Clearing House facilitates the exchange of small-scale technology certificates between buyers and sellers at the fixed price of $40.
Climate Change Authority		The Climate Change Authority is an independent statutory authority established by the Climate Change Authority Act 2011 and provides advice on the operation of Australia's emissions reduction targets, and other Australian Government climate change initiatives.
Closing the RET to new entrants		An ACIL Allen modelling scenario where the LRET scheme continues to operate, but only large-scale renewable energy power stations currently accredited under the scheme and those currently under construction or fully committed are able to create LGCs. For modelling purposes a fixed price of $40 in nominal terms per LGC was chosen. The SRES ceases from 1 January 2015.
Compliance period		A full calendar year, the period over which each annual target under the Renewable Energy Target must be achieved.
Council of Australian Governments	CoAG	CoAG is the peak intergovernmental forum in Australia. The members of the CoAG are the Prime Minister, State and Territory Premiers and Chief Ministers and the President of the Australian Local Government Association.

Deeming		The estimation of the amount of electricity a small-scale solar power system or small-scale wind or hydro system generates, or the electricity a solar water heater or heat pump displaces. Deeming allows the owners of these technologies to receive their entitlement to small-scale technology certificates before the system has produced or displaced the electricity.
Emissions-intensive trade-exposed	EITE	Businesses conducting specified emissions-intensive trade-exposed activities are eligible for assistance under the Renewable Energy Target scheme.
Floating target		A floating target is where the RET target would be regularly updated in line with the most recent projections of electricity demand. This is in contrast to including fixed GWh targets in legislation.
Gigawatt	GW	A measure of power (or demand) equal to a thousand Megawatts.
Gigawatt hours	GWh	A measure of electricity generation/use over a period of time.
Grandfathering		See 'Closing the RET to new entrants'.
Kilowatt	kW	A measure of power (or demand).
Kilowatt hour	kWh	A measure of electricity generation/use over a period of time (or energy).
Large-scale generation certificates	LGC	Large-scale generation certificates may be created by power stations generating electricity from renewable sources. Each certificate represents one megawatt hour of renewable energy generation.
Liable entities		Entities that are required by legislation to surrender a specified number of renewable certificates or pay a renewable energy shortfall charge.
Large-scale Renewable Energy Target	LRET	The LRET encourages the deployment of large-scale renewable energy projects. It sets legislated targets for large-scale renewable generation each year that increase to 41,000 GWh of electricity in 2020.
Mandatory Renewable Energy Target	MRET	The Mandatory Renewable Energy Target commenced in 2001. The MRET had a target of 9,500 gigawatt hours in 2010 (mandated out to 2020) and interim targets that gradually increased year on year.
Megawatt	MW	A measure of power (or demand) equal to one million watts.
Megawatt hour	MWh	A measure of electricity generation /use over a period of time.
National Electricity Market	NEM	The National Electricity Market interconnects five regional market jurisdictions (Queensland, New South Wales, Victoria, South Australia and Tasmania). Western Australia and Northern Territory are not connected to the National Electricity Market.
Net Present Value	NPV	The NPV of an amount of money accounts for the changing value of money over time by discounting future cash flows to an equivalent amount of money that is available to spend now.
North West Interconnected System	NWIS	The NWIS supplies electricity to communities in the north west of Western Australia including the Pilbara region.

Partial Exemption Certificate	PEC	The Renewable Energy (Electricity) Act 2000 (Cth) and the Renewable Energy (Electricity) Regulations 2001 include provisions to provide partial exemption from Renewable Energy Target liability for electricity used in defined emissions-intensive trade-exposed activities. To obtain an exemption, prescribed persons may apply to the CER for a partial exemption certificate.
Power Purchase Agreement	PPA	A Power Purchase Agreement (PPA) is a contract between a renewable generator and an electricity retailer for the purchase of both electricity and LGCs.
'Real 20 per cent' target		A modelled policy scenario where the LRET targets are reset to achieve a 20 per cent share of renewables in the generation mix by 2020, based on the electricity demand projections used in the modelling. The LRET targets are maintained at 2020 levels until 2030.
'Real 30 per cent' target		A modelled policy scenario where the LRET is reset to achieve a 30 per cent share of renewables in the generation mix by 2030, based on the electricity demand projections used in the modelling. The targets remain at 2030 levels until 2040.
Reference case		The modelled scenario of the current legislated RET policy. It includes an LRET target of 41,000 GWh by 2020 and an uncapped SRES scheme, where solar PV installations receive 15 years of deemed certificates (progressively phased out from 2017) and solar water heaters receive 10 years of deemed certificates (progressively phased out from 2022).
Regional Forestry Agreements		The regulation of logging activity is managed by state and territory governments through forestry plans, such as Regional Forestry Agreements, and generally requires harvesting to be conducted in accordance with ecological sustainability requirements.
Renewable Energy Certificates	REC	The term used for renewable energy certificates generated under the Renewable Energy Target scheme prior to 2011.
REC Registry		A secure web-based application managed by the CER that facilitates the creation, trade and surrender of certificates.
Renewable Energy (Electricity) Act 2000 (Cth)	REE Act	The legislative framework for the Renewable Energy Target scheme.
Renewable Energy (Electricity) Regulations 2001 (Cth)	REE Regulations	The detailed rules and provisions of the Renewable Energy Target scheme.
Renewable Energy Target	RET	The Renewable Energy Target operates in two parts – the Small-scale Renewable Energy Scheme and the Large-scale Renewable Energy Target.
Renewable Power Percentage	RPP	The RPP establishes the rate of liability for LRET and is the mechanism that liable entities use to determine how many LGCs need to be surrendered to meet their liability each year.

Repeal of the RET		The complete removal of both the LRET and SRES schemes
Self-generators		Self-generators produce and consume their own electricity. Where a self-generator consumes the electricity within one kilometre of the point of generation or via a dedicated line it is exempt from liability under the RET. This exemption has been in place since the commencement of the scheme in 2001.
Small-scale Renewable Energy Scheme	SRES	The SRES supports the installation of small-scale renewable energy systems, including solar PV and solar water heaters.
Small-scale Technology Certificate	STC	Certificates created by small-scale technologies like solar PV and solar water heaters. Each certificate represents one megawatt hour of renewable generation or the displacement of one megawatt hour of electricity.
Small-scale Technology Percentage	STP	The STP establishes the rate of liability for the SRES. The STP is the mechanism that liable entities use to determine the number of STCs needed to be surrendered to meet their liability each quarter.
Solar Credits		The Solar Credits multiplier was introduced in mid-2009 to provide support for solar PV by multiplying the number of certificates that systems were able to create. The multiplier was originally set at five, so systems were eligible to create five times 15 years' worth of certificates. Due to rapidly falling system costs and strong uptake, the mechanism was terminated on 1 January 2013.
South West Interconnected System	SWIS	The SWIS is the electricity network that services the majority of Western Australia's population.
'50 per cent share of new growth' scenario		A modelled policy scenario where annual LRET targets are set corresponding to the previous year's target plus a 50 per cent share of expected growth in electricity demand on the main networks and large-scale off-grid demand over the next year. The LRET targets are retained at 2020 levels until 2030.

Renewable Energy Target Scheme

Report of the Expert Panel