Australian Government
Climate Change Authority

RENEWABLE ENERGY TARGET REVIEW

Final Report

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FINAL REPORT

This final report sets out the Climate Change Authority's recommendations on the Renewable Energy Target review. The recommendations have been developed having regard to the Authority's charter, stakeholder views and modelling work commissioned by the Authority.

Process

Issues paper	›	Submissions received	›	Discussion paper	›	Consultation and feedback	›	**Final report**
August 2012		September 2012		October 2012		November 2012		**December 2012**

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Australian Government
Climate Change Authority

19 December 2012

The Hon Greg Combet AM MP

Minister for Climate Change and Energy Efficiency

Parliament House

CANBERRA ACT 2600

Dear Minister

In accordance with Section 162 of the *Renewable Energy (Electricity) Act 2000* (Cth), the Climate Change Authority has the pleasure of submitting to you its final report of the Renewable Energy Target review.

Yours sincerely

Bernie Fraser
Chair

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OVERVIEW

This is the final report of the Climate Change Authority on its review of the Renewable Energy Target.

The Climate Change Authority (the Authority) was established on 1 July 2012 as an independent advisory body on climate change. The Authority is to conduct climate change research, as well as periodic statutory reviews on a range of climate change policies. This report covers its first statutory review of the Renewable Energy Target (RET).

An issues paper was released in August 2012 setting out background to the RET and seeking feedback from stakeholders on key issues. Almost 8 700 submissions were received in response.

In October 2012, the Authority released a discussion paper outlining its preliminary views on the RET. Consultations were held with a wide range of stakeholders through a series of roundtables and individual meetings. Written feedback on the discussion paper was also received from a number of stakeholders. The Authority is grateful to all the industry and community groups, governments and other participants who provided initial submissions and feedback on the discussion paper; the Authority has taken this feedback into account in reaching its final recommendations.

The RET commenced operation in 2001 as the Mandatory Renewable Energy Target (MRET), with the objectives of encouraging additional investment in renewable energy generation and reducing emissions of greenhouse gases in the electricity sector. Various amendments (some substantial) have been made to the scheme over time.

The RET creates demand for additional renewable energy generation by placing an obligation on entities that purchase wholesale electricity to surrender a certain number of renewable energy certificates each year. The RET operates as two schemes – the Large-scale Renewable Energy Target (LRET) and the Small-scale Renewable Energy Scheme (SRES).

The RET is an established scheme, which has operated for some years.

The Authority acknowledges that in conducting this review, it was not starting with a blank canvas. The RET has operated for some years; many companies have already made significant investments on the basis of the existing legislation and more commitments are in the pipeline.

The Authority also acknowledges that the renewable generation and reductions in greenhouse gas emissions created through the RET entail costs that are borne by electricity consumers already experiencing large increases in electricity prices for other reasons.

The policy landscape is changing but major uncertainties remain.

The policy landscape has changed significantly since the MRET was introduced. In particular, a carbon pricing mechanism is in place and is intended, over time, to be the main instrument by which Australia achieves its greenhouse gas emissions reduction targets. In addition, the Commonwealth Government has established the Australian Renewable Energy Agency (ARENA) and the Clean Energy Finance Corporation (CEFC).

These organisations are intended to support the future development of renewable generation. Further changes have been on-going step rises in electricity prices – and lower projections of demand – largely for reasons unrelated to the RET.

The Authority believes the RET has a continuing role to play in supporting investment in renewable generation in an uncertain policy environment. The review therefore focusses on possible improvements in the RET, rather than challenges its continued existence.

The real challenge for the Authority has been to reach recommendations that would represent an appropriate balance between promoting investments in renewable generation to reduce Australia's greenhouse gas emissions on the one hand, and containing the costs of the arrangements to electricity users on the other.

The *Climate Change Authority Act 2011* (Cth) outlines certain guiding principles that the Authority must have regard to in pursuing this balance, including economic efficiency, environmental effectiveness and equity considerations. This the Authority has endeavoured to do, having regard to the following broad objectives:

- increasing confidence and predictability;
- managing overall costs to electricity users and providers;
- providing flexibility and choice; and
- streamlining administration and compliance costs.

Increasing confidence and predictability

Confidence and policy stability are critical for ongoing investment in renewables.

Confidence, including in the sustainability of important policy frameworks, is critical in persuading investors (and their financiers) to continue with their plans for long-term investments in renewable generation. Shocks to confidence, from whatever source, tend to be followed by curtailments and deferrals of investment plans, as witnessed in the mining sector of late.

The Australian electricity market is already facing considerable uncertainty, not least in response to the future of the carbon price arrangements. In its recommendations, the Authority has sought to avoid adding to these uncertainties in ways that could increase risk premiums required by lenders and investors in renewable energy.

Frequency and scope of future reviews

One of the Authority's recommendations intended to promote confidence and predictability relates to the frequency and scope of future reviews. Currently, the *Renewable Energy (Electricity) Act 2000* (Cth) *(REE Act)* requires reviews of the scheme to occur every two years. Many participants commented on this issue and, regardless of their position on the RET overall, mostly argued against two-yearly reviews.

The Authority should review the RET every four years to promote greater investor confidence.

Given the importance it attaches to supporting investor confidence, and the impracticalities of undertaking in-depth reviews within a two-yearly period, the Authority's recommendation is that the frequency of scheduled reviews should be amended from every two years to every four years. This approach would see the next scheduled review of the RET take place in 2016 when, hopefully, some current policy uncertainties will be somewhat clearer. Unscheduled reviews could be initiated by the Commonwealth Government of the day at any time.

The Authority is not recommending any narrowing of the scope of future reviews.

The level and form of the Large-scale Renewable Energy Target

The level and form of the LRET target was a major focus of the review, with potentially significant impacts on confidence and predictability for many stakeholders.

Currently, the RET comprises the LRET with a fixed legislated target rising to 41 000 gigawatt hours (GWh) per annum for the period 2020 to 2030, and an 'uncapped' SRES with no quantitative limit.

There was a wide range of views regarding the appropriate level and form of the large-scale target.

Most submissions to the Authority commented on the level of the LRET target, with views generally falling into one of four camps:

- leaving the existing target unchanged at 41 000 GWh;
- reducing the gigawatt hour target to align it with an updated version of 20 per cent of projected electricity supply, based on current forecasts of electricity demand, which are significantly lower than previous forecasts (either on a rolling or a once-off basis). Advocates of a target of no more than 20 per cent argued this would reduce the potential costs of the scheme, particularly for energy users and incumbent generators;

- increasing the target to promote a greater share of renewable energy more quickly and, particularly in light of the creation of the CEFC, to make any renewable generation attributable to the CEFC additional (in quantity terms) to that delivered by the RET; and
- repealing the RET altogether.

On balance, the benefits of changing the target do not appear likely to outweigh the costs of reduced investor confidence.

On balance, the Authority is not convinced that a compelling case exists to adjust the target. In arriving at this judgement, the Authority has given particular weight to concerns that any changes to the target at this time would reduce investor confidence and increase risk premiums for planned renewable energy projects. Given existing uncertainties in the climate change policy area, this would affect the likelihood of meeting any particular target.

Several supporters of a reduction in the target also advocated a change in its form – to either a floating percentage-based target, or retaining the current gigawatt hour target, but setting this level periodically.

The target should remain fixed in terms of gigawatt hours to provide confidence to investors.

The Authority recommends that the form of the target should remain fixed in terms of gigawatt hours. In its view, a one-off change to the level of the target risks damage to investor confidence and possibly more so if the target was expressed as a percentage, or in gigawatt hours but adjusted over time.

The 2016 review should take into account the fact that the RET is viewed as a transitional measure, to provide temporary industry support and encourage additional renewable energy generation ahead of a carbon price trajectory consistent with delivering on Australia's long-term environmental goals.

Shortfall charge

No change is required to the shortfall charge but, if circumstances were to change materially, it should be reconsidered.

Based on its consultations, as well as its commissioned modelling work, the Authority considers that the current shortfall charge is sufficient to encourage compliance with the 41 000 GWh target. The Authority does not, therefore, recommend any change to the shortfall charge at this time. The Authority notes, however, that in the event that the carbon price or electricity demand are significantly lower than currently projected, there is a risk that the target would not be met with the current shortfall charge. The Authority would propose to consider the level of the shortfall charge in its scheduled 2016 review, or earlier if circumstances warrant.

The ongoing existence of the Small-scale Renewable Energy Scheme

The SRES should remain separate from the LRET…

The Authority recommends that the SRES remain a separate scheme, and its broad structure remain largely unchanged. This would provide a degree of confidence and predictability for the small-scale installers, small businesses, households and community groups participating in the scheme.

… as there are less disruptive ways of addressing concerns over costs than remerging the schemes.

The Authority examined the possibility of remerging the SRES and the LRET into the one scheme. The primary benefit is a likely reduction in costs because it would cap SRES generation, leading to less overall renewable energy generation in 2020. The main disadvantage is the risk of undermining investor confidence. On balance, the Authority believes there are preferred ways of addressing concerns about the costs of the SRES, some of which have been implemented recently in respect to feed-in tariffs and multipliers.

The clearing house should be amended to a 'deficit sales facility' to make it clear that it cannot guarantee a set price of $40 per certificate in a timely fashion.

To provide clarity to scheme participants, the Authority recommends that the clearing house be amended to a 'deficit sales facility', whereby certificates are only allowed to be entered in the clearing house when the clearing house is in deficit (that is, only when regulator-created certificates have been issued to liable entities). This would allow the continued operation of the clearing house as a price cap, while making it clear that it is unable to guarantee a set price of $40 per certificate in a timely fashion. Such a change would also allow the clearing house price to be more easily amended as there would be no need for transitional arrangements for certificates on the transfer list.

Other recommendations in respect of the SRES, which bear upon cost containment, are discussed below.

The liability and exemption framework

The Authority's recommendations in relation to the liability and exemption framework also reflect its concerns to promote confidence and predictability.

The current settings for the point of liability and the 100 megawatt grid capacity threshold appear to be functioning effectively. Liable entities are accustomed to the existing arrangements and there are no compelling reasons for change.

The renewable power percentage and small-scale technology percentage should be set prior to a compliance year, preferably by 1 December of the preceding year.

Some participants proposed changing the timing of the publication of the renewable power percentage and small-scale technology percentage from 31 March of the compliance year, to before the commencement of the compliance year.

The Authority agrees and recommends that the percentages be announced by 1 December of the previous year. If the Commonwealth Government is attracted to this recommendation, it may wish to consider whether to continue setting the percentages in regulations or some other way.

Current arrangements for the surrender of certificates should be maintained.

Currently, certificates must be surrendered annually under the LRET and quarterly under the SRES. The Authority recommends the retention of this framework as it provides a reasonable balance between providing cash flows to sellers of certificates and managing the compliance costs for liable entities.

The recommended changes to the announcement of the percentages also help to reduce some of the compliance cost burdens of liable entities under the SRES, as they will have greater certainty of their first quarter liability earlier in the compliance year and may therefore be able to manage certificate purchases in a more efficient way.

The exemption from liability under the RET for self-generation should continue in its current form.

As to self-generation, the Authority's preliminary view was that the exemption should be retained for current projects but not allowed for new projects. Considerable feedback was provided by stakeholders on this issue, and further issues were identified regarding the effect of repealing the exemption for new self-generators.

The Authority has now revised its preliminary view. Given the small proportion of electricity estimated to be produced by self-generators, complications in setting of an appropriate threshold for exempting new self-generators, and the fact that the current provisions may support new lower-emissions investments, the Authority is of the view that the self-generation exemption should continue in its current form.

The Authority also recommends that an appropriate framework be developed to allow for incidental electricity offtakes under the self-generation exemption which provide community benefits in remote locations.

Eligibility under the Renewable Energy Target

The LRET eligibility and accreditation arrangements are working well and no change is required.

The Authority considers that the current LRET eligibility and accreditation arrangements are appropriate. They ensure power stations are established in accordance with relevant regulations and are registered to create large-scale generation certificates.

Existing arrangements for waste coal mine gas should be maintained…

Policy-makers have placed clear boundaries on the support for waste coal mine gas under the LRET. Only existing waste coal mine gas power stations are eligible to create renewable energy certificates and (only until 2020), with separate targets that are additional to the broader LRET target. Given this contained support, the Authority recommends maintaining the current LRET arrangements for existing waste coal mine power stations.

… but new waste coal mine gas should not be eligible under the LRET.

Waste coal mine gas was included in the LRET as a transitional measure. Given that a carbon pricing mechanism is now in operation, there is no strong rationale for new waste coal mine gas to be eligible.

The Commonwealth Government should explore whether the RET eligibility for native forest wood waste is likely to increase the rate of logging of native forests. If it is not, then wood waste eligibility should be reinstated, subject to appropriate accreditation processes.

Wood waste from native forests is not included in the LRET. It was originally included in the MRET, but removed from the RET in 2011. Some stakeholders have argued for its re-inclusion in the scheme.

The Authority believes that the Commonwealth Government should explore whether RET eligibility for native forest wood waste is likely to increase the rate of logging of native forests. If satisfied that it would not, wood waste eligibility should be reinstated, subject to appropriate accreditation processes to ensure no additional logging of native forests occurs as a result.

New small-scale technologies should be considered for inclusion in the SRES on a case by case basis.

The Authority proposes that the possible inclusion of new small-scale technologies in the SRES should be considered by the Minister on a case by case basis, on a range of objective considerations.

At this time, the Authority does not consider that any new technologies are mature enough to warrant their immediate inclusion in the SRES.

No new displacement technologies

Displacement technologies are better suited to an energy efficiency 'white certificate scheme' than the RET.

One of the objectives of the RET is to encourage additional electricity generation from renewable sources. In principle, technologies that displace electricity, rather than generate it, do not further this objective and, while important, do not belong in the RET. Displacement technologies would seem to be better suited to an energy efficiency 'white certificate scheme' (a certificate trading scheme where the certificates would relate to an amount of energy saved).

The SRES already includes two 'displacement' technologies – solar water heaters and heat pumps. Given these anomalies already exist in the scheme, it is more difficult to argue that no new displacement technologies should be added (both technologies have potentially the same effect on greenhouse gas emissions, for example). This issue, incidentally, highlights the difficulties inherent in technology specific measures rather than broad-based measures, like a carbon price; technology specific schemes require that boundaries be drawn around eligibility.

No new displacement technologies should be admitted but existing displacement technologies should remain eligible.

Given the RET's primary focus on generation, the Authority recommends that no new displacement technologies be added to the RET.

The Authority recommends that existing displacement technologies should remain eligible at this time but, in the event that a national white certificate scheme were to be implemented, all displacement technologies should cease to be eligible under the RET, and be transferred to that new scheme. The ongoing eligibility of solar water heaters should be reviewed in light of regulatory developments: to the extent that solar water heaters are mandated through other means it would be difficult to justify their continued support through the RET.

Managing overall costs to electricity users and producers

The costs of the RET are borne by electricity consumers through some additional increase in electricity prices. They are borne also by fossil-fuel generators through lower wholesale prices and reduced market shares. Among consumers, low-income households spend less on domestic power and fuel costs than other households, but their spending represents a larger proportion of their total expenditure.

These considerations were of obvious interest to the Authority even though matters of cost and equity in the electricity market raised issues way beyond the RET and the scope of this review.

Options for cost-containment in the Small-scale Renewable Energy Scheme

The 'uncapped' nature of the SRES means its costs are also uncapped.

The SRES has no quantitative cap. Given quantity is unpredictable, there are also unpredictable impacts on electricity prices. There are no mechanisms for the price of certificates to decline automatically in response to falling technology costs or rising electricity prices.

In recent times, SRES has constituted an unexpectedly high proportion of retail electricity prices because of higher than anticipated certificate creation rates. Key factors driving this have either now ceased (generous feed-in tariffs at the state and territory level) or are being phased out (the end date for the Solar Credits multiplier was brought forward by six months to 1 January 2013).

A mechanism to constrain the costs of the SRES will ensure they remain appropriate and provide predictability to business.

The Authority considered other measures that could help constrain the future costs of the SRES and deliver greater confidence to participants about the sustainability of their industry.

There are a range of mechanisms that could be used to constrain the costs of the SRES.

Measures considered by the Authority to cap the SRES or otherwise limit its impact on electricity prices by controlling either the number of supported installations or the price of certificates, included:

- a gigawatt hour target;
- a small-scale technology percentage cap (capping liability);
- a discounting mechanism;
- lowering the existing price cap; and
- lowering the solar photovoltaic (PV) kilowatt threshold.

Many review participants expressed concern regarding the Authority's preliminary recommendation for a ministerial power to apply a discount factor.

The Authority's preliminary view proposed a discount mechanism be applied at the Minister's discretion based on a number of possible considerations, including the payback period falling below ten years, changes in net system costs, and the SRES constituting more than 1.5 per cent of an average electricity bill.

Many industry participants expressed concern with this possible approach. Some strongly supported the concept of discounting but were concerned the proposed method of application could generate too many uncertainties.

The Authority considers that mechanisms that reduce the risk of a possible rise in installations should be used rather than mechanisms that actively limit the number of installations.

After further consultation, the Authority is now of the view that possibilities of lowering the SRES capacity threshold for solar PV, reducing deeming as a way of phasing out the SRES, and retaining the ministerial power to lower the clearing house price cap offer the best prospects for balancing cost containment with predictability for scheme participants. These measures, together with the reductions in generous feed-in tariffs and the imminent removal of the Solar Credits multiplier, mean that the prospects of a new surge in SRES costs appear unlikely.

While a gigawatt hour target, a small-scale technology percentage cap or a discounting mechanism might all contain the cost of the SRES, they also require significant regulatory changes and would be likely to generate considerable uncertainty for scheme participants.

A gigawatt hour target or a small-scale technology percentage cap could also create certificate price volatility and 'boom-bust' cycles.

The Authority favours other measures to contain SRES costs which are likely to be more predictable and less disruptive in their impact. Specifically, the Authority recommends a number of measures that would reduce the number of certificates created in the small-scale scheme.

The most likely area for a future boom in installations is solar PV on commercial buildings. Should they remain in the SRES, a boom in installations of these systems could be costly to electricity users generally, especially given that the larger systems involved create more certificates than typical residential systems.

The current capacity limit for solar PV is 100 kilowatts (kW). This is considerably larger than the average size of solar PV systems installed by households, currently at around 2.6 kW.

The threshold for small-scale PV systems to be included in the SRES should be reduced from 100 kW to, say, 10 kW. Larger systems should be in the LRET, with reduced deeming periods.

Lowering the capacity limit would still provide an incentive for larger, commercially-installed solar PV, but in the context of the capped LRET scheme. It is envisaged that these systems would be subject to five year deeming, which would encourage better accuracy around deeming arrangements. The Authority recommends lowering the SRES threshold of solar PV units from 100 kW to, say, 10 kW. The Commonwealth Government should conduct further consultation with stakeholders to determine an appropriate threshold so that the bulk of commercial-scale PV systems were included in the LRET at a scale where five year deeming periods (rather than 15) was more appropriate.

This approach would limit potential price rises from the SRES and provide a degree of certainty to the as yet untapped potential for commercial deployment of small-scale systems in Australia.

Deeming should be used to phase out the scheme.

The Authority also recommends reduced deeming as a way of phasing out the SRES. Under this approach, small-scale systems would only be provided with certificates for generation up to 2030. The approach has the benefit of providing a clear and graduated reduction in support over time, consistent with the transitional nature of the RET. Under this proposal, 2016 would be the last year in which small-scale systems were provided with 15 years' worth of deemed certificates. In 2017, it would be for 14 years; in 2018, 13 years and so on.

The recommendation would not come into effect until 2017, after the scheduled 2016 legislated review. In that review, the Authority will again be considering, among other things, possible improvements to the SRES. If necessary, the Authority can re-examine this recommendation during that review as part of any broader recommendations regarding the future of the RET in the 2016 policy context.

If unexpectedly high levels of installations of units under the threshold limit occur, the Minister could exercise the power to lower the price cap as an 'emergency brake'.

In the event that there was an unexpectedly high level of installations of units under the threshold limit (signalling that the level of subsidy is unnecessarily high), the Minister could exercise the power to lower the price cap (set at $40 through the clearing house price). While this tool has its drawbacks, it could act as an 'emergency brake' should installations take off again, perhaps driven by falling technology costs or further rises in the Australian dollar. Lowering the price cap has the advantage of being known to scheme participants, who are aware when they invested that it could be exercised. Some of the disadvantages associated with lowering the price cap – such as transitional arrangements for certificates on the transfer list – would be more manageable should the Commonwealth Government adopt the Authority's recommendations regarding the clearing house.

Diversity of RET technologies

The Authority does not recommend any changes to the RET to promote diversity.

The RET allows a diverse range of technologies to generate certificates. The current mix of generation capacity reflects the adoption of technologies with relatively low costs. The Authority's view is that this approach should continue, so long as the future mix deployed under the RET does not affect the reliable delivery of electricity within networks.

The RET supports the most efficient technology used. The Authority does not believe the scheme should be used to promote diversity – especially through multipliers, introducing banding or caps – which would increase the cost of the scheme to consumers.

Other policy initiatives, particularly ARENA and the CEFC, are better placed to promote diversity.

Providing flexibility and choice

The Authority makes several recommendations to promote greater flexibility and choice in areas where existing constraints appear to impose avoidable costs.

Making partial exemption certificates tradeable

Partial exemption certificates should be made 'tradeable'…

In situations where RET costs are being passed on to emissions-intensive, trade-exposed industries, the Authority recommends that the resultant partial exemption certificates should be tradeable. That is, firms should be able to sell them to any liable party, not just their own electricity supplier. Currently, businesses carrying out eligible activities can apply annually for partial exemption certificates; they are provided as a form of assistance to reduce the cost impact of the RET.

… to make it more likely that emissions-intensive, trade-exposed businesses will receive a market value for them.

Partial exemption certificates are provided for the benefit of the recipients, not electricity suppliers: making them tradeable increases the likelihood that the recipient would receive a market value for them to offset actual scheme costs, as intended by the policy.

Introduce an opt-in option for large energy users

Opt-in liability arrangements would allow large electricity users to better manage their own compliance costs.

A second area where the Authority recommends greater flexibility and choice is in relation to an opt-in facility for large electricity consumers. Currently, large electricity users are not able to opt-in to manage their own liability under the RET. Opt-in arrangements for large electricity users have been used in other certificate-based trading schemes, including the carbon pricing mechanism and the New South Wales Greenhouse Gas Reduction Scheme.

The Authority considers that allowing large electricity users to manage their own liabilities (if they choose) would improve flexibility and choice.

Streamlining administration and compliance costs

The Authority believes there are opportunities to streamline the administration and compliance costs of the RET and lessen its impact on businesses.

Greater alignment between schemes

The level of assistance for emissions-intensive, trade-exposed businesses should be reviewed by the Productivity Commission

The partial exemption framework for emissions-intensive, trade-exposed industries has the same rationale as the Jobs and Competitiveness Program under the carbon pricing mechanism. The Productivity Commission is responsible for reviewing the level of assistance provided under the carbon pricing mechanism.

Given the similarities between the partial exemption framework under the RET and the Jobs and Competitiveness Program, the Authority recommends that they should be reviewed together by the Productivity Commission as part of its broader review of the assistance under the carbon pricing mechanism.

There is scope to streamline administrative requirements for the partial exemption framework and the Jobs and Competitiveness Program.

Another area where the Authority suggests that greater administrative streamlining could occur is in relation to the partial exemption framework under the RET. This framework is similar, but not identical to, the Jobs and Competitiveness Program under the carbon pricing mechanism. The Authority recommends greater streamlining of the processes for gathering information and for audits under the two arrangements.

Data collection by the Clean Energy Regulator

The second area where compliance and administrative costs could be reduced relates to the data collected by the Clean Energy Regulator, including information on out-of-pocket expenses for small generation units, and generation returns.

At present the Minister is required to consider the amount of out-of-pocket expenses that system owners contribute when reducing the clearing house price; the Regulator currently collects this information.

Current arrangements to collect information on out-of-pocket expenses should be removed…

Information on what customers are actually paying for small-scale systems is likely to be useful. It is questionable, however, whether the current arrangements create either an accurate data source or a cost-effective one.

… and be replaced by surveys.

The Authority's recommendation is that the requirement to provide data on the out-of-pocket expense for a small generation unit installation should be removed from the *REE Act*, reducing overall administration and compliance costs. The Regulator should continue to gather information on out-of-pocket expenses, but should do so through appropriate surveys.

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The *REE Act* requires any registered person creating more than 250 certificates in a calendar year to lodge a solar water heater and small generation unit return to the Regulator.

The requirement to submit a solar water heater and small generation unit return should be removed from the REE Act.

The solar water heater and small generation unit return is intended to provide the Regulator with quantitative and qualitative data. Most of the information submitted, however, is already available to the Clean Energy Regulator. The Authority recommends that the legislative requirement to produce a return should be removed: the administrative costs are not considered to be justified, given the absence of any clear benefit from collecting the information.

Maintain one accreditation body

The final recommendation in respect of administration and compliance cost relates to the accreditation of small-scale technology installers.

The Authority considered the benefits of opening up the accreditation of small-scale technology installers to more than one body.

Currently, the Clean Energy Council is the only organisation that can accredit small generation unit installers for the purpose of creating certificates. In its discussion paper, the Authority made the preliminary recommendation that the accreditation of designers and installers of small generation units be open to certified accreditation bodies beyond the Clean Energy Council. The rationale for this draft recommendation was that more accreditation bodies might provide greater opportunity for installers and products to become certified. This could also increase services and reduce costs for industry.

While there are inherent benefits to competition, in this case there are risks that it could lead to poor outcomes for customers.

There is a risk, however, that competition between accreditation organisations could encourage poor quality control and dilute public confidence in the accreditation system. It would also increase the costs of the Clean Energy Regulator. To manage this risk, the Commonwealth Government would need to develop and implement detailed provisions to ensure that the quality of products and installation is maintained. There are also issues in that the Clean Energy Regulator does not have legislative responsibility for electrical safety, which resides with the states and territories.

On balance, the Authority recommends maintaining one accreditation body.

On further investigation, at this time, the Authority considers the potential benefits of allowing multiple bodies to accredit installers and products do not outweigh the costs associated with the additional administrative requirements necessary to properly address these risks.

Next steps

The Authority has provided the final report to the Minister for Climate Change and Energy Efficiency for the consideration of the Commonwealth Government. Under the *REE Act*, the report must be tabled in the Commonwealth Parliament within 15 sitting days of the Minister receiving it.

The Commonwealth Government must respond to the Authority's recommendations within six months of receiving the final report.

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CHAPTER 1. INTRODUCTION AND HISTORY

The Climate Change Authority (the Authority) is required by legislation to review the Renewable Energy Target (RET) every two years, beginning in 2012. This report constitutes the Authority's first RET review. Chapter 1 introduces the RET review and outlines the structure of the report. It includes a brief summary of the major developments in the evolution of the RET.

1.1. The Climate Change Authority

The Authority was established on 1 July 2012 as an independent advisory body on climate change. The Authority is to conduct climate change research, as well as periodic reviews on a range of matters, including carbon pollution caps, progress towards meeting national emissions reduction targets, the carbon pricing mechanism, the RET and the Carbon Farming Initiative.

The Authority's constitution, functions and guiding principles are set out in the *Climate Change Authority Act 2011* (Cth).

1.2. An overview of the Renewable Energy Target

The RET aims to ensure that 'the equivalent of at least 20 per cent of Australia's electricity generation comes from renewable resources by 2020' (Commonwealth Government 2010) (see Box 1).The term 'equivalent' is used to capture displacement technologies – such as solar water heaters and heat pumps, which are included in the RET scheme but do not generate electricity.

Box 1 Summary of the Renewable Energy Target legislation

- *Renewable Energy (Electricity) Act 2000* (Cth)
  Establishes the large-scale and small-scale schemes, including the liability framework, certificate generation and administrative arrangements.
- *Renewable Energy (Electricity) (Small-scale Technology Shortfall Charge) Act 2010* (Cth)
  Imposes the small-scale technology shortfall charge at a rate of $65 per megawatt hour.
- *Renewable Energy (Electricity) (Large-scale Generation Shortfall Charge) Act 2000* (Cth)
  Imposes the large-scale generation shortfall charge at a rate of $65 per megawatt hour.
- *Renewable Energy (Electricity) Regulations 2001* (Cth)
  Sets out further detail regarding the operation and administration of the large-scale and small-scale schemes.

The RET scheme creates a demand for additional renewable energy by placing a legal obligation on entities that purchase wholesale electricity (mainly electricity retailers) to surrender a certain number of renewable energy certificates to the Clean Energy Regulator each year. Each certificate represents one megawatt hour of additional renewable energy for compliance purposes. Certificates are generated by accredited renewable energy power stations and eligible small-scale renewable technology systems. The sale of certificates supports additional renewable energy investment. Certificates are tradeable and

may be 'banked', in the sense that certificates issued in one year may be surrendered to meet an obligation in a later year.

Since 1 January 2011, the RET has operated as two schemes – the Large-scale Renewable Energy Target (LRET) and the Small-scale Renewable Energy Scheme (SRES). The LRET supports large-scale renewable energy projects, such as wind generators and commercial solar, by helping to bridge the cost between renewable and fossil-fuel generation. The SRES assists households, small businesses and community groups with the upfront cost of installing small-scale renewable technology systems (for example, solar photovoltaics (PV) and solar water heaters).

The RET scheme is administered by the Clean Energy Regulator (formerly the Office of the Renewable Energy Regulator). The Clean Energy Regulator is an independent statutory authority established by the *Clean Energy Regulator Act 2011* (Cth). The Clean Energy Regulator's main functions in relation to the RET include maintaining the Registry, issuing certificates, managing the surrender of certificates, administering the liability provisions and enforcing compliance with the scheme.

Certificate creation, trade and surrender are managed through the Renewable Energy Certificates (REC) Registry. The Registry is an internet-based registry system that:

- facilitates the creation, registration, transfer and surrender of certificates;
- tracks the ownership of certificates;
- provides access to the small-scale technology certificate clearing house; and
- maintains the public registers required by the *Renewable Energy (Electricity) Act 2000* (Cth) *(REE Act)*.

1.3. The Renewable Energy Target review

1.3.1. Legislative requirements and scope of the review

The *REE Act* and the *Climate Change Authority Act 2011* set legislative requirements for the RET review in respect of timing, scope, conduct, recommendations and publication.

Timing and Scope

Section 162 of the *REE Act* mandates reviews every two years and defines the scope of these reviews:

> 162(1) The Climate Change Authority must conduct reviews of the following:
>
> a) the operation of the *REE Act* and the scheme constituted by the *REE Act*;
>
> b) the operation of the regulations;
>
> c) the operation of the *Renewable Energy (Electricity) (Large-scale Generation Shortfall Charge) Act 2000* (Cth);
>
> d) the operation of the *Renewable Energy (Electricity) (Small-scale Technology Shortfall Charge) Act 2010* (Cth); and
>
> e) the diversity of renewable energy access to the scheme constituted by this Act, to be considered with reference to a cost benefit analysis of the environmental and economic impact of that access.

In line with these requirements, the Authority has interpreted the scope of its review as covering:

- the capacity of the RET arrangements to support additional generation of electricity from renewable sources to contribute reductions in greenhouse gas emissions at reasonable cost;
- the role of the RET and its relationship to other policy measures;
- the LRET, including the level and trajectory of the target;
- the SRES, including its design, architecture, and administration;
- the liability and exemptions framework, and the shortfall charge of both the large-scale and small-scale schemes;
- the eligibility framework for both schemes and the diversity of renewable energy; and
- the frequency and scope of future reviews under the *REE Act*.

The Authority also sees the RET as part of a broader suite of government climate and energy policies, including:

- the carbon pricing mechanism, planning regulations, energy efficiency schemes and feed-in tariffs;
- the Clean Energy Finance Corporation and the Australian Renewable Energy Agency; and
- rules and regulations regarding electricity markets, including network connection arrangements and retail electricity tariffs.

These policies have implications for the RET review, but are not themselves the subject of specific recommendations in this review; issues in respect of electricity distribution networks, for example, extend beyond the RET arrangements.

The Minister for Climate Change and Energy Efficiency wrote to the Chair of the Authority on 13 July 2012 in respect of the RET review (Appendix B). As well as providing background relevant to the RET review, the Minister noted that the Council of Australian Governments was prioritising a review of climate programs to assess their complementarity with a carbon pricing mechanism, and that the Authority's report will be an input to the Council's work.

Conduct

In conducting its review, the *Climate Change Authority Act 2011* requires the Authority to have regard to a number of broad principles, including economic efficiency, environmental effectiveness, equity in the impacts of measures on households, businesses, workers and communities, and consistency with the development of an effective global response to climate change.

The Authority has had regard to these principles in this review.

As also required, the Authority has consulted widely with interested parties throughout the review, including energy retailers and consumers, environmental and welfare groups, and the renewable energy industry.

To assist the consultation process, the Authority released an issues paper and a discussion paper. The issues paper (released 20 August 2012) described the RET scheme and requested feedback from stakeholders on particular questions. Almost 8 700 submissions were received, including from two campaigns organised by GetUp (over 7 700 submissions) and Hepburn Wind (over 700 submissions). Submissions, including samples from the two campaigns, are available on the Authority's website at http://climatechangeauthority.gov.au/submissions/received.

The discussion paper (released 26 October 2012) set out the Authority's preliminary views on key issues. The discussion paper formed the basis for further consultation, including four stakeholder

consultation roundtables held on 2 and 5 November 2012 in Melbourne and Sydney respectively. A summary of these discussions has been published on the Authority's website along with a list of the participating stakeholders.

The Authority received 54 written responses to the discussion paper and held more than 60 one-on-one meetings with participants over the course of the review.

Publication and response

As required by the *REE Act*, this RET review has been completed and provided to the Minister by 31 December 2012, as well as published on the Climate Change Authority website.

The Minister is required to table copies of the report in Parliament within 15 sitting days of the completion of the review. The Government's response to the Authority's recommendations is required within six months.

1.3.2. Modelling

Consultants SKM MMA were commissioned to undertake electricity market modelling to assess possible market impacts of potential changes to the RET. The modelling approach and the key results are summarised at Appendix D. The full SKM MMA modelling report is available at the Authority's website.

1.4. Development of the Renewable Energy Target

Prior to the announcement of the Mandatory Renewable Energy Target (MRET) in 1997, Australia produced around 16 000 gigawatt hours (GWh) of electricity from renewable sources. Most of this was from hydro-electricity schemes in Tasmania and the Snowy Mountains, with smaller contributions from landfill gas, biomass (bagasse and black liquor), and solar PV and wind generators. Renewable generation then amounted to around 10.5 per cent of Australia's electricity supply.

1.4.1. The Mandatory Renewable Energy Target

In 1997, Prime Minister, Mr John Howard, announced a suite of greenhouse gas mitigation measures in the statement *Safeguarding the Future: Australia's Response to Climate Change*. That initiative introduced the MRET, which was intended to impose a legal obligation on electricity retailers and other large electricity buyers to source an additional two per cent of their electricity from renewable or specified waste-product energy sources by 2010.

After two years of negotiation between the Commonwealth, states and territories and stakeholders, the MRET was enacted in legislation with a target of 9 500 GWh of additional renewable electricity to be generated by 2010. In the second reading speech to the House of Representatives, the MRET was said to have both environmental and industry development objectives, which were to:

- accelerate the uptake of grid based renewable electricity to reduce greenhouse gas emissions;
- provide an ongoing base for the development of commercially competitive renewable energy as part of the broader package to stimulate the use of renewables; and
- contribute to the development of domestic industries which could compete effectively in overseas markets. (Commonwealth House of Representatives 2000)

The MRET sought to achieve these ends by creating a liability for wholesale energy purchasers to encourage additional renewable energy by acquiring renewable energy certificates. The *REE Act*

created a framework for renewable energy generators to create certificates for every megawatt hour of electricity produced above a renewable generator's baseline, which was set by the regulator as the average electricity produced between 1994 and 1996 by the generator (called the '1997 baseline'). Eligible generators could continue to create certificates until the final year of the scheme in 2020. The legislation also established a regulator (the Renewable Energy Regulator supported by the Office of the Renewable Energy Regulator) to oversee and manage the scheme.

The *REE Act* required that an independent review of the Act be undertaken in 2003.

1.4.2. The 2003 Tambling Review

The 2003 MRET review was chaired by Mr Grant Tambling (former Senator for the Northern Territory). It considered the extent to which the Act had contributed to reducing greenhouse gas emissions and encouraged additional renewable energy generation, as well as the achievement of other policy objectives, and the need to amend aspects of the Act or consider alternative approaches.

The review panel found that the MRET had broad community support, contributed significantly to additional renewable energy generation, resulted in some exports of domestically manufactured equipment, and had a very small negative effect on the Australian economy from the associated increases in electricity costs (MRET Review Panel 2003).

Of the review's 30 recommendations, the most significant was for the target to be increased over time, to reach 20 000 GWh in 2020. The Panel argued that such an increase would:

- provide investment confidence and industry development opportunities;
- deliver the minimum 'critical mass' of investment needed to demonstrate commercial viability and create the potential for domestically manufactured components of renewable energy projects;
- establish a domestic demand base for the development of further export markets; and
- provide for a more managed investment framework that would promote cost effective technology improvements and industry learning.

In August 2004, the Commonwealth Government accepted most of the review's recommendations, but decided not to increase the target, instead maintaining its commitment to the 9 500 GWh target announced in 1997.

By 2007, there was sufficient renewable energy generation capacity in place to meet the legislated targets and no further investment was necessary for that purpose.

1.4.3. State and territory renewable energy target schemes

Following the Commonwealth Government's decision to maintain the 9 500 GWh renewable energy target, a number of state governments planned or enacted their own renewable energy targets.

Victoria, New South Wales and South Australia all announced renewable energy targets. Victoria announced a scheme in 2006, which commenced on 1 January 2007 (Theophanous, Thwaites 2006). The Victorian Renewable Energy Target required electricity retailers to purchase a minimum of ten per cent of electricity from renewable energy sources by 2016. The New South Wales Renewable Energy Target was set at ten per cent of New South Wales end use consumption by 2010, and 15 per cent by 2020 (New South Wales Government 2006). However, while a certificate based trading scheme was planned, it never commenced. A target of 20 per cent of energy generated from renewable energy sources by 2007 was set in South Australia; this target was achieved ahead of schedule in

2011, and South Australia is now aiming for 33 per cent renewable electricity generation by 2020 (Rann 2011).

1.4.4. The 2009 expanded Renewable Energy Target

In 2007, the Commonwealth Government embarked on a two year consultation period with state and territory governments and stakeholders to expand the MRET, which was agreed by the Council of Australian Governments in April 2009. The amended *Renewable Energy (Electricity) Bill 2000* was introduced into the House of Representatives in June 2009, one month after the Carbon Pollution Reduction Scheme was introduced.

While the basis of the MRET remained, significant changes were made to both the target and how it would be achieved. These included:

- increasing the target to 45 000 GWh in 2020, to be maintained at that level until 2030;
- introducing Solar Credits, which would assist households and business with the upfront costs of small-scale renewable energy generation units by applying a 'multiplier' to the number of certificates received from installation of small-scale generation technologies;
- providing a partial exemption from liability for emissions-intensive, trade-exposed activities, to reflect the cumulative cost impact of the RET and anticipated carbon price on those industries. The partial exemption applied only to the expanded part of the RET and not the 9 500 GWh target set under the original legislation; and
- allowing state-based renewable energy targets enacted under state legislation to transition to the RET.

1.4.5. The Renewable Energy Target today

In 2010, the Commonwealth Parliament passed amendments to separate the RET into two parts: the LRET and the SRES. Higher than expected uptake of small-scale systems – stimulated by falling system costs, the financial incentives offered through the Solar Credits multiplier, and state and territory feed-in tariffs – had created a large spike in the number of certificates. This depressed certificate prices and discouraged investment in large-scale projects, which have very large capital requirements. The division of the RET was designed to address this issue by creating separate incentives for large-scale projects and small-scale technologies. This meant that large-scale and small-scale technologies were no longer directly competing with one another under the RET scheme, effective from 1 January 2011.

The LRET is expected to deliver the majority of the target – 41 000 GWh of the original 45 000 GWh 2020 target – and retains many of the design features of the original MRET scheme. The LRET is discussed in more detail in Chapter 4.

The SRES has an implicit target of 4 000 GWh of renewable energy generation or displacement of electricity through solar water heaters and heat pumps. However, the SRES is an 'uncapped' scheme, meaning its gigawatt hour contribution by 2020 is uncertain. The SRES is discussed in more detail in Chapter 5.

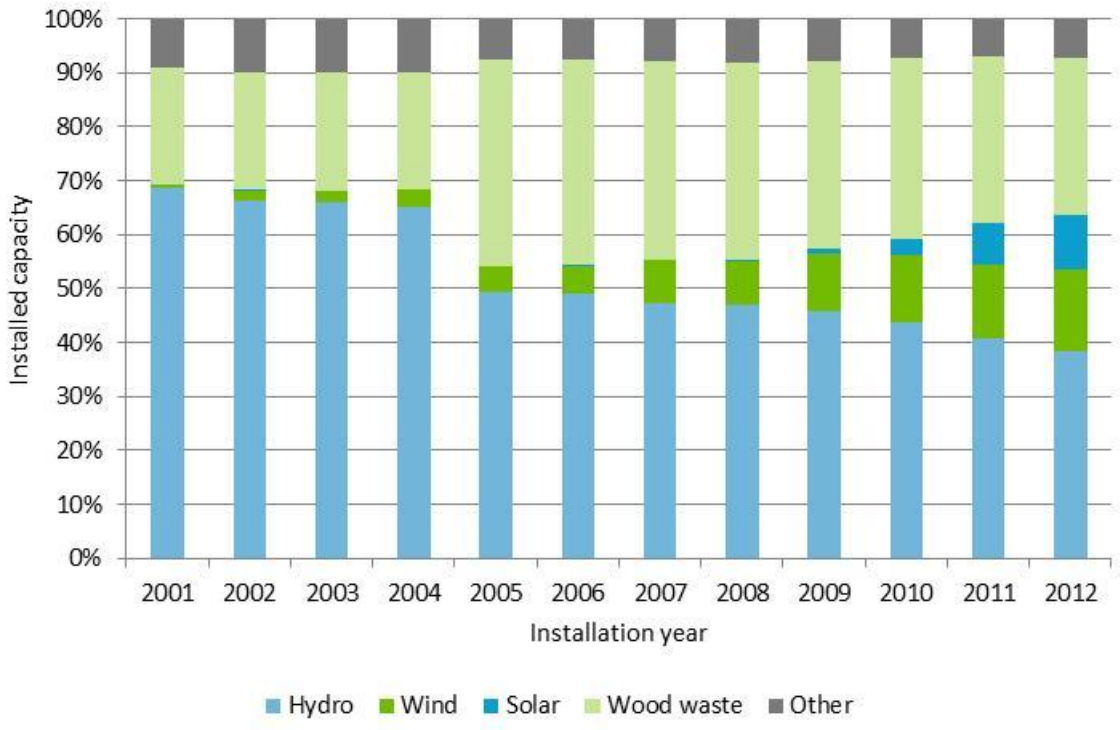
CHAPTER 2. PERFORMANCE OF THE RENEWABLE ENERGY TARGET

This chapter considers how the Renewable Energy Target (RET) has performed to date, against the objectives of the *Renewable Energy (Electricity) Act 2000* (Cth) (*REE Act)*. It explores the RET's impact on levels of renewable energy generation and capacity, changes in greenhouse gas emissions, and the development of the renewable energy industry. It also considers the impact of the RET on electricity prices.

2.1. Renewable electricity capacity and generation

The major aim of the *REE Act* is to encourage additional generation of electricity from renewable sources. Since the introduction of the Mandatory Renewable Energy Target (MRET) in 2001, Australia's renewable electricity capacity has almost doubled, increasing from around 10 650 megawatts (MW) in 2001 to around 19 700 MW in 2012. As Figure 1 illustrates, renewable generation from sources other than hydro now account for more than 50 per cent of total installed renewable capacity.

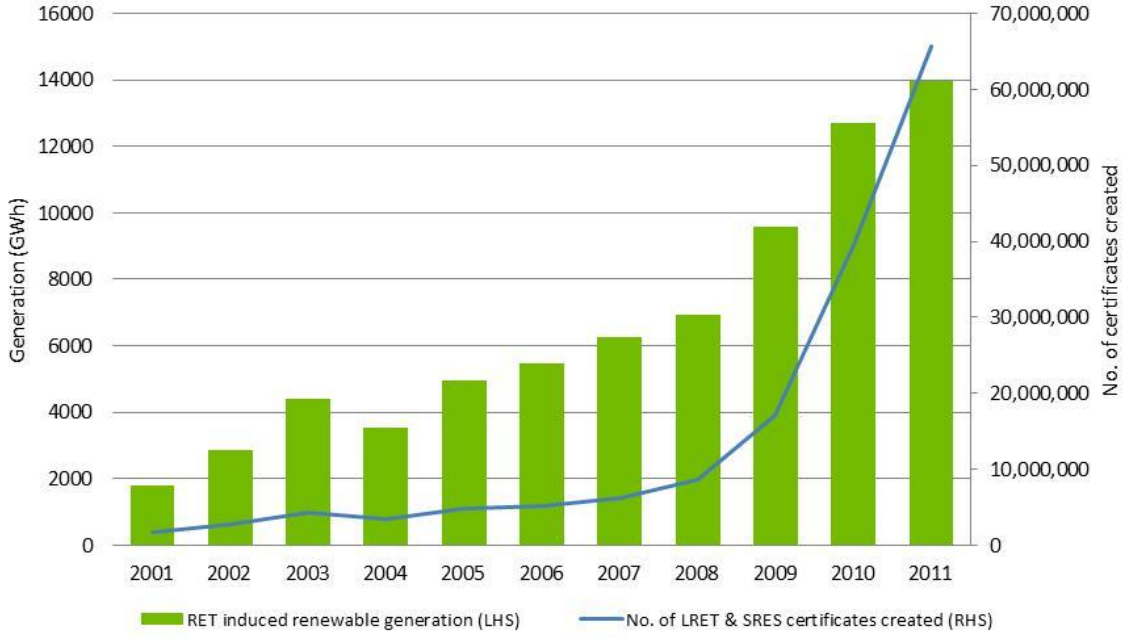
Figure 1 Technologies as a proportion of total installed renewable capacity, 2001-2012



Source: Clean Energy Regulator and Climate Change Authority, 2012.
Note: 'Other' includes landfill gas, bagasse, food waste, food processing waste, sewage gas and biomass-based components of sewage, black liquor, waste coal mine gas (to the extent that it is eligible under the RET scheme), agricultural waste, energy crops, waste from processing of agricultural products and biomass-based components of municipal solid waste.

The increase in renewable generation capacity has been supported by the sale of certificates under the RET. Almost 160 million certificates were created over the period 2001 to 2011, and generation eligible under the RET produced around 14 000 gigawatt hours (GWh) of electricity in 2011 (see Figure 2).

Figure 2 RET induced renewable generation and the number of certificates created



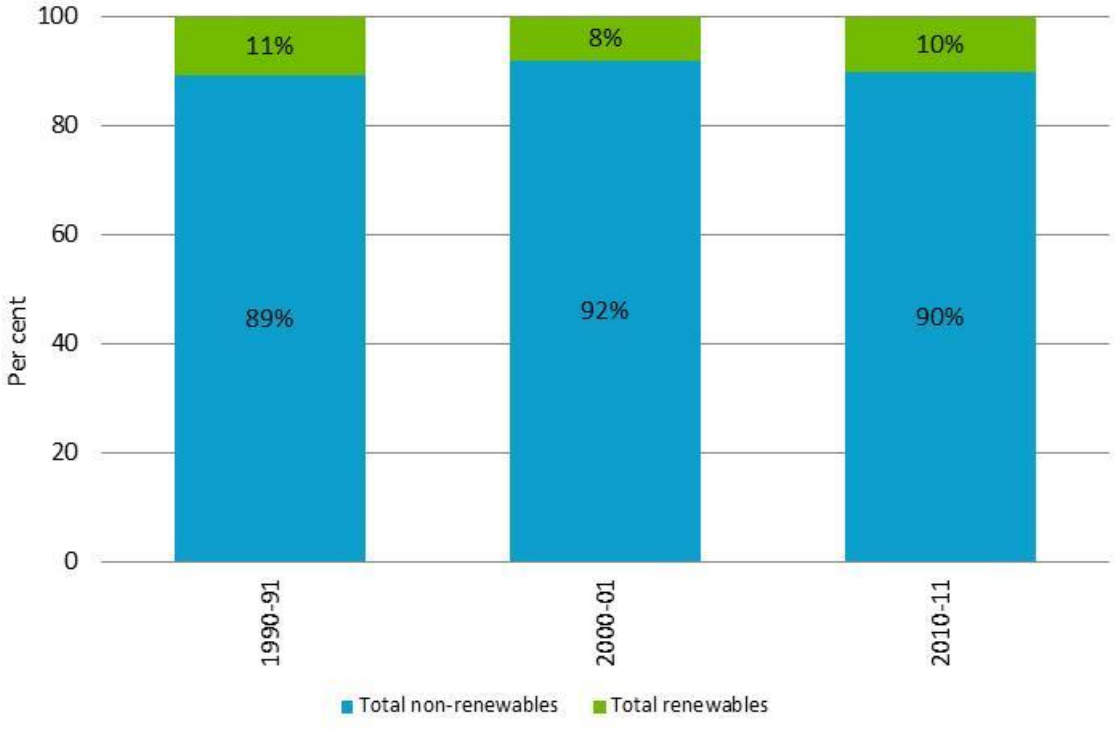
Source: Clean Energy Regulator and Climate Change Authority, 2012.
Note: 'RET induced renewable generation' has been calculated using renewable energy certificates accounting for any multiplier impacts.

Renewable electricity generation currently accounts for around ten per cent of total electricity generation in Australia. Despite the increase in absolute terms, renewable generation as a proportion of total electricity generation has not changed significantly since 2000-2001 (see Figure 3).This is because growth in electricity demand, which increased by around 13 per cent over the period, has been met with growth in both non-renewable and renewable electricity generation.

Electricity generation from non-renewable sources grew by ten per cent over the period 2000-01 to 2010-11, although substantial changes have occurred in the composition of the fossil-fuel generation mix. The contribution of natural gas almost doubled to more than 20 per cent of total electricity generation in 2010-11.

Black coal electricity generation decreased by around 13 per cent over the same period, to around 46 per cent of total generation in 2010-11, while brown coal increased by six per cent to contribute 22 per cent of total electricity generation. The growth in renewables has been significantly offset by a decrease in generation from pre-existing hydro generators, reflecting low rainfall between 2005-06 and 2008-09.

Figure 3 Australian electricity generation mix



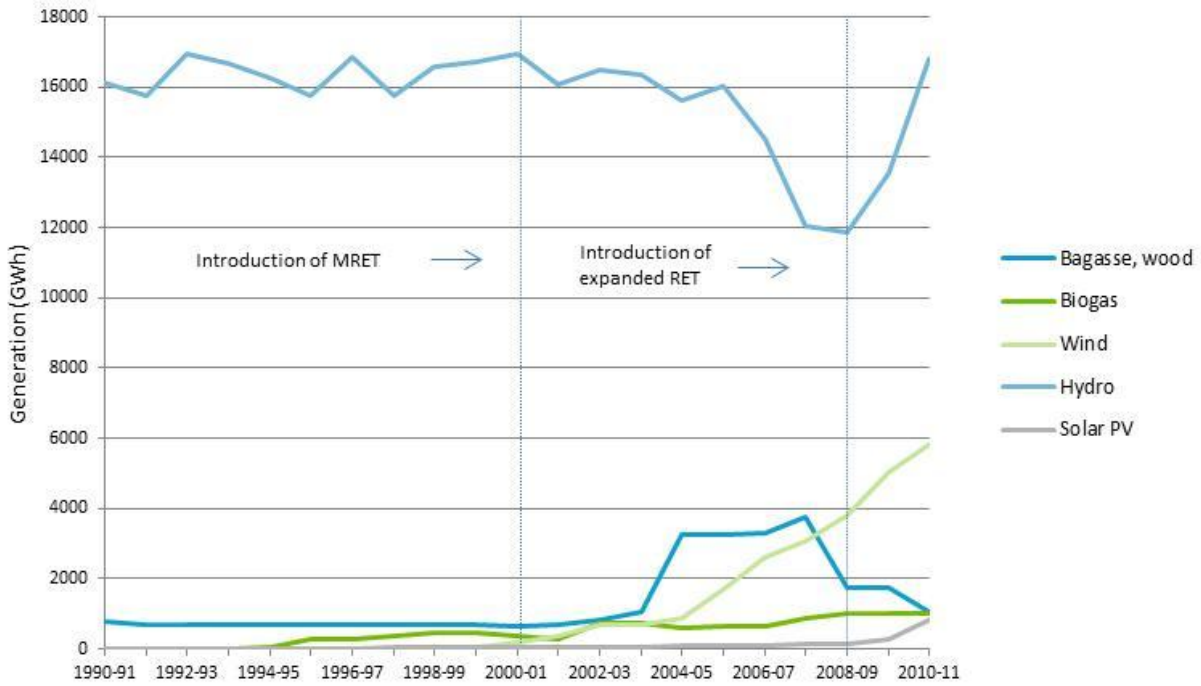
Source: Bureau of Resources and Energy Economics (BREE), 2012.

2.1.1. Mix of renewable energy generation

Wind and solar photovoltaic (PV) generation have accounted for the bulk of the (absolute) increase in renewable energy generation capacity (see Figure 1). Wind has grown rapidly under the RET, generating more than 5 800 gigawatt hours (GWh) in 2010-11, up from around 200 GWh in 2000-01 (see Figure 4). Solar PV generation has also increased significantly, generating around 850 GWh in 2010-11, compared with around 50 GWh in 2000-01 (see Figure 4). Despite the downward adjustment to the Solar Credits multiplier, the rate of solar PV installations remains strong in 2012 (see Chapter 5).

Hydro generation remains the largest single source of renewable energy in Australia, but much of this capacity was installed before 2001 and is therefore not included in the 41 000 GWh target (see Figure 4). Favourable seasonal conditions over the past two years have seen hydro electricity generation recover to its long-run average but, with hydro resources now largely exploited, further significant growth is unlikely.

Figure 4 Australian renewable electricity generation by fuel



Source: BREE, 2012.

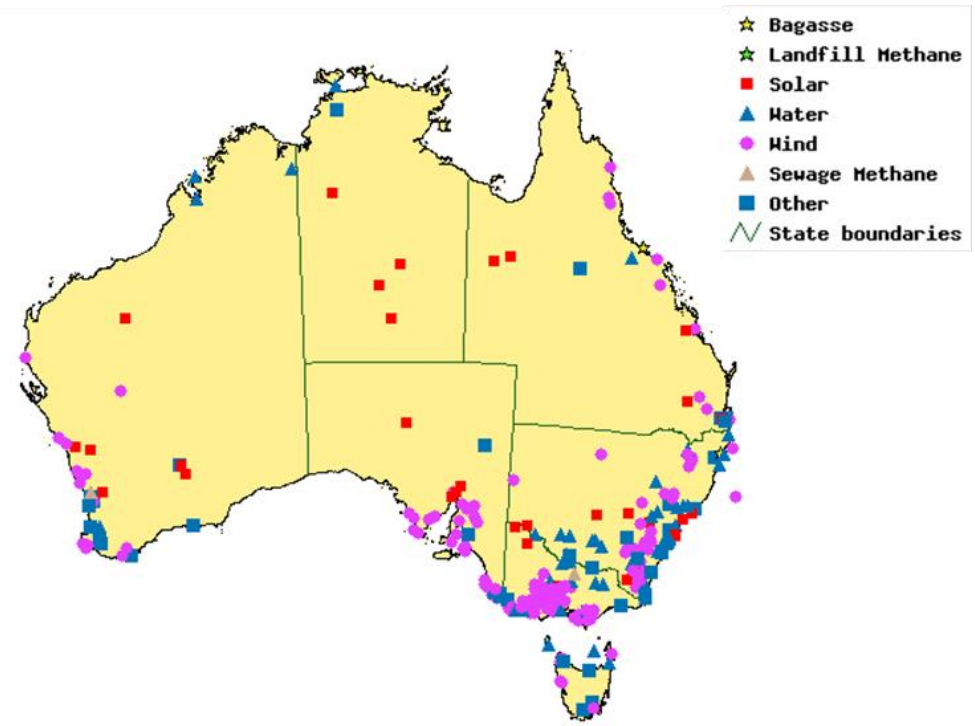
2.1.2. Distribution of renewable generation capacity

Large-scale renewable projects are scattered across all states and territories (see Figure 5). Significant wind generation occurs across large parts of southern Australia, with hydro generation concentrated in Tasmania, Victoria and New South Wales. Solar generation occurs across parts of central Australia while biomass is confined to eastern Queensland.

LRET certificate creation over the period 2001 to 2012 also indicates that eastern and southern parts of Australia have accounted for around 90 per cent of total new LRET generation, while Western Australia and the Northern Territory have accounted for around ten per cent of total LRET generation (see Figure 6).

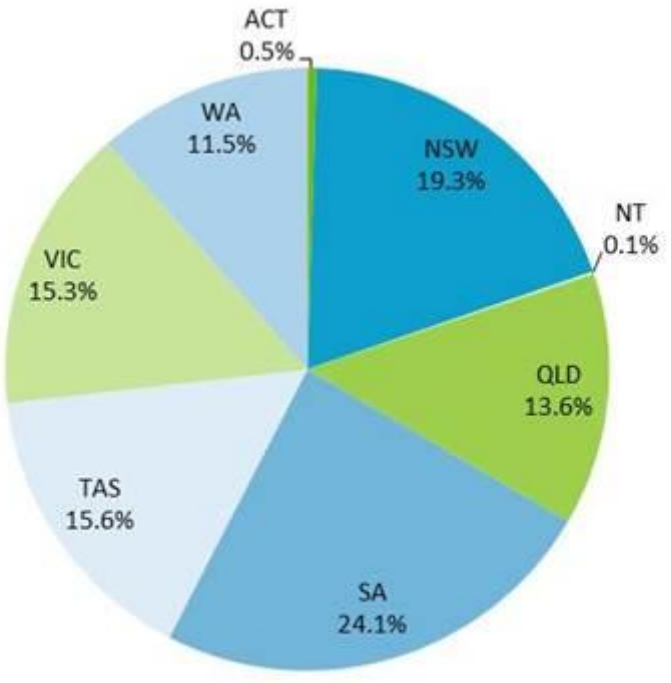
Small-scale Renewable Energy Scheme (SRES) installations over the period 2001 to 2012 also indicate that around 90 per cent of installations are located in eastern and southern parts of Australia. On a per household basis, however, solar PV and solar water heater penetration varies significantly from state to state (see Figure 7). Data submitted by the REC Agents Association suggests that small-scale renewable energy systems are widely dispersed across Australia, with urban areas accounting for 47 per cent of installations and regional and rural areas for 53 per cent.

Figure 5 Renewable energy generation in Australia



Source: Geoscience Australia, 2012.

Figure 6 Large-scale Renewable Energy Target induced generation by state, 2001 to 2012



Source: Clean Energy Regulator and Climate Change Authority, 2012.

Figure 7 Penetration of small-scale renewables per household by state, 2001 to 2012

Source: Australian Bureau of Statistics Census 2012, Clean Energy Regulator and Climate Change Authority, 2012.

2.2. Abatement from the Renewable Energy Target

A related major objective of the *REE Act* is to reduce emissions of greenhouse gases from the electricity sector by encouraging greater renewable generation.

Assessing the impact of the RET on greenhouse gas emissions requires a consideration of what emissions would have been if the RET had not existed. This counterfactual cannot be observed; it must be estimated.

A number of emission reduction estimates have been calculated by various organisations over time and often with different results, depending on the underlying assumptions used. A recent study conducted by SKM MMA for the Clean Energy Council, estimated that the RET had induced cumulative emission reductions of around 20 million tonnes of carbon dioxide equivalent between 2001 and 2012.
The SKM MMA report also indicated that over the same period, around 90 per cent of the abatement achieved in the electricity sector was attributable to the RET, with the remainder attributable to other renewable generation support mechanisms. The report suggests that without the RET, Australia would not have met its emissions reduction target under the Kyoto Protocol by around two to three percentage points.

2.3. Industry development

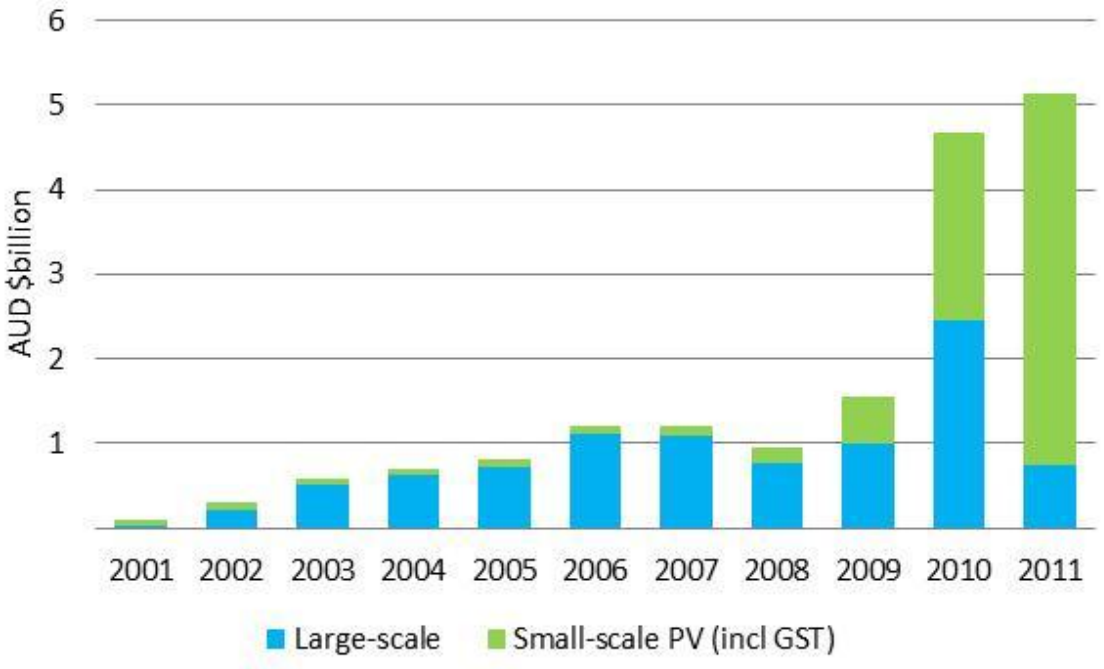
As noted, one of the announced objectives of the MRET was to 'contribute to the development of internationally competitive industries, which could participate effectively in overseas markets' (Commonwealth House of Representatives 2000, p.18 031). The impact of the RET on investment and employment patterns in the renewable generation sector is discussed below.

2.3.1. Investment

The RET has stimulated considerable investment in Australian renewable energy over the last decade. In 2011, investment in large-scale and small-scale renewable energy in Australia totalled in excess of $5 billion from almost nothing in 2001 (see Figure 8).

Investment in large-scale projects has dominated the renewables sector for most of the past decade but, since the introduction of the expanded RET and the Solar Credits multiplier, small-scale PV investment has eclipsed large-scale investment. In 2011, small-scale PV investment totalled more than $4.3 billion.

Figure 8 Total large and small-scale renewable energy investment in Australia

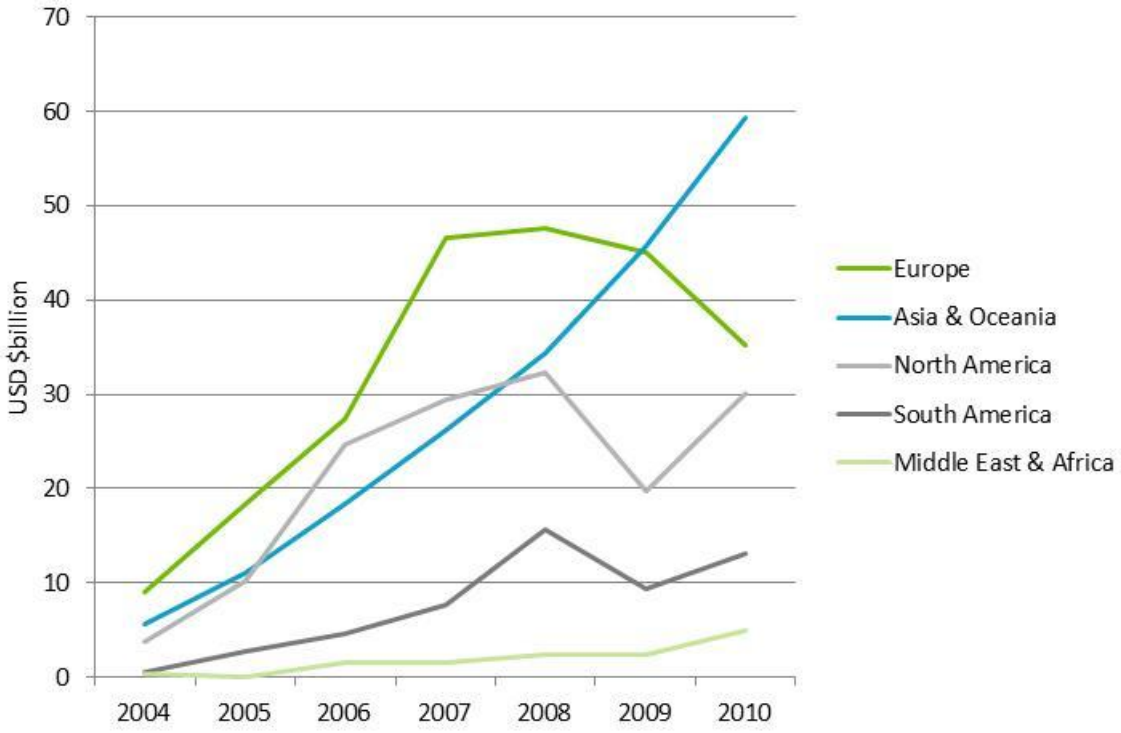


Source: Bloomberg New Energy Finance, 2012.

Globally, investment in renewable technologies has been increasing. According to Bloomberg New Energy Finance (2011), global investment in large-scale renewable technologies grew roughly sevenfold between 2004 and 2010, from US$19.2 billion to US$142.7 billion (see Figure 9).

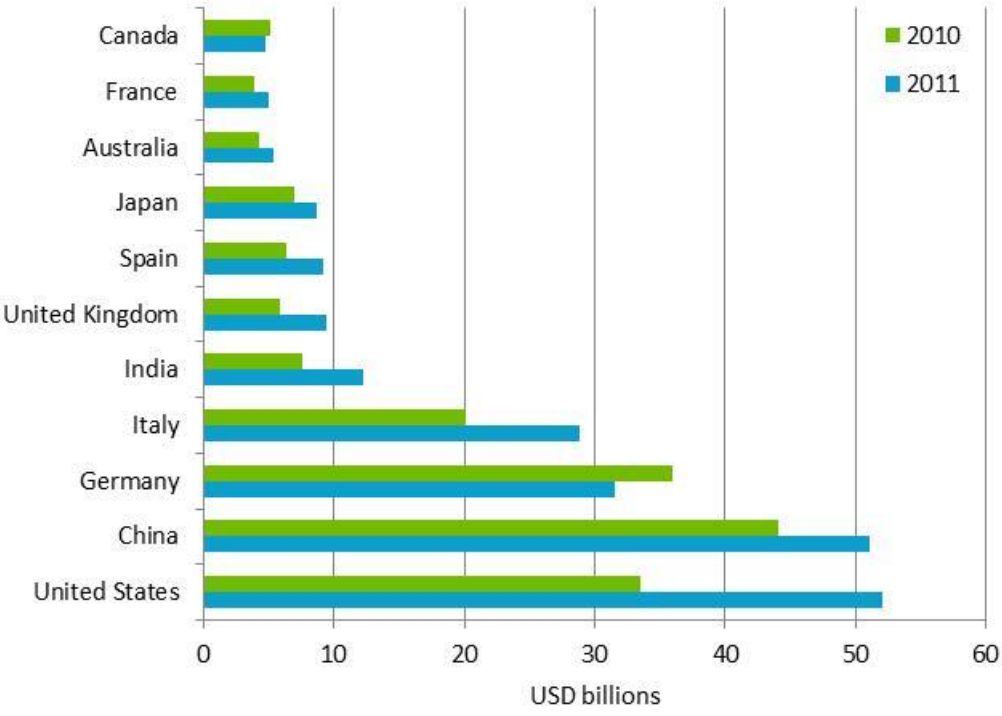
In broad terms, Australia contributed around US$5.3 billion, or two per cent, to global investment in clean energy in 2011 (see Figure 10).

Figure 9 New financial investment in large-scale renewable energy by region



Source: Bloomberg New Energy Finance, 2011.

Figure 10 Total new clean energy financial investment 2010 and 2011



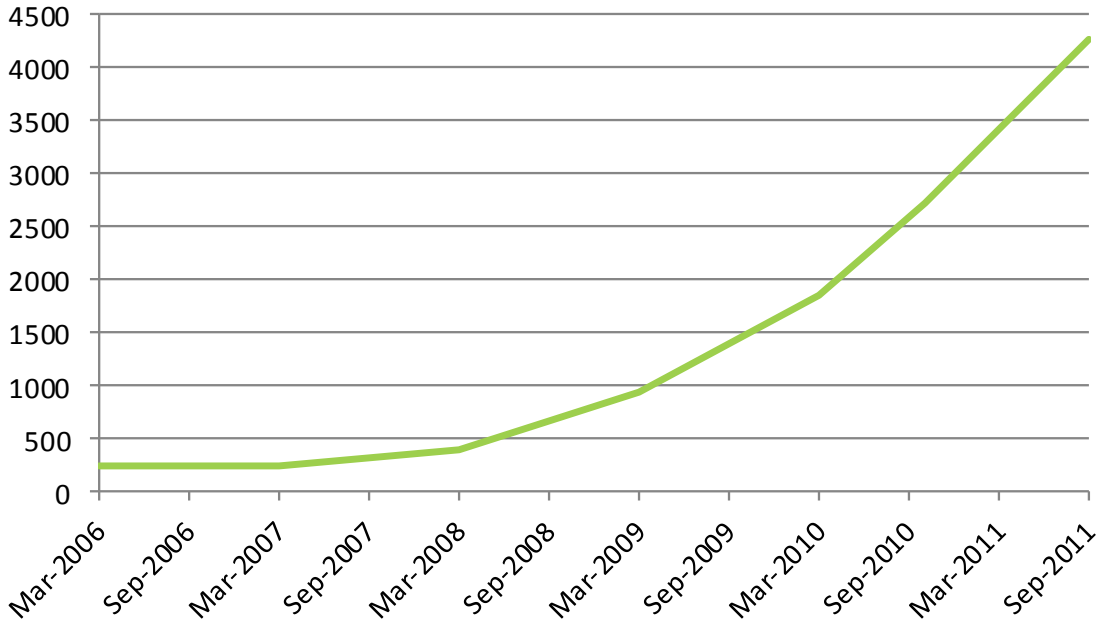
Source: Bloomberg New Energy Finance, 2011.

2.3.2. The renewable energy industry in Australia

Investment in renewable energy stimulated by the RET has boosted the renewable energy sector in Australia. This in turn has supported the growth of new firms entering the renewable energy industry.

Between March 2006 and September 2011, the number of accredited solar PV installers and designers in Australia accelerated to over 4 200 (see Figure 11), although not all installers work full-time on PV installations; many alternate between solar PV installations and other electrical work.

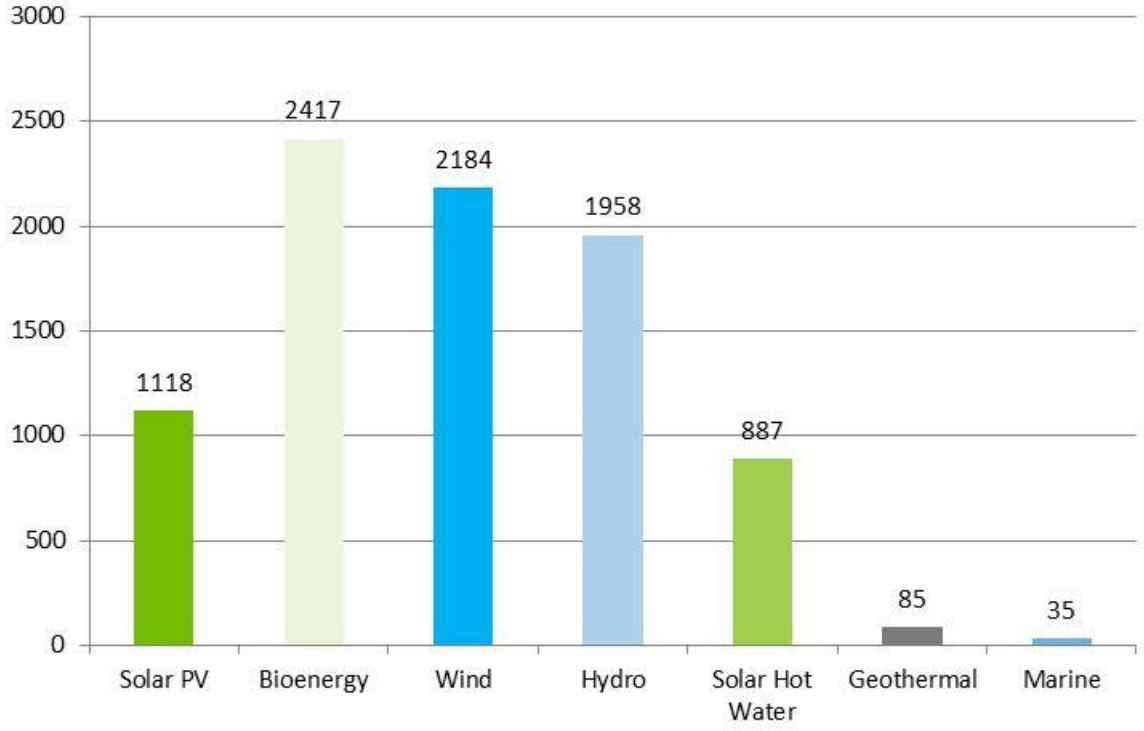
Figure 11 Total number of accredited renewable energy installers and designers in Australia



Source: Clean Energy Council, 2011.

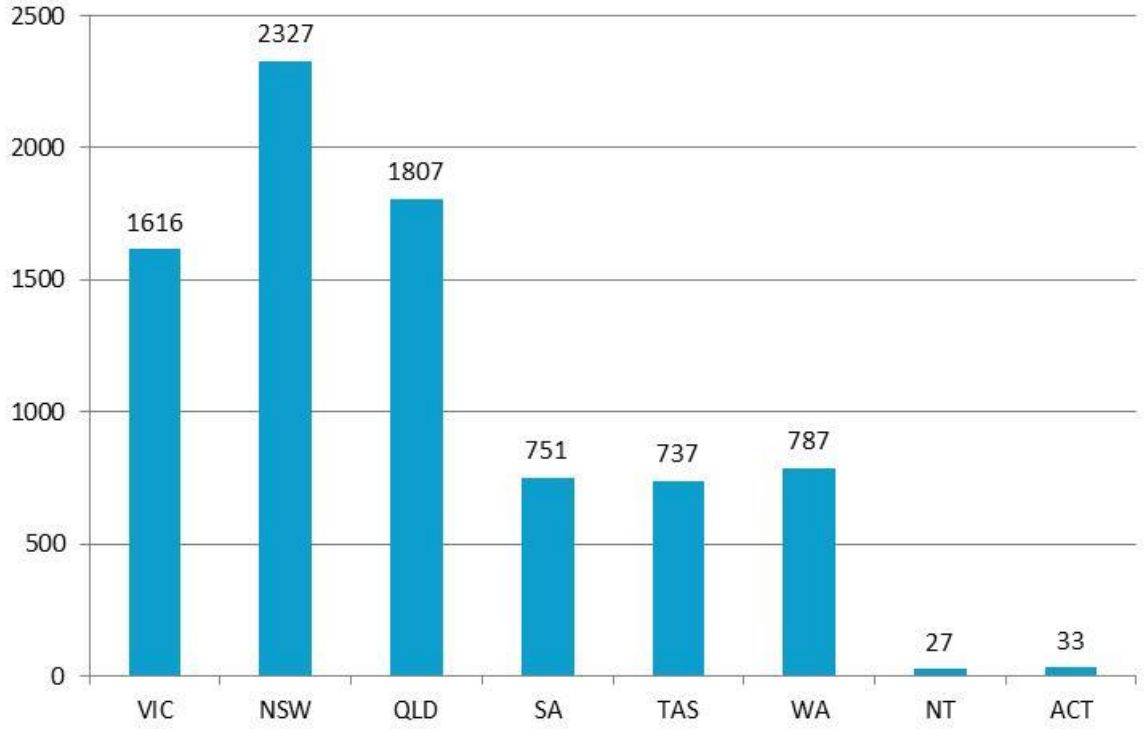
Employment in the renewable energy industry also has risen with increased levels of investment. In 2010, the industry employed more than 8 600 full-time employees, primarily in the bioenergy, wind, hydro, solar PV and solar water heating sectors (see Figure 12). New South Wales, Victoria and Queensland together accounted for more than 70 per cent of the total number employed (see Figure 13). These figures cover those directly involved in construction, installation, operations and maintenance activities, and exclude significant numbers in related sales, administration and management activities; the Clean Energy Council estimated that 6 000 people were employed in the distribution, sales and installation of solar hot water systems in 2011, compared with only around 900 working directly in the sector.

Figure 12 Full-time equivalent jobs in the Australian renewable energy industry, 2010



Source: Clean Energy Council, 2011.

Figure 13 Full-time equivalent employees in the renewable energy industry by state, 2010



Source: Clean Energy Council, 2011.

2.3.3. Cost performance of technologies over time

The cost of several renewable technologies has decreased significantly over the life of the RET.

Domestic and international factors can influence the costs of deploying renewable technologies in Australia. The bulk of domestic costs consist of labour costs in construction and installation activities. Improvements in Australian 'know how' and supply chains can be influenced by the scale of domestic operations, and by domestic policies. The most significant cost associated with wind and solar PV installations however, is the cost of the technology module. BREE (2012a) suggest that around 70 per cent of solar PV and onshore wind costs reflect internationally sourced technology, principally modules.

Module costs have fallen as increased global production capacity has created economies of scale, and as the technologies themselves have improved in response to research and development activities. As a relatively small player in the development and manufacture of renewable technologies, the RET has arguably had little impact in reducing technology costs. The high Australian dollar over recent years, however, has contributed to lower costs of imported modules.

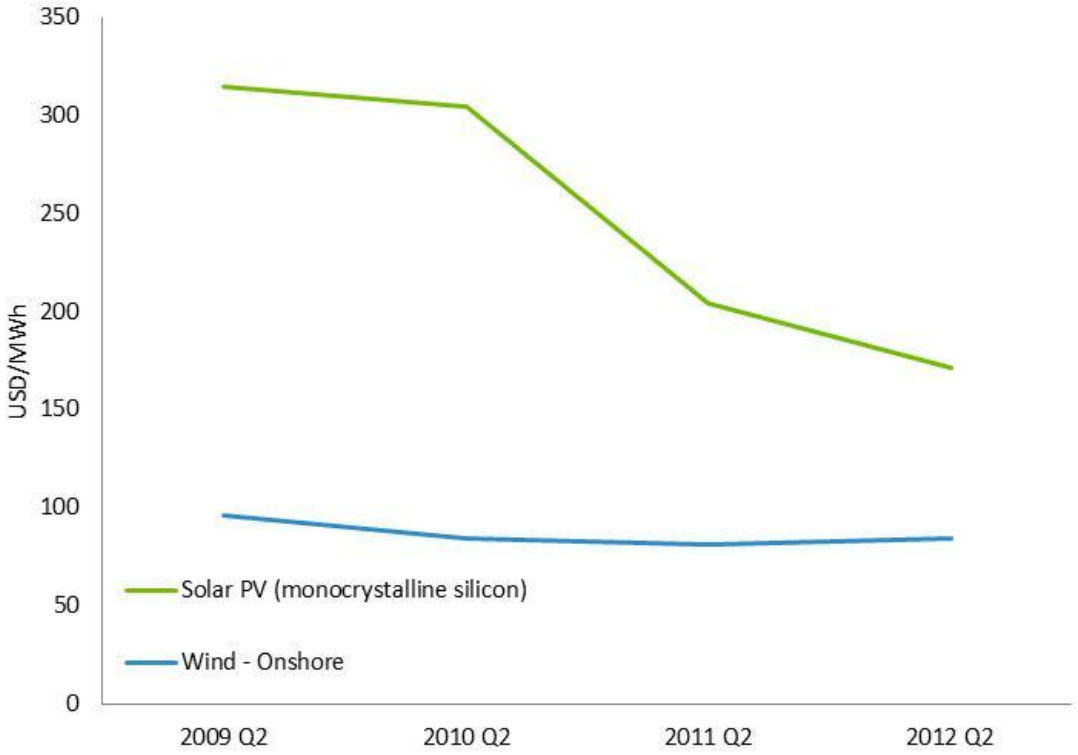
Many electricity generation technologies, and renewables in particular, are characterised by high fixed capital costs and low running costs. Different technologies operate at different capacity factors – that is, the proportion of the year they can produce energy. Levelised costs of energy are often used to compare the relative costs of different technologies when faced with varying capital and operating costs, as well as different capacity factors. The levelised cost of energy is a measure of the average cost per megawatt hour over the life of an electricity generating asset.

Historically, the levelised cost of renewable energy technologies has been far higher than that of fossil-fuel generation, although the gap has been shrinking. At a global level, solar PV and wind costs, in particular, have decreased dramatically on the back of advances in technology (see Figure 14).

The Bureau of Resources and Energy Economics (BREE) expect the cost differences in electricity generation between non-renewable and renewable sources to continue to narrow over time. In its 2012 report, BREE notes that the levelised costs of energy of solar PV and onshore-wind in Australia declined significantly over recent years and forecasts they will have the lowest levelised cost of all technologies by 2030; BREE's underlying assumptions include falling module costs and a rising international carbon price over the period (BREE 2012a).

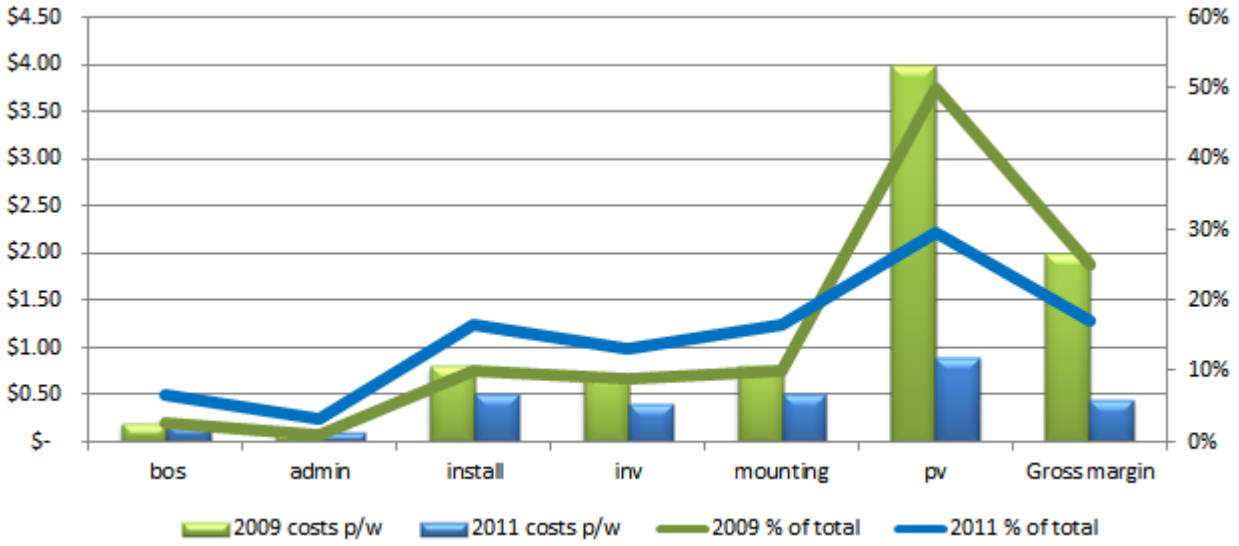
While international economies of scale appear to have driven down the module cost of many technologies, domestic costs associated with installing and mounting small-scale PV systems also appear to have declined between 2009 and 2011 (see Figure 15). Increased competition among installers and suppliers, driven in part by the RET, has also compressed retail margins, with flow-on reductions in the costs to households of PV systems.

Figure 14 Global levelised cost of energy



Source: Bloomberg New Energy Finance, 2012.

Figure 15 Average photovoltaic system prices and retail margins



Source: SolarBusinessServices, sub. 227.
Note: 'bos' refers to balance of system price, 'inv' refers to invertor costs and 'p/w' refers to per watt.

2.4. Impact of the Renewable Energy Target on electricity prices

The RET's impact on electricity prices paid by consumers is the net result of two factors:

- the RET's effect on wholesale prices arising from changes in the demand/supply balance in the electricity generation market; and
- the cost of certificates, which is passed on to consumers in retail prices.

2.4.1. Wholesale prices

The RET can be expected to exert downward pressure on wholesale electricity prices for two reasons. First, the RET can result in additional supply entering the market earlier than would otherwise have been required to meet demand. Secondly, this extra capacity is likely to be characterised by low marginal costs of production – it sits at the bottom of the supply curve, and means that the dispatch of generators with higher short run supply costs is sometimes avoided.

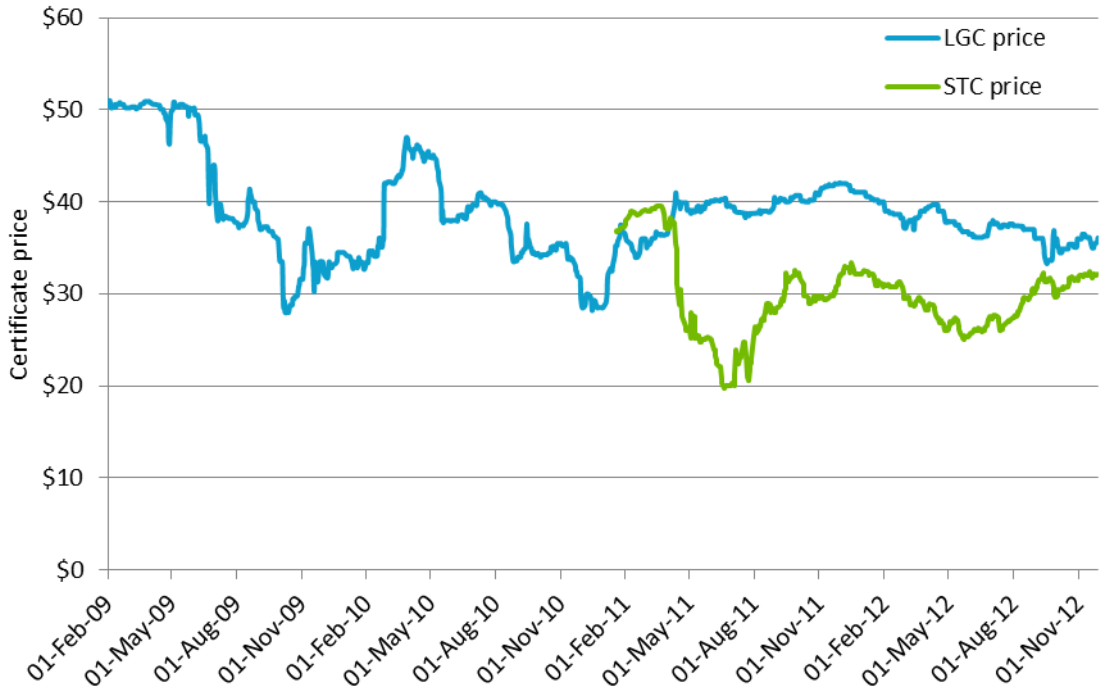
The Authority has not commissioned any modelling on the historic effect that the RET would have had on wholesale prices. SKM MMA modelling commissioned by the Clean Energy Council, however, suggested that for most states, the RET has reduced average wholesale prices which led to a reduction in retail prices (Clean Energy Council 2012).

2.4.2. Cost of certificates

Operating to offset any reduction in wholesale electricity prices driven by the RET are increases in retail electricity prices due to the need for liable entities, generally electricity retailers, to purchase renewable energy certificates to acquit their annual RET liability. Liable entities generally pass on the costs of these certificates to energy consumers.

Since 2009 certificate prices have fluctuated, ranging from around $20 for small-scale technology certificates (STC) to $50 for large-scale generation certificates (LGC), but have remained relatively stable in recent years (around $35 for large-scale certificates and around $30 for small-scale certificates) (see Figure 16).

Figure 16 Certificate price history



Source: Nextgen, 2012.

2.4.3. Retail prices

As noted, the RET's impact on retail prices depends on the net impact of its effect on wholesale prices and the cost of renewable energy certificates.

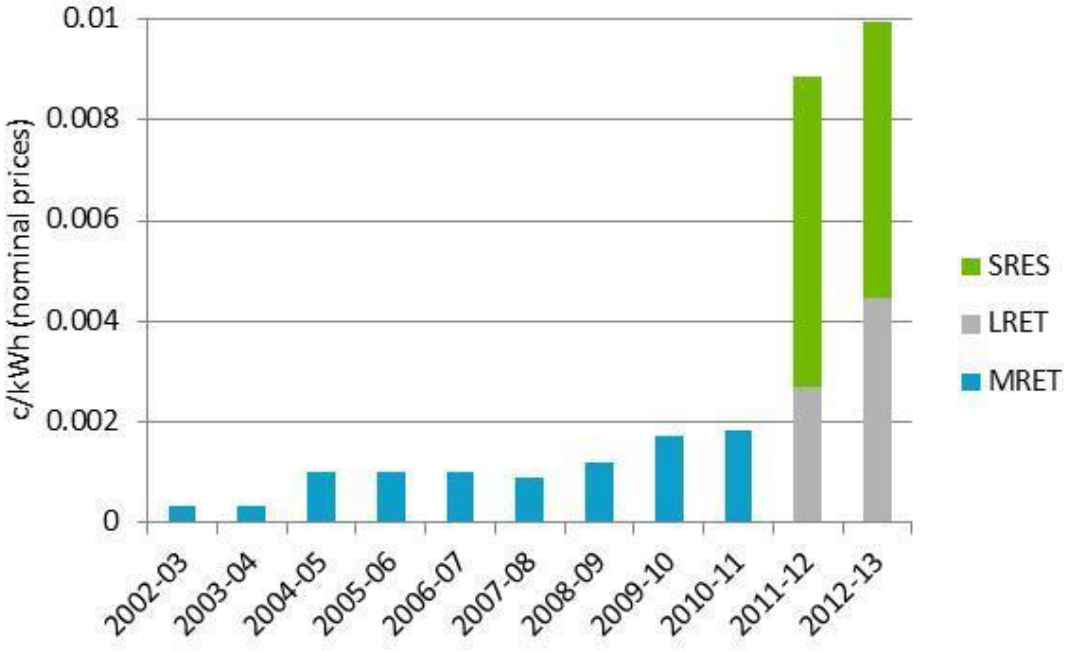
In jurisdictions where retail prices are regulated, the relevant regulator, as part of its price determination, estimates the cost impact of the RET and sets an allowable limit on RET-related costs that can be recovered from consumers through retail tariffs.

For example, in New South Wales, the Independent Pricing and Regulatory Tribunal (IPART) allowed for a sharp rise in the RET component of regulated tariffs in 2011-12 and 2012-13 (see Figure 17).

IPART estimates that the impact of the RET on a typical New South Wales customer's annual electricity bill in 2012-13 will be around $100, which represents around five per cent of that customers total electricity bill. It should be noted that the IPART 2011-12 figures assume a SRES price of around $40 per STC, while the actual cost of certificates averaged around $30 in 2011-12. It is possible that customers who found a competitive retail offer, rather than staying on the regulated tariff set by IPART, may have benefited from a lower SRES certificate cost.

SKM MMA modelling commissioned by the Authority delivers retail price forecasts under a number of scenarios (see Chapter 4). Under current settings, the modelling estimates that the effect of the RET on a typical Australian's annual electricity bill in 2012-13 will be around $68, or around 4.5 per cent of their total electricity bill. This is similar to the estimate in the Australian Energy Market Commission's (2011) report on the *Impact of the Enhanced Renewable Energy Target* that the cost of the RET accounted for around three per cent of residential retail electricity prices in Australia in 2011-12.

Figure 17 Electricity price tariffs in New South Wales attributable to the RET



Source: IPART determinations and reviews of regulated retail prices for electricity, 2002-03 to 2012-13.
Note: Tariffs have been averaged where determinations provide an allowable range. IPART did not incorporate the announced RET changes into its 2010-11 determination.

2.5. Distributional impacts of the Renewable Energy Target across states and socio-economic issues

The distribution effects of the RET can be considered, in very broad terms, according to their net impacts on different household types and on different regions.

2.5.1. Equity of benefits across households – beneficiaries

The geographic distribution of small-scale installations since the commencement of the RET is shown in Figure 18.

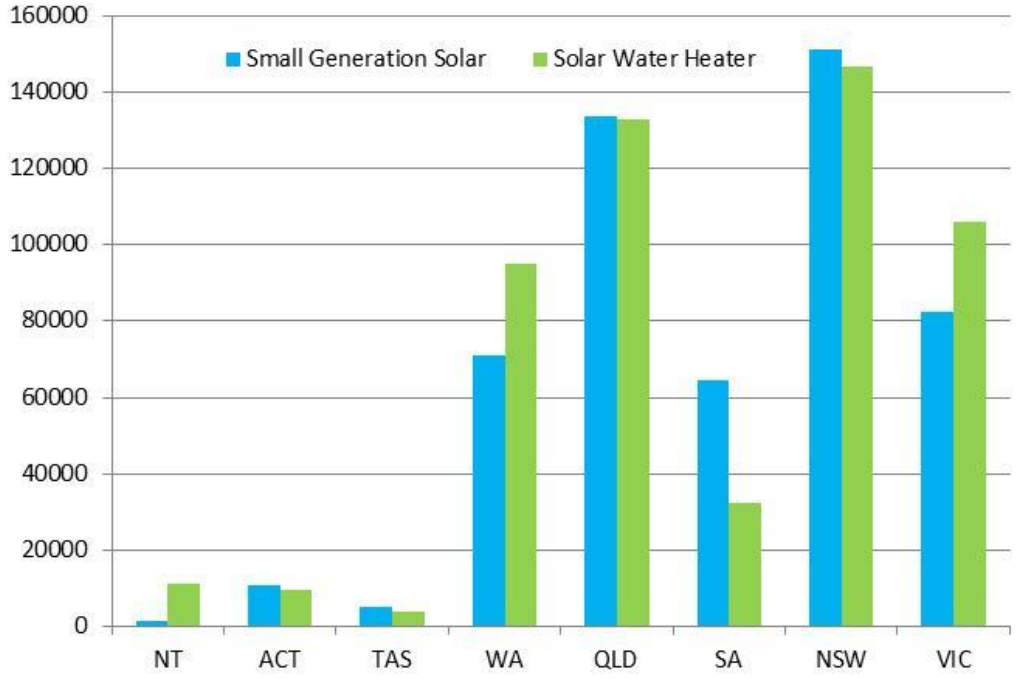
New South Wales and Queensland have the highest number of installations for both solar PV and solar water heaters. On a per capita basis, however, the Northern Territory has the highest penetration of solar water heaters, while South Australia has the highest penetration of solar PV units (see Figure 19).

Seed Advisory (2011) investigated the characteristics of postcodes which had installed solar PV and solar water heaters under the RET and found that postcodes with higher average income generally had a lower take-up of solar PV than the national average.

Penetration of solar PV was also found to decrease in areas where: residents were in the 20-34 age bracket, people had low levels of literacy and/or where there were high population density levels. Similar results were found for the installation of solar water heaters.

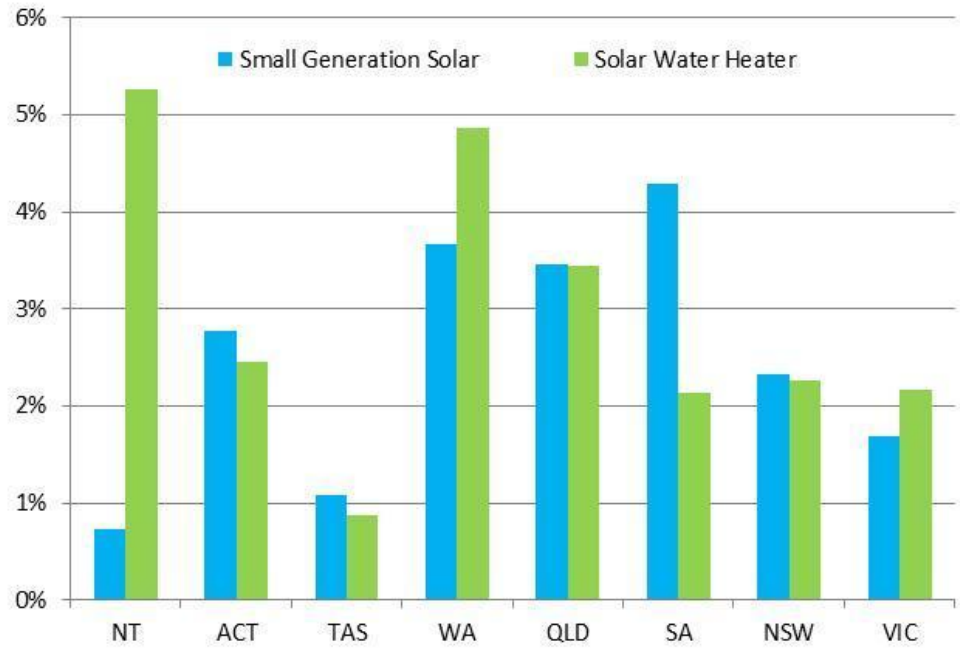
While some households have benefited directly from the SRES, all energy consumers, including households, share the costs of the RET through the impact which the renewable energy certificates (SRES and LRET) have on retail electricity prices.

Figure 18 Number of small-scale systems installed by state and territory, January 2001 to September 2011



Source: Clean Energy Regulator, 2012.

Figure 19 Per capita installation of small-scale systems by state and territory, January 2001 to September 2011



Source: Clean Energy Regulator, 2012.

2.5.2. Impact on household expenditure

Conceptually, the RET can be considered as a levy on electricity consumption to promote the development of the renewable energy industry and, ultimately to contain greenhouse gas emissions. The incidence of this levy affects different consumers in different ways.

Analysis conducted by the Australian Bureau of Statistics, in its Household Expenditure Survey 2009-10, indicated that households with the lowest disposable income spent $7 less each week on domestic fuel and power (including gas and electricity) than the average household. At the same time these households spent the highest proportion of their expenditure on domestic fuel and power (four per cent), compared with average households (2.6 per cent), abstracting from differences in types of dwellings and numbers of occupants.

Of households with the lowest disposable income, the Australian Bureau of Statistics found that 17.9 per cent experienced difficultly in paying electricity, gas or telephone bills on time during the 12 months before the survey, compared with the 12.5 per cent of average households.

While the Commonwealth Government has created the Household Assistance Package to offset cost of living increases as a result of the carbon price for low income households, no comparable arrangements were instituted to compensate for higher electricity costs attributable to the RET.

CHAPTER 3. THE ROLE OF THE RENEWABLE ENERGY TARGET

This chapter considers the role of the Renewable Energy Target (RET) in the current policy context, including the introduction of the carbon pricing mechanism and the establishment of the Australian Renewable Energy Agency (ARENA) and the Clean Energy Finance Corporation (CEFC). This chapter explores the way these policies interact with the RET and their implications for the future role of the RET. Finally, the appropriate frequency of reviews of the RET is considered.

3.1. The broader policy context

The legislative objects of the RET reflect a view that the renewable energy industry must be expanded and developed to promote greenhouse gas emissions reductions. The 2003 *Tambling Review* summarised the objectives of the RET as reducing greenhouse gases and promoting renewable industry development (Australian Greenhouse Office 2003). In the Australian context, where concerns over the availability of fossil-fuel energy sources are not warranted, the industry development objective also reflects, ultimately, a greenhouse gas mitigation objective (see Section 3.2.3).

In terms of both greenhouse gas emissions reductions and industry development, the policy landscape has changed considerably since the RET scheme began operating in 2001. The most significant of these changes was the Commonwealth Government's Clean Energy Future Plan in 2011, which introduced the carbon pricing mechanism and established ARENA and the CEFC.

This chapter considers the role of the RET in this new policy environment. First, it examines the interactions between the RET, the carbon pricing mechanism, ARENA and the CEFC, and the broader electricity market. It then explores the ongoing case for the RET in the current policy context.

3.1.1. Carbon pricing mechanism

When the RET was first legislated in 2000, there was no national carbon price in place, and the Commonwealth Government had no plans to implement such a scheme. In this context, the RET was expected to play a key role in helping Australia to meet its emissions reduction target under the Kyoto Protocol (Commonwealth, House of Representatives 2000, p.18 030).

A national carbon price has been in place since 1 July 2012 and it is intended to be the primary tool for reducing Australia's greenhouse gas emission levels (see Box 2). However, the future of the carbon price is subject to continued political and public debate (see Section 3.2.1).

The carbon pricing mechanism has a broad coverage of emission sources, allows for carbon units to be traded and is linked to international markets. This means that the market will determine the most cost effective way to reduce emissions, with the cheapest opportunities pursued first whether they are in Australia or overseas.

Box 2 How the carbon pricing mechanism works

The Australian carbon pricing mechanism commenced on 1 July 2012.

Liable entities will report on their emissions and buy and surrender to the Government a carbon unit or international unit for every tonne of greenhouse gas emissions they produce.

For the first three years of its operation (until 1 July 2015), the carbon pricing mechanism has a fixed price starting at $23 per tonne of greenhouse gases emitted and growing at around 2.5 per cent in real terms each year. The amount of carbon units that liable entities need to meet their obligations will be available at the set fixed price.

From 1 July 2015, the carbon pricing mechanism shifts automatically to an emissions trading scheme with a flexible price. The total number of carbon units issued by the Government will be capped. Australian emissions covered by the scheme can only exceed the cap if approved domestic or international carbon offsets are surrendered instead.

The price of carbon units will be determined by the market. Liable entities will compete to buy the number of carbon units they need to meet their obligations. Those that value carbon units most highly, because the cost of reducing their emissions is higher, will be willing to pay the most for them. Others will reduce their emissions if they can do so at a cost that is less than the carbon price.

From the start of the flexible price period, liable entities will also have access to international carbon markets to buy international units that represent emissions reductions that have occurred in another country. This means that liable entities can access emissions reductions in other countries if these can be achieved at a lower cost than emissions reductions in Australia. The Australian scheme will be linked to the European Union's Emissions Trading Scheme from the start of the flexible price period. European Union Allowances will be able to be used for compliance in the Australian scheme.

Liable entities must not surrender more than 50 per cent of their liability using international units including a 12.5 per cent limit on the use of Kyoto units (Certified Emissions Reductions, Emission Reduction Units and Removal Units).

The RET will interact with the internationally-linked carbon pricing mechanism in three important ways.

First, in the presence of a carbon price, the RET is likely to increase the short-term cost of achieving the emissions reduction target. This is because it mandates the type of abatement that has to occur. While the RET will, in general, promote the least cost renewable energy generation, it promotes more expensive abatement than that currently being encouraged by the carbon price alone.

The Productivity Commission's *Carbon Emission's Policies in Key Economies* concluded that broad-based carbon prices are likely to deliver abatement at a lower cost than industry-specific policies such as the RET:

> *Emissions trading schemes were found to be relatively cost effective, while policies encouraging small-scale renewable generation and biofuels have generated little abatement for substantially higher cost. (p.xiv)*
>
> *It is generally recognised that the most direct and, consequently, most efficient way of implementing the 'relative price' change required to discourage consumption of high-emission products in favour of low-emission ones, is through a global, broadly-based carbon tax or quota scheme (emissions trading scheme). (2011, p.49)*

Emissions trading schemes are found to have been the most cost-effective instruments identified. (2011, p.79)

The Authority's modelling estimates that the additional reductions in greenhouse gas emissions driven by the RET cost, on average, around $40 per tonne.

Second, there is an interaction between certificate prices under the RET and the carbon price. Under the current design of the carbon pricing mechanism, the carbon price will affect certificate prices under the RET, but the RET will not affect the carbon price. Until 1 July 2015, the level of the carbon price is fixed in legislation. Thereafter, the carbon pricing mechanism allows the use of international offsets, including European Union Allowances. This link means that Australia is likely to be a price taker in international carbon markets: the carbon price in Australia will be determined by the price in linked markets (in the first instance, by the price of European Union Allowances).

The level of the carbon price does, however, affect the price of certificates under the RET. RET certificate prices represent the 'top up' on wholesale electricity prices required to make renewable energy commercially viable. All other things being equal, in Australia, higher carbon prices are likely to lead to higher wholesale prices, which therefore implies lower RET certificate prices.

Third, the RET will affect the pattern of emissions abatement in Australia. While Australia has an emissions trading scheme in place that is linked to international carbon markets, the effect of the RET on emissions will be to:

- reduce emissions and demand for emissions units in the electricity sector (therefore increasing domestic abatement); and
- not result in any changes to abatement activities of other sectors (which would respond to the unchanged international carbon price).

The overall impact would be to reduce the number of international units that Australia would need to purchase to meet its emissions reduction goals. That is, the RET is likely to increase the proportion of domestic abatement Australia undertakes to meet its targets, and reduce its reliance on imported emissions units.

3.1.2. The Australian Renewable Energy Agency and Clean Energy Finance Corporation

In relation to the industry development goal of the RET, two new institutions (ARENA and the CEFC) have been created, adding new dimensions to the overall renewable energy industry development policy.

ARENA's role is to provide grant funding of around $3.2 billion to support innovations that improve the competitiveness of renewable energy technologies and increase the supply of renewable energy in Australia. While ARENA's mandate is broad, it is expected to assist with the 'technology-push' phase of the innovation chain and will support research and development into promising and emerging renewable energy technologies (see Figure 20).

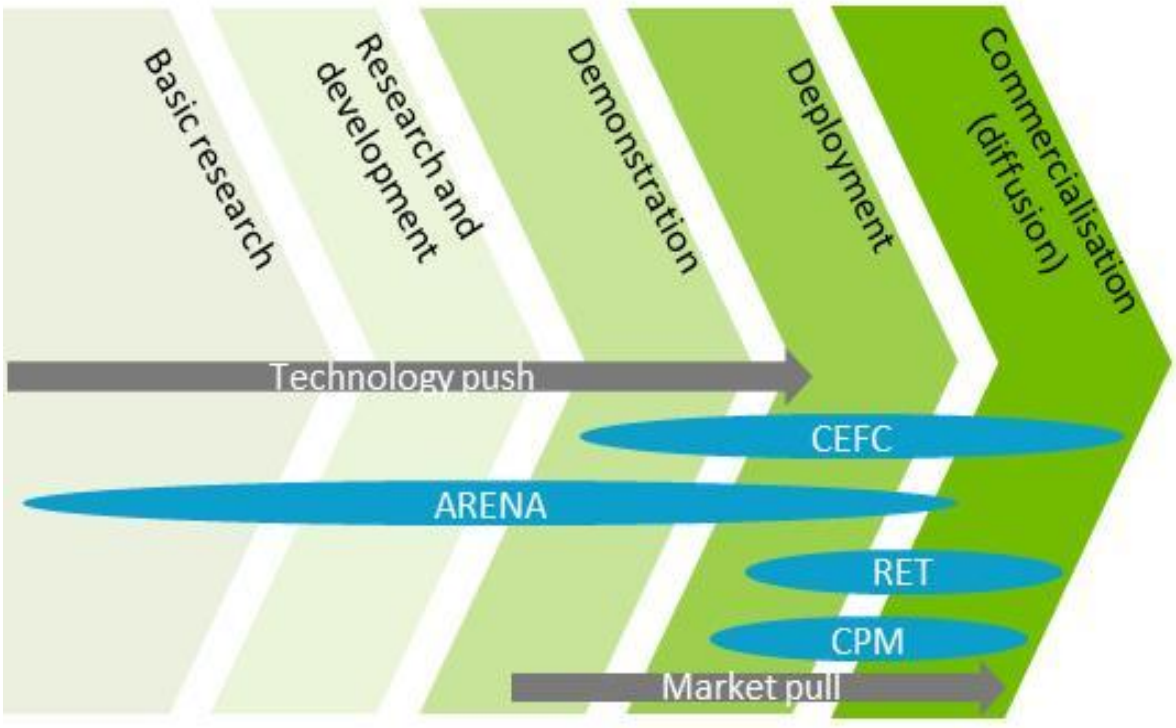
The objective of the CEFC is to overcome capital market barriers that hinder the financing, commercialisation and deployment of renewable energy, energy efficiency and low emissions technologies and the transformation of existing manufacturing businesses to re-focus on meeting demand for inputs for these sectors (see www.cleanenergyfuture.gov.au). It will invest in projects or firms on a commercial basis, seeking to catalyse private sector financing not previously available to

clean energy technologies and therefore contribute to the growth of the clean energy industry.
The CEFC has a goal of allocating 50 per cent or more of its total of $10 billion in funding to renewable energy investment, and the remainder to low-emissions and energy efficiency investment. The CEFC is intended to be commercially oriented and make a positive return on its investments. Given this focus on deployment and commercialisation, the CEFC assists with the 'market-pull' component of the innovation chain and is therefore designed to complement the work of ARENA (see Figure 20). Furthermore, according to the CEFC Expert Review Panel it:

> *…will finance Australia's clean energy sector using financial products and structures to address the barriers currently inhibiting investment.*
>
> *The Panel considers an appropriate objective to be:*
>
> - *apply capital through a commercial filter to facilitate increased flows of finance into the clean energy sector thus preparing and positioning the Australian economy and industry for a cleaner energy future. (Commonwealth Treasury 2012, p.ix)*

The RET supports the deployment of market-ready renewable energy technologies, where the chief barrier to 'business as usual' deployment is cost. ARENA and the CEFC appear likely to target renewable technologies at an earlier stage in their development – that is, technologies that would not otherwise be deployed under the RET. The Authority believes that ARENA and the CEFC are likely to influence the range of technologies that could ultimately be supported by the RET.

Figure 20 Position of government policies along the innovation chain



Source: Climate Change Authority, 2012.

3.1.3. Electricity market reform

Today the RET operates in a very different electricity market and policy environment to when it was first introduced. The energy market reforms that began in the 1990s created a national framework for

governance, network regulation, planning, pricing demand-side participation and non-economic regulation. These developments have helped shape the outcomes of the RET to date.

Energy market reforms are, however, incomplete. A number of market review activities by energy market bodies in the National Electricity Market (NEM) and non-NEM jurisdictions are underway, along with a range of market and jurisdiction specific reviews. Key areas of focus include:

- improving electricity network efficiency and performance;
- enhancing wholesale markets;
- improving demand-side participation;
- promoting retail competition; and
- strengthening regulatory arrangements and governance.

Regulatory frameworks for electricity, along with other policy issues such as planning regulations, can have a material bearing on the RET. For example, wholesale market rules can affect the way renewable energy competes with other forms of generation, while network regulation can influence the cost and availability of access for renewable generation connecting to the grid.

In its recent review of electricity network regulatory frameworks the Productivity Commission found inefficiencies in the electricity industry and flaws in the regulatory environment. It called for:

> *… a more fundamental, nationally-focused, package of reforms that addresses the major, interlinked regulatory barriers to the efficiency of electricity networks, including:*
>
> - *a poor focus on consumers, despite their interests being the overarching objective of the regulatory regime*
> - *inadequate demand management*
> - *costly ways of achieving, and sometimes excessive, reliability requirements*
> - *state regulatory arrangements and network business ownership*
> - *the resourcing and capacity of, and structural arrangement for, the regulator*
> - *the regulatory rules, and ability of the regulator to apply them. (Productivity Commission 2012, p.2)*

Of particular relevance to the RET, the Productivity Commission also examined the issue of a fair and reasonable value for distributed generation, following similar studies by the Independent Pricing and Regulatory Tribunal of NSW (IPART) (IPART 2012) and the Victorian Competition and Efficiency Commission (VCEC) (VCEC 2012). Consistent with the Council of Australian Governments' national feed-in tariff principles, these studies have concluded that the energy (output) value of electricity exported to the grid by a distributed generator should reflect the market wholesale price at the time of energy production, and the (net) value to network businesses at peak periods. In regard to the network value, the VCEC found that regulatory reforms would be required to identify the (net) network value of distributed generation (VCEC 2012, p.xxi).

As outlined in Chapter 1, the Authority has not made recommendations on broader energy market settings. However, given that these issues can affect the efficiency and effectiveness of the RET, the Authority supports the Council of Australian Governments' efforts to develop and implement nationally consistent economy-wide energy market reforms in a manner that, among other things, maximises policy integration and alignment. The Authority considers that renewable energy should be treated

neutrally in future reforms (compared with, say, energy efficiency activities in the home) and that renewable policy should not be adjusted to address broader regulatory failings.

3.2. Role of the Renewable Energy Target

In light of the broader policy context, it is necessary to consider what role the RET should play.

A number of review participants considered that the RET was no longer justified in the presence of the carbon price. For example, IPART concluded that:

> *… in our view, the introduction of the carbon price and a move towards an emissions trading scheme (ETS) removes the need for the RET (and ultimately electricity customers) to continue to subsidise investment in the renewable sector. The RET is not complementary to the carbon price and does not cost effectively address any other significant market failure. (IPART, sub.81, p.1)*

Literature on the effectiveness of energy technology policy and on the economics of innovation strongly supports the need for both 'technology-push' and 'market-pull' policies, although the emphasis will generally shift from push to pull as technologies mature (International Energy Agency 2012, p.118). As both the RET and the carbon pricing mechanism act as market-pull policies, there needs to be a justification for the additional demand for renewables created by the RET over and above that encouraged by the carbon price. Even in the presence of a carbon price, the RET may continue to be important if it helps to:

- mitigate the risk that uncertainty surrounding the carbon price (both in Australia and elsewhere) suppresses investment in low-emissions technologies (Section 3.2.1);
- mitigate the risk that the carbon price is lower than optimal to achieve long-run mitigation goals leading to suboptimal investment in low-emission technologies (Section 3.2.1);
- reduce the cost of climate change mitigation over time, by promoting 'learning-by-doing' cost savings (Section 3.2.2); and/or
- mitigate other risks or create other benefits (such as energy security, public health, increased retail competition or enhancing employment) (Section 3.2.3).

3.2.1. Carbon pricing policy credibility

In an ideal world, efficient global carbon markets would reflect faith in credible commitments to long-term emissions reduction targets by countries around the world, and would represent the true cost of achieving this long-term global ambition. These circumstances currently do not apply – considerable uncertainty prevails on the longevity of carbon pricing arrangements in Australia, and in relation to ultimate levels of global environmental ambition.

Uncertainty around carbon pricing policy may lead to less than optimal levels of innovation and investment. It can also increase the cost of any investment that does occur.

In Australia, climate change policy is currently the subject of intense political and public debate. A recent survey on the carbon price undertaken by the Centre for Climate Economics and Policy at the Australian National University found that 40 per cent of respondents think the carbon price will be repealed by 2016, however half of these respondents think it will be re-instated by 2020 (Jotzo 2012). The dominant finding from the survey was a pervasive uncertainty about the future of the carbon pricing mechanism in Australia.

The level of the international carbon price can also be affected by perceptions of the credibility of governments' commitments to long-term emissions reduction goals. For example, modelling conducted for the 2008 Garnaut Review estimated that the carbon prices required to create a 50 per cent chance of limiting global warming to 2 degrees Celcius started at over $40 in 2013, increasing steadily at a rate of four per cent each year. Current international carbon prices are well below this level.

In its submission to the Garnaut Review, the Productivity Commission made the following comments on the role of supplementary policies such as the RET when the credibility of future carbon prices is uncertain:

> *Whether a gap between the forward emissions price path envisaged by policy makers and the price path private agents factor into decision making might warrant a greater role for supplementary policies in the early years of an [emissions trading scheme] depends in part on the reason for the discrepancy.*
>
> *If private agents think that major technological breakthroughs that will greatly lower the cost of achieving emission reductions are imminent, the gap may simply reflect the market having access to better information and no enhanced role for supplementary policies is warranted.*
>
> *If, on the other hand, the departure is due to low credibility because of a view that future governments are likely to water down or dismantle the [emissions trading scheme], a case for an extra role for supplementary policies during the transitional phase can be argued. (Productivity Commission 2008, p.11)*

As also noted by the Productivity Commission, to perfectly address the uncertainty of the carbon price with supplementary policies would require governments to know the optimal investment path and to know how firms would have responded to a more certain emissions price path (Productivity Commission 2008, p.31).

It is impossible for governments to ever know the optimal investment path to achieve any particular outcome. Given Australia's abundant renewable energy resources, however, it is difficult to imagine that a growing renewable energy sector will not play a part in a carbon constrained future.

In his submission to this review, Professor Garnaut argued:

> *With uncertainty about the future of carbon pricing, the Renewable Energy Target has to play a more central role in the reduction of emissions in the Australian electricity sector. The acceptance of the Renewable Energy Target by both sides of partisan politics in Australia means that it can now provide a more secure basis than politically contested carbon pricing for emissions-reducing investments in the electricity sector. (Professor Ross Garnaut, sub.167, p.2)*

The Authority considers that the RET can be justified as a transitional measure in the presence of the current carbon pricing arrangements, ahead of a carbon price trajectory capable of delivering on Australia's long-term environmental goals.

Another potential consequence of uncertainty over future carbon pricing arrangements is to increase the risk of 'lock-in' of new emissions-intensive infrastructure. Most power generation plants have a long lifetime. The expected lifetime of a coal-fired generator is 40 years (International Energy Agency, 2010, p.43). The International Energy Agency (IEA) has assessed the global costs of locking in high-emissions energy infrastructure due to delayed investment in abatement. Under the IEA's 450 Scenario (stabilising greenhouse gases at 450 parts per million), for every $1 of avoided

investment between 2011 and 2020, either through reduced low-carbon investment or adoption of cheaper fossil-fuel investment options, an additional $4.30 would need to be spent between 2021 and 2035 on additional abatement to compensate for higher emissions earlier in the period, as more low-carbon plant and equipment need to be installed (IEA 2011a, p.40).

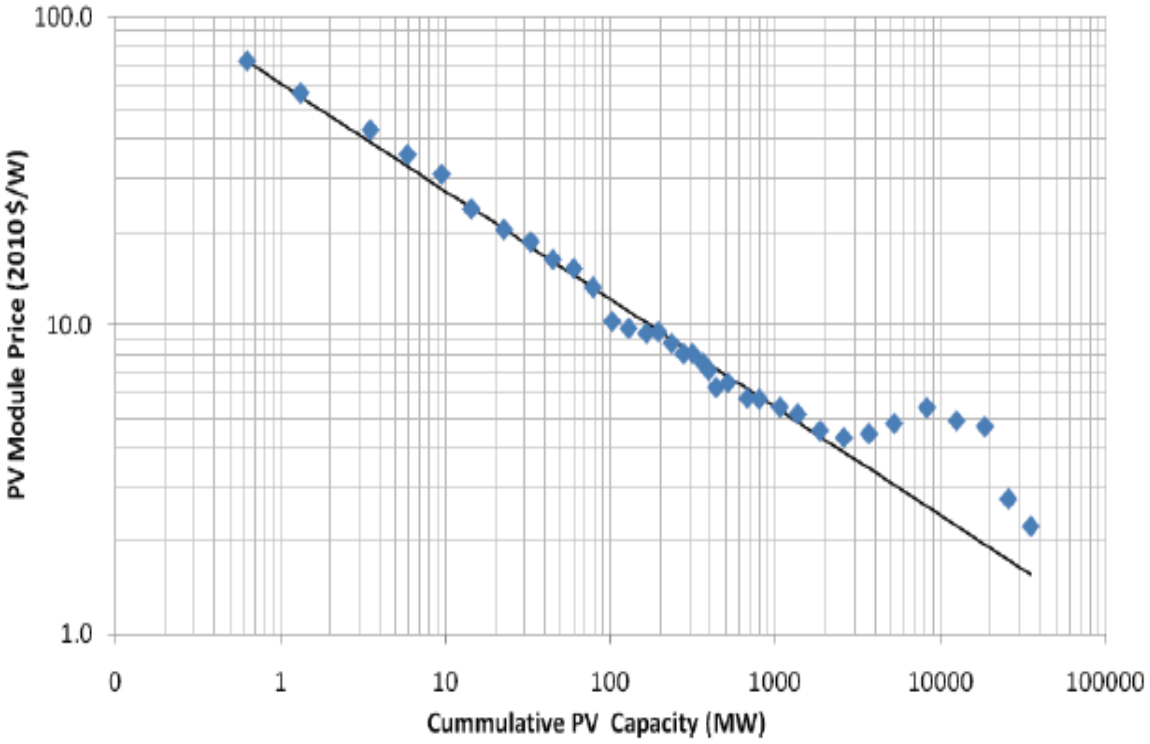
If, however, Australia continues to see slow growth in electricity demand over the coming years, the risk of locking in new emissions-intensive plant appears low – on current projections, no significant new generation capacity appears to be required for many years to come.

3.2.2. Minimising the cost of climate change mitigation over time

Globally, increased rates of deployment of renewable energy are associated with falling costs referred to as the 'learning by doing' effect. At an international level, increasing rates of deployment are likely to more rapidly bring renewable technologies down the cost curve, which could help reduce the longer term costs of emissions reductions.

Technology learning rates are generally defined as the cost reduction obtained for a doubling of capacity. For example, globally, solar photovoltaic (PV) modules have shown a learning rate of 22 per cent over the period 1976 to 2003 (see Figure 21) (Melbourne Energy Institute 2011, p.10).

Figure 21 Historic experience curve for photovoltaic with 22 per cent learning rate globally



Source: Melbourne Energy Institute, 2011.

As outlined in Chapter 2, the module cost of solar PV and the domestic costs associated with installing and mounting small-scale PV systems has significantly declined between 2009 and 2011, which may indicate that the trend in the above chart is continuing, or potentially accelerating. In addition, in their projections of technology costs, the IEA and the European Photovoltaic Industry Association expect that, with continued investment in solar PV, the historic global learning rate will continue into the future.

Furthermore, from a 2010 baseline, the IEA expects the capital cost for utility scale PV facilities could drop by 40 per cent by 2015, and 50 per cent by 2020 (IEA 2010, p.56).

Wind generation has also experienced cost reductions as capacity has increased.
The European Wind Energy Association assumes a learning rate of ten per cent over the period 2010 to 2015 (European Wind Energy Association 2009, p.59). While a more mature technology than solar PV, in 2010, the IEA expected the future learning rate for wind generation to be at about seven per cent (IEA 2010). The 2009 IEA Roadmap for wind generation expects investment costs to decrease for onshore wind by 23 per cent by 2050 and for offshore wind by 38 per cent by 2050 (IEA 2009, p.4).

Australia has benefited from global reductions in renewable technology costs, and is likely to continue to do so in the future. A key issue is whether there are additional cost reductions to be gained from increased deployment in Australia – that is, whether there are important local learning-by-doing cost savings that the RET could foster.

In response to its discussion paper, the Authority received evidence suggesting that there is some scope for local cost reductions in terms of developing an experienced workforce, improving logistics, and streamlining the process of obtaining (and granting) regulatory approvals. The solar industry also provided evidence that there were savings in terms of improved buying power that came from increased local scale (SolarBusinessServices, sub. 227).

Most of these local learning-by-doing cost savings appeared to be exhausted fairly early in the deployment process in Australia. For example, the Authority received no compelling evidence to suggest that increased deployment of wind farms in Australia would lead to further cost reductions – any future cost reductions are likely to arise from falling international technology costs, which are only marginally influenced by Australian deployment rates.

While the RET is likely to assist with domestic learning-by-doing cost reductions in the initial installations of any particular technology, in isolation, these benefits are insufficient to justify the RET.

3.2.3. Benefits unrelated to climate change

Other arguments that have been made in Australia and elsewhere for increasing the deployment of renewable energy include:

- promoting energy security;
- avoiding some of the health and broader environmental costs associated with the production and use of fossil-fuels;
- promoting retail competition; and
- creating employment.

Energy security

Energy security is frequently put forward in other countries as a reason for investing in renewable energy generation as it reduces reliance on finite, and often imported, fuels (United Kingdom Department of Energy and Climate Change 2011, pp.43-44). Australia, however, has an abundance of fuel resources and does not generally import fuel for electricity generation. Australian reserves are large enough to supply us for many decades into the future and underpin our energy security (Commonwealth Government Department of Resources, Energy and Tourism 2012, p.12). In the Australian context, therefore, the RET does not play a role in promoting energy security through reduced reliance on imported fuels.

The Commonwealth Government Department of Resources, Energy and Tourism's National Energy Security Assessment (2011) reports on energy costs as a component of energy security:

> *In the Australian context, energy security is defined as the adequate, reliable and competitive supply of energy to support the functioning of the economy and social development, where: … competitiveness is the provision of energy at an affordable price that does not adversely affect the competitiveness of the economy and that supports continued investment in the energy sector. (p.2)*

In the short term, renewable energy adds to the cost to society of electricity supply. Most renewable energy technologies, however, have very low running costs. Renewable energy sources, such as solar and wind, are not subject to fluctuations in world fossil-fuel prices, and will also not vary with world carbon prices – once built, their ongoing running costs are likely to be much more predictable than fossil-fuel power stations. Therefore, it could be argued that increasing the share of renewable energy reduces the risk of uncertain and potentially high energy costs in the future. This view is shared by the IEA:

> *Fossil energy technologies require an input fuel and are thus fully exposed to price volatility of fuels and price uncertainty. Because they do not need a fuel, renewables (hydro, solar, wind) are not exposed to these aspects. (IEA 2011, p.12)*

Stable operating costs that are not subject to fluctuations in fuel costs and carbon prices may be of some benefit, but could not be used as a primary rationale for the RET. The market has developed a range of products to hedge against uncertainties relating to both fuel and carbon prices. Furthermore, as a net exporter of energy, Australia is likely to benefit overall from higher fossil-fuel prices.

Public health benefits

Another source of benefits from renewable energy that does not relate to climate change relates to public health and broader environmental benefits.

The IEA has recognised that the deployment of renewables can lead to positive benefits for human health through displacing electricity generated by fossil-fuels and thereby decreasing harmful pollutants such as sulphur and nitrogen oxides (IEA 2011). The benefits of reducing harmful by-product pollution from fossil-fuel generation were noted by the Climate and Health Alliance:

> *Reducing the burning of fossil fuels for electricity and transport can reduce the incidence of heart and lung diseases, including lung cancer, as well as neurologic disorders. (Climate and Health Alliance (Attachment), sub.18, p.5)*

The Australian Academy of Technological Sciences and Engineering estimate that the total health damage cost of coal-fired electricity generation is about $13 per megawatt hour, equivalent to an aggregated national health burden of around $2.6 billion per annum (The Australian Academy of Technological Sciences and Engineering 2009, p.ii).

As noted in the RET review issues paper, the National Health and Medical Research Council is investigating the effect of wind farms on human health. The Council is commissioning a systematic review of the scientific literature to examine the possible effects of wind farms on human health, including audible and inaudible noise. See http://www.nhmrc.gov.au/your-health/wind-farms-and-human-health for further information.

The Authority has not attempted to quantify the health costs and benefits associated with renewable technologies compared with fossil-fuel generation. It is the Authority's view 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 or planning restrictions, taking into account local conditions (including limits on coal sulphur content or emissions of particulates).

Electricity retail competition

Meridian Energy Australia suggested that an additional benefit of the RET is to promote new long-term retail competition. It argues that sustainable retailers need to be vertically integrated, and that:

> *Without LRET, opportunities for generation asset investment which can be accessed by new entrant participants would be lacking. The absence of such opportunities would inhibit the ability of new entrants to participate on a sustained basis in Australia's retail market. (Meridian Energy Australia, sub.159, p.2)*

The Authority has not assessed the extent of this possible effect. While promoting retail competition is desirable, any effect that the RET has on supporting new entrants could be viewed as an unintended positive outcome, rather than a primary rationale for the scheme.

Creating employment

The IEA has recognised that an objective of renewable energy policy can be to enhance employment (2011). As shown in Chapter 2, there has been an increase in the number of people employed in the renewable energy sector since the commencement of the Mandatory Renewable Energy Target. Furthermore, analysis by SKM MMA and the University of Technology, Sydney for the Climate Institute estimated that there is significant potential for additional employment creation in the renewable energy sector, particularly in regional areas, with up to 34 000 new jobs created by 2030. This estimate is based on the existing RET settings and a significantly higher carbon price consistent with a 25 per cent emissions reduction target below 2000 levels by 2020. The report concludes that the RET:

> *… drives most of the investment in clean energy prior to 2020. (The Climate Institute 2010, p.3)*

A large portion of employment creation, however, is associated with the construction and installation of renewable electricity generation capacity. Ongoing employment tends to be for the operation and maintenance of electricity generators. The Climate Institute projects 7 600 ongoing positions, which is much smaller than the total 34 000 new jobs estimate (2010, p.5). Furthermore, the study does not assess job transfers or losses across the broader economy. The Authority has not assessed whether the RET will create net employment benefits and does not consider that job creation is an adequate rationale for the RET.

3.2.4. Conclusion

The Authority recognises that the RET is not a 'first best' approach to reducing greenhouse gas emissions, and that if a carbon price remains in place and gradually rises over time, the RET would phase itself out, as certificate prices drop to zero.

The Authority also recognises that the carbon price has only just been introduced in Australia and continues to be the subject of intense political and public debate. The RET is bolstering incentives for renewable investment in an environment of general uncertainty in relation to the future of a carbon price. In the current policy environment, the RET can be seen as being complementary to the carbon

price, as a transitional measure, while a carbon price is being established, its future becomes more certain, and price levels adjust to reflect Australia's long-term emissions reduction goals. Therefore the review concentrates on whether any improvements can be made to the design of the RET, rather than challenging the RET's existence.

Furthermore, the Authority is aware that it is not starting with a blank canvas: the RET has operated now for many years. Companies have already made significant investments on the basis of that legislation and are planning on investing substantially more.

Transitioning to a clean energy future will require considerable investment over decades. A stable and predictable policy environment is crucial to fostering the confidence required for such investment. Consistent feedback from participants has highlighted the high level of policy uncertainty in the climate change policy environment and the negative affect this has on investment. Furthermore, the importance of maintaining a stable policy environment has been emphasised by many participants including the Ai Group:

> *… many businesses have commented on the importance of providing a stable policy environment for future investment in energy generation, whether renewable or otherwise. The RET has been through several major changes in recent years, and any further adjustments need caution if they are not to reduce the credibility and reliability of energy policy as a whole. (Ai Group, sub.46, p.5)*

Changes to policy can have considerable costs if the changes negatively influence the perception of regulatory risk. A strong and clear case needs to be made for any policy changes, including changes to the RET, with the benefits of such changes weighed against all likely costs, including the additional risk premium on investment and the effects of lower innovation and lock-in of high-emissions infrastructure due to perceived regulatory risk.

Professor Garnaut recognised the importance of providing regulatory stability in his submission:

> *It remains my view that if there were certainty about the retention of economy-wide carbon pricing at economically and environmentally rational prices, it would be advisable to retain the Renewable Energy Target and to allow it gradually to be made redundant by a rising carbon price. In this set of circumstances, for reasons of business certainty, it would be wise to retain the Renewable Energy Target with the legislated parameters. Many business decisions have been made on the basis of current legislation and changes in the law increase uncertainty about the stability of future policies. Uncertainty raises the supply price of investment and the costs of electricity to users. Change in the law should not be contemplated without compelling policy reasons. (Professor Ross Garnaut, sub.167, p.2)*

The Authority recognises the costs and uncertainty associated with regulatory risk and the need to establish a clear and strong case for changes to policy. Given this, there needs to be a strong policy rationale to recommend a change and the expected benefits of any recommended change need to exceed the expected costs.

3.3. Frequency of Renewable Energy Target reviews

Currently the *REE Act* requires that the Authority conducts reviews of the RET every two years.

A large number of submissions from a diverse range of participants, including liable entities, peak industry bodies and large energy users raised concern with the current frequency and scope of reviews, arguing that it adversely affects investor confidence. Participants supporting less frequent reviews were

Pacific Hydro, the Australian Industry Greenhouse Network, the Business Council of Australia and the Clean Energy Council, among others.

Following the publication of the discussion paper, in which the Authority expressed a preliminary view that the timeframe for reviews should be increased from two to four years, a number of participants expressed support for retaining the current two year timeframe. For example:

Alinta Energy stated:

> *Alinta Energy does not endorse the Authority's preliminary view that scheduled reviews take place every four years instead of the previously determined two years. Further, the Authority has failed to consider the validity of two-yearly reviews and that given the nature of the RET regular reviews provide consumers with an assurance the policy will be appropriately managed. (Alinta Energy, sub.183, p.2)*

GDF Suez considers:

> *In the interests of regulatory stability, less frequent reviews would normally be supported. However, given our reservations about many of the key design aspects of the RET we support having the next review in 2014 rather than 2016. (GDF Suez, sub.20, p.6)*

EnergyAustralia noted:

> *In general we support less frequent policy review periods and if a "real 20% by 2020" target was adopted then a review in 2016 would be appropriate. We note that providing four years of policy certainty (until 2016) is broadly consistent with EnergyAustralia's preferred approach to achieving a "real 20% by 2020" which is based on providing at least 3 forward years of fixed gigawatt hour targets at any point in the RET's operation.*
>
> *However if the current RET is maintained then the next review ought to occur in 2 years time to assess any further changes to electricity demand, scheme costs and deliverability of the target. (EnergyAustralia, sub.196, p.8)*

On balance, the Authority is of the view that the current frequency of reviews is affecting investor confidence. The Authority also considers that the two year review timeline could prove to be impractical. With the two year schedule, it is possible that the Authority would need to start work on its next review before the Commonwealth Government had a chance to respond to, and implement, recommendations from the previous review. Accordingly, the following options to address these concerns have been considered:

- maintain the existing time frame for reviews but narrow the scope of each review;
- extend the time frame for reviews to four years; or
- only review the scheme when and if certain conditions are met.

Under the first option, the Authority would continue to undertake reviews every two years, but narrow the scope of every second review so that it is focused only on administrative issues and eligibility of any new technologies that have emerged. For this option, more fundamental reforms, such as potential changes to targets, are only considered every four years. This approach is supported by the Business Council of Australia:

> *One way to address this is to identify now the nature of the future reviews making clear what the specific role of the review will be and matters to be considered. The BCA proposes the use of a "light touch" approach for most reviews and then specified years for matters such as*

the process for phasing out the RET at the end of the current legislated period (2030). (Business Council of Australia, sub.130, p.7)

This option allows for flexibility to respond to problems that have arisen in administering the scheme at regular intervals while ensuring a degree of policy stability on more fundamental aspects of the policy framework. All things considered, however, it may not provide sufficient predictability for investors.

The second option involves maintaining the current review scope, but undertaking the reviews less frequently, every four years. This allows flexibility to make amendments to reflect changed circumstances, but also provides policy stability and predictability. Furthermore, this option means that reviews of the scheme can be done in a holistic way and ensures that administrative and structural issues are reviewed in parallel. This approach is suggested by several submissions. For example, the Climate Institute noted:

The year 2016 should be the earliest major review and the scope should be narrowed to consideration of post-2020 design issues (e.g. expanding the target post-2020). (The Climate Institute, sub.86, p.4)

Eraring Energy also recommended:

… less frequent reviews of the scheme – perhaps once in 4 years as the current [biennial] review creates more uncertainty leading to unnecessary investment risks. (Eraring Energy, sub.146, p.2)

In addition, this time frame is more in accord with the Commonwealth Government Best Practice Regulation Handbook 2007, which recommends, as a benchmark, that reviews of regulation occur at least every five years.

The third option involves the Authority only undertaking a review if certain conditions are met. This approach has been suggested in a number of submissions, including by AGL Energy:

It is AGL's view that the policy should not be reviewed every two years – to do so is destructive to the efficient operation of the market. Rather than conducting a review every two years, market effectiveness would be better facilitated if the review only commenced once relevant threshold criteria were met. Such criteria would involve some type of LRET market failure which necessitated intervention. (AGL, sub.38, p.5)

Pre-specifying triggers for a review runs two key risks:

- first, market participants might try to 'game' the system, by modifying their behaviour to bring on a review; and
- second, it may be difficult to anticipate all of the changes in circumstances that might warrant a further review.

3.3.1. Conclusion

On balance, the Authority considers that full reviews every four years will provide an appropriate balance between policy flexibility and investor certainty.

Beyond the legislative review timetable, it should be noted that at any stage, reviews, including of the RET, can be requested by the Minister or the Australian Parliament. If warranted, the Authority can also conduct and commission its own independent research and analysis.

In regard to the review scope, the Authority considers that, to encourage investor confidence and predictability, at the time of the next review substantive changes to key components of the scheme such as the form and level of the 2020 target, should only be considered in the event of extenuating circumstances.

The Authority anticipates that its approach to future reviews will remain consistent with the approach established for this review. That is, the Authority will consider the scheme in the policy context at the time of the review and only make changes if a compelling case can be made.

RECOMMENDATION

R.1. The frequency of scheduled scheme reviews should be amended from every two years to every four years, so that the next scheduled review would be in 2016.

CHAPTER 4. THE LARGE-SCALE RENEWABLE ENERGY TARGET

This chapter considers the form and level of the Large-scale Renewable Energy Target (LRET). It examines the implications of maintaining the existing target compared to a higher or lower target.

4.1. Background

The Mandatory Renewable Energy Target (MRET) of 9 500 gigawatt hours (GWh) was intended to encourage an additional two per cent renewable energy generation beyond what would otherwise have been in place by 2010. By 2002, electricity demand was growing more rapidly than anticipated, prompting some to call for an increase in the gigawatt hour target to ensure the scheme delivered on the percentage target. This issue was considered in the 2003 Tambling Review of the MRET, which concluded:

> *The Review Panel [is] convinced … that any future target should continue to be expressed in terms of a fixed GWh level. By their nature, projections of electricity demand contain a degree of uncertainty. The changes in projected electricity demand that have occurred since the MRET was announced demonstrate that a percentage-based target would require the corresponding generation level to be regularly revised. This would adversely impact on market certainty. Risk is a key factor in investment decision making, so that any changes to MRET that would reduce market certainty would also reduce the prospect of attracting the required financial backing for projects. The Review Panel considers that a fixed target is more compatible with market certainty, with MRET's industry development objective, which defines a level of renewable energy generation rather than a percentage of a fluctuating electricity market over which the industry has no control. (MRET Review Panel, 2003, p.119-120)*

In 2009, legislation was passed to give effect to the Commonwealth Government's policy commitment that 'the equivalent of at least 20 per cent of Australia's electricity supply will come from renewable sources by 2020' (20 per cent by 2020 commitment) (Commonwealth Government 2009).

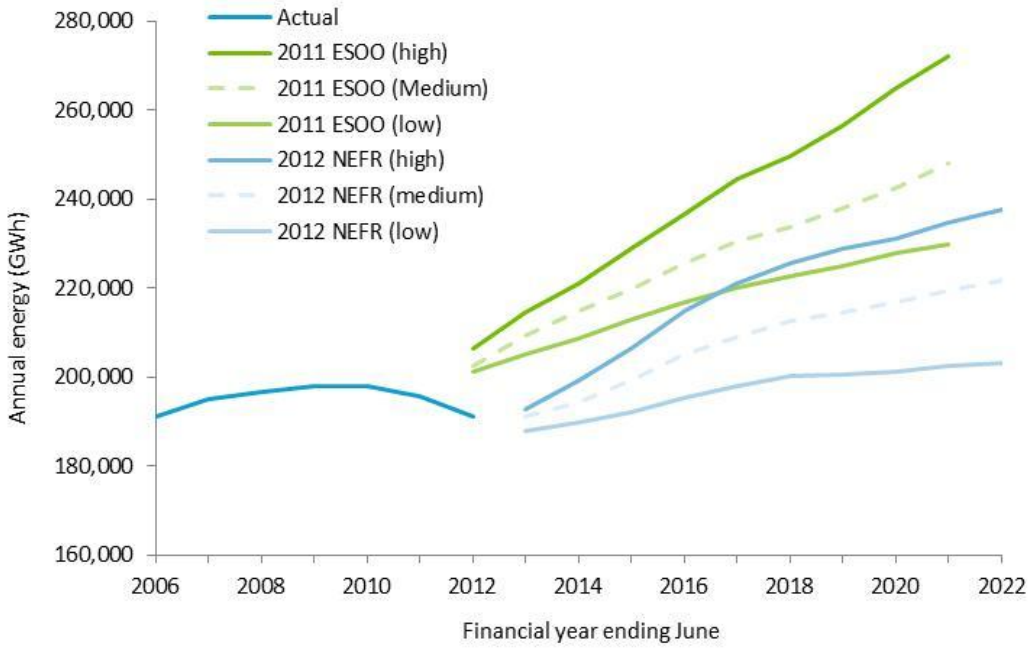
The 20 per cent by 2020 commitment was translated into a legislative target of 45 000 GWh of renewable generation in 2020 (through to 2030). In 2010, the Renewable Energy Target (RET) was split. The target was revised to 41 000 GWh in 2020 (through to 2030) for the LRET and the Small-scale Renewable Energy Scheme (SRES) was left uncapped, but notionally allocated at least 4 000 GWh.

The 45 000 GWh value was expected to deliver around 20 per cent renewable energy based on a 2007 forecast of electricity demand in 2020 and the inclusion of renewable generation already operating prior to the introduction of the MRET (see Box 3). At the time, it was estimated that the RET would ensure almost all of the growth in electricity demand would be met by renewable energy.

In June 2012, the Australian Energy Market Operator (AEMO) published its long-term electricity demand forecasts in the National Electricity Forecasting Report (NEFR), which represented a

substantial downward revision to the level of electricity demand previously published in its 2011 Electricity Statement of Opportunities (ESOO) (see Figure 22).

Figure 22 Australian Energy Market Operator's long-term forecasts of electricity demand in the National Electricity Market



Source: Australian Energy Market Operator, 2012.

Several factors appear to be affecting current levels of electricity demand, including:

- lower industrial activity, particularly in manufacturing, than previously forecast;
- a user response to significant increases in retail electricity prices;
- the increase in penetration of household solar photovoltaic;
- the effects of energy efficiency programs and regulation; and
- the relatively mild summer weather over the past two years.

Some of these factors are permanent and structural, while others may be cyclical.

4.2. Form of the target

There has always been potential for conflict between policy statements about how much renewable energy the RET (and the MRET before it) is designed to achieve in terms of a percentage of total energy demand (20 per cent and two per cent respectively), versus the fixed gigawatt hour targets included in the legislation, which define actual liabilities.

Estimating the contribution of renewables in 2020 under the current LRET settings is sensitive to assumptions for key parameters (see Box 3).

Box 3 Estimating the contribution of renewable energy

Estimates of the proportion of electricity supplied by renewable generation in 2020 vary depending on the definitions used and the projections made of future electricity supply and renewable energy generation.

In projecting the proportion of renewable energy by 2020, today, there is a range of assumptions and forecasts that need to be employed. There are four distinct components that affect the proportion of renewable energy. Those components are:

- electricity demand;
- actual generation from renewable sources prior to the inception of the RET (and MRET before it);
- large-scale renewable generation; and
- small-scale renewable generation.

When the initial 20 per cent by 2020 target was translated to a fixed gigawatt hour amount in 2007, the following market expectations were relevant:

- Australia-wide electricity supply of around 300 000 GWh in 2020;
- pre-existing renewable generation of 15 000 GWh per year; and
- Renewable Energy Target of 45 000 GWh per year by 2020.

This translated to a total renewable energy contribution of 60 000 GWh per year, equivalent to 20 per cent of previously forecasted demand, by 2020.

The Authority has estimated the possible share of Australia's future electricity supply in 2020-21 using the following revised assumptions:

- as a measure of 'Australia's electricity supply', the Authority has used an estimate of Australia-wide native demand (a measure of electrical energy supplied by scheduled, semi-scheduled, and significant non-scheduled generation that includes electricity transmission losses but excludes non-grid generation) of around 258 500 GWh;
- pre-existing renewables of around 14 300 GWh per year reflecting a downward revision of their long term energy capability;
- renewable energy delivered by the LRET of around 43 000 GWh (due to financial year reporting, this figure is slightly higher than the 2020 calendar year target of 41 000 GWh. However, averaging the 2019-20 and 2020-21 financial years, total LRET generation is around 41 000 GWh in the calendar year 2020); and
- renewable energy delivered by the SRES of around 10 900 GWh (including approximately 3 000 GWh from solar water heaters).

This translates to a total renewable energy contribution (including deemed generation displacement by solar water heaters) of around 68 200 GWh, equivalent to around 26 per cent of forecast native demand, by 2020-21.

A key point is that several of the key inputs to any estimation of the future share of renewable energy – forecasts for electricity demand, pre-existing renewable generation and small-scale renewable generation – are subject to uncertainty and are liable to change over time.

Participants including Rio Tinto and EnergyAustralia (formerly TRUenergy) believe the policy intent of the RET was to deliver 20 per cent of electricity demand in 2020. For example, EnergyAustralia stated:

> *Retaining the current targets for the RET and allowing the SRES to continue uncapped is likely to result in an effective 26% RET by 2020, overshooting the original policy intent of 20% renewables. (TRUenergy, sub.102, p.3)*

Conversely, participants such as Meridian Energy Australia, Alstom Limited and Vestas believe the intent was the fixed gigawatt target. For example, Vestas states:

> *The choice of a headline percentage-based target is to a significant extent arbitrary, and the choice of a fixed gigawatt hour target to match the percentage goal is necessarily based on point estimates of future consumption. The fixed gigawatt hour target itself, however, then becomes a stable basis for investment decisions.*
> *(Vestas Australian Wind Technology Pty Ltd, sub.57, pp.6-7)*

The Authority considers that a fixed target is preferable to a floating target. The Authority concurs with the Tambling Review's reasoning and conclusion, that electricity demand projections are uncertain and trying to match gigawatt hour targets to a particular percentage of demand would require continuous change leading to significant uncertainty (see Section 4.1). In particular, the period over which the RET has operated in its various forms has shown the inaccuracy of initial estimates of relevant parameters and demonstrated that there will need to be constant readjustment of any floating target.
The Authority's view, therefore, is that the form of the LRET should continue to be expressed in terms of a fixed gigawatt hour level.

RECOMMENDATION

R.2. The form of the Large-scale Renewable Energy Target should continue to be expressed in legislation in terms of a fixed gigawatt hour level.

4.3. Implications for maintaining the existing 41 000 gigawatt hour target

Several submissions to the review commented on whether the existing LRET can be met and the implications for maintaining the existing target. These issues are considered in the following section.

4.3.1. Can the current target be met?

Industry participants have estimated that by 2020 between around 7 000 megawatts (MW) and 10 000 MW of new renewable energy is required to meet the existing LRET. Participants have expressed conflicting views about whether the existing target can be met.

Participants, including EnergyAustralia, the Energy Supply Association of Australia, Macquarie Generation and Origin Energy expressed a concern that the LRET will not be met, because insufficient renewable capacity can be built in time. Concerns centred around the industry's ability to build capacity at roughly double the rate of past Australian expansion, the ability to obtain planning approvals in time (especially given strong local opposition to wind farms in some areas), and the ability to negotiate connection agreements in time. For example, Macquarie Generation stated:

> *Achieving the 41 TWh target by 2020 would require a significant increase in the rate of windfarm commissioning over the next 8 years. This is likely to be difficult for a number of reasons:*

- *the projects with the best wind speeds and proximity to the grid will have already been commissioned;*
- *windfarm developers face significant planning and approval hurdles and there is growing opposition from some local community groups to new windfarm proposals; [and]*
- *this also requires a much faster rate of negotiation of network connection agreements and construction of transmission extension assets. (Macquarie Generation, sub.209, p.8)*

The potential effect of state planning regimes on the LRET was noted in the Australian Energy Market Commission's (AEMC 2011) review of the impact of the RET on energy markets. The modelling did not take into account the changes to the Victorian planning requirements, however, the AEMC concluded that so long as a carbon price was in place, the target was likely to be met by 2020.

> *Under both carbon emissions price scenarios, the LRET was found to just be met by 2020… It should be noted that the modelled result do not include the impact of recently announced changes to Victorian planning requirements for wind turbines… requirements may increase the resource costs of meeting the LRET as less economic sites may need to be used, and may reduce the level of future renewable generation in Victoria and affect the achievement of the LRET. (AEMC, 2011, p.6)*

In addition, large-scale renewable projects take a number of years to plan and build, and therefore the timing of investment decisions and project commissioning is critical to meeting the target. Samsung C&T Corporation stated:

> *Any further delays or deviations away from the already aggressive construction schedule needed to meet the current trajectory will almost certainly result in its [the target] not being met due to constraints in resources needed to deliver projects. (Samsung C&T Corporation, sub.11, p.3)*

A number of other participants considered that the target can be met, including RATCH-Australia Corporation (RAC), Wind Prospects, AGL Energy and the Clean Energy Council. For example, RAC has stated:

> *The electricity industry has been able to meet the requirements of the RET to date and RAC expects that the industry will be able to meet requirements to 2020. (RATCH-Australia Corporation, sub.134, p.2)*

The Clean Energy Council noted:

> *In terms of future investment, there is a significant pipeline and drivers for increased deployment that can all ensure the 20 per cent target is ultimately achieved. (Clean Energy Council, sub.12, p.9)*

AGL Energy stated:

> *To be clear, AGL believes that achievement of the RET is possible, provided sensible and economically efficient pricing decisions are made by jurisdictional pricing regulators. (AGL Energy Limited, sub.181, p.1)*

The need for significant additional transmission infrastructure to underpin the RET has been raised by some participants as both a potential cause for delays and a 'hidden cost' of the RET. For example, Alinta Energy noted:

As an aside, it has also been suggested that, regardless of the reduction in demand, the ability to build the amount of transmission investment required to connect 45,000 GWh of renewables by 2020 is not feasible. (Alinta Energy, sub.89, p.4)

Analysis by AEMO does not support the notion that major new upgrades of transmission capacity are required because of the RET. This finding is consistent with the analysis conducting by SKM MMA on behalf of the Authority. AEMO's 2012 National Transmission Networks and Distribution Planning report (2012, p.iii) noted that modelling for transmission investment found that:

There is generally sufficient capability in the main transmission network for new generation to connect at locations which allow for growth avoiding the need for significant new transmission investment.

Project pipeline

The Bureau of Resource and Energy Economics (BREE) publishes a list of major electricity generation projects in Australia, ranging from "committed" projects through to projects in the planning phase. Table 1 shows that over 6 000 MW of wind projects have received at least approval; around a further 10 800 MW are in the planning phase.

Table 1 Possible new wind energy projects in Australia

Development stage	Approximate capacity
Committed	550 MW
Under construction	700 MW
Government, planning and/or development approval received	5 100 MW
Planning (for example, feasibility studies and approvals) underway	10 800 MW

Source: Bureau of Resource and Energy Economics, 2012.

The BREE list of major generation projects also includes approximately 2 300 MW of proposed hydro, biomass, geothermal, ocean and solar projects in various stages of development.

The BREE project list is broadly similar to a number of other sources.

AEMO data shows around 13 400 MW of publically announced wind energy projects in the National Electricity Market, which does not include Western Australia and the Northern Territory. GE reiterated the availability of projects to meet the target:

GE believes the AEMO report identifies a significant range of possible projects well in excess of the 8GW to 10GW of wind anticipated to deliver the 2020 LRET of 41,000GWh. (GE, sub.203, p.4)

Further, WindLab Systems has provided its own estimate of the project pipeline for wind projects and stated:

… 'Approved' wind is not far off being able to supply the whole target and projects actively seeking approval (Permitting) well exceed the target. (WindLab Systems Pty Limited, sub.63, p.4)

Authority's view

As discussed in Chapter 6, a situation in which the target cannot be met and liable parties pay the shortfall charge is neither a desirable nor sustainable outcome. However, the Authority does not consider there to be sufficient evidence that the target cannot be met to warrant changing the target on

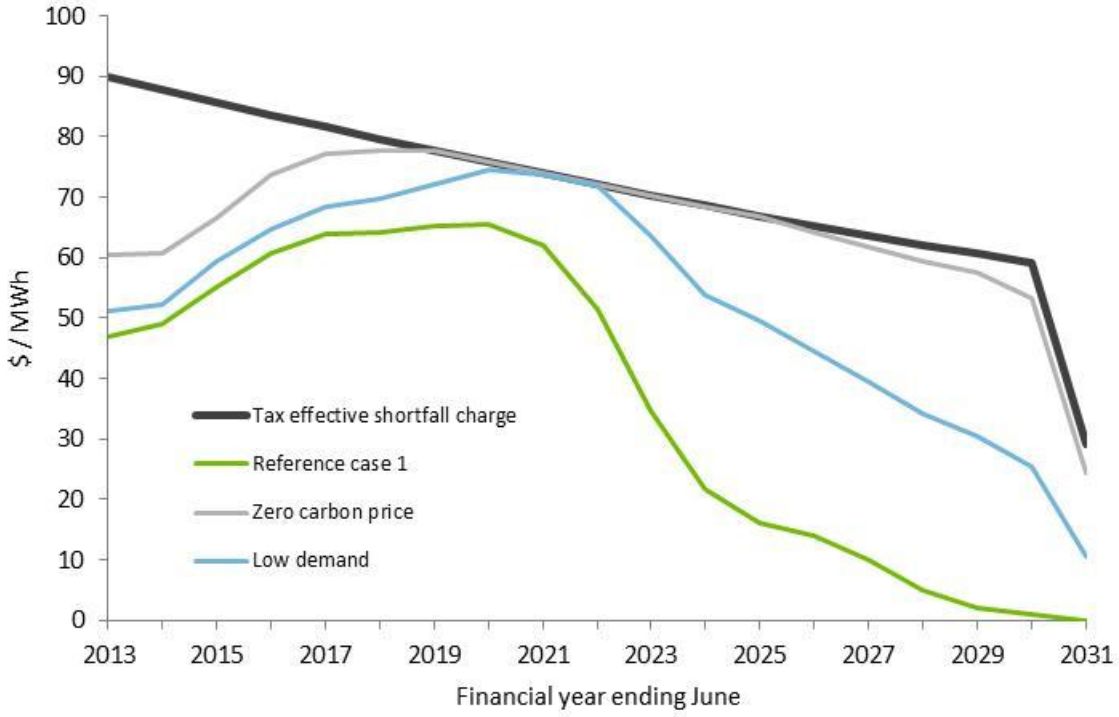
those grounds. The need for transmission network upgrades, an ability to negotiate new network connections in time, and the logistical challenges of industry expansion do not appear to be compelling impediments.

Regulatory impediments could potentially pose a harder constraint. However, a number of active wind farm developers have stated that even with the more stringent planning approval processes in some states now in place, more than enough projects would still go ahead to meet the target.

In modelling commissioned by the Authority, SKM MMA has taken the current planning arrangements into account, and estimates that the target can be met. This is consistent with the finding of AEMO's National Transmission Networks and Distribution Planning report (2012).

In the *reference case 1* scenario, modelled by SKM MMA with the current LRET, it is projected that the target could be met without breaching the shortfall charge, which effectively acts as a price cap for the scheme. A change in electricity demand and/or the carbon price will influence the ability to meet the current LRET (Figure 23).

Figure 23 Large-scale generation certificate prices and shortfall charge under alternative scenarios



Source: SKM MMA and Climate Change Authority, 2012.

In the *low demand* scenario the target is met, however the certificate price nears the tax-effective shortfall charge. The modelling indicates, however, that with a zero carbon price the shortfall charge is breached between 2019-20 and 2022-23.

Given the concerns expressed by a number of participants in relation to planning arrangements, the Authority considers there may be value in the Standing Council on Energy and Resources examining the implications of current planning regimes for national energy markets.

Finally, the presence of the Clean Energy Finance Corporation (CEFC) increases the likelihood that the existing target can be met. The CEFC is in a position to facilitate the flow of funds into the renewable energy industry, and encourage projects that otherwise may not have gone ahead.

In summary, the Authority does not consider that there are currently any policy or physical impediments to the existing LRET being met.

4.3.2. Authority modelling of the existing 41 000 gigawatt hour target

Electricity market modelling was undertaken to compare the existing 41 000 GWh target (*reference case 1* scenario) to a scenario with no RET from 1 January 2013 (*no RET* scenario). The *no RET* scenario provides a baseline from which to examine the effects of the existing target. In summary, the main effects of the existing RET (LRET and the SRES) over the period 2012-2013 to 2020-21, are estimated by the modelling to be:

- an additional 8 800 MW of new renewable energy capacity;
- a decrease in emissions in the stationary energy sector of around 100 million tonnes of carbon dioxide equivalent (Mt CO_2-e) or six per cent;
- additional resource costs incurred in the electricity sector of around $5 billion in net present value terms or 6.5 per cent of the total resource costs of $77.5 billion under *reference case 1* incurred in the generation sector (in terms of both capital and operating costs); and
- an increase in retail electricity prices of between one and four per cent, representing an increase of between $12 and $64 to a household's annual electricity bill.

Detailed context, key assumptions and results for these scenarios can be found in Appendix D and SKM MMA's modelling report, available on the Authority's website.

4.4. Reduce the target

Some participants have proposed changing the level of the target:

- reduce the target in line with lower electricity demand; or
- increase the target, mainly to cater for the effects of additional renewable energy projects that might be financed with the assistance of the CEFC.

Modelling undertaken for the Authority compared the existing LRET target (*reference case 1* scenario) with a scenario in which the target is decreased to 26 400 GWh (*updated 20% target* scenario). Box 4 summarises the key outcomes.

Box 4 Key outcomes for the modelled *updated 20% target* scenario

The estimated effects of maintaining the RET scheme (including the LRET and the SRES) as it currently stands (*reference case 1* scenario) compared to a scenario in which the LRET is decreased (*updated 20% target* scenario with a LRET of 26 400 GWh) over the period 2012-13 to 2020-21, are:

- around 4 500 MW of additional new renewable energy capacity;
- a decrease in emissions from the stationary energy sector of around 47 million tonnes (Mt CO_2.e) or around three per cent;
- additional resource costs of around $2.5 billion in net present value terms or three per cent of resource costs of $77.5 billion under *reference case 1* incurred in the electricity industry; and
- no material change in estimated average household bills over the period.

Detailed context, key assumptions and results for this scenario can be found in Appendix D and SKM MMA's modelling report, available on the Authority's website.

4.4.1. Assessment of the benefits of reducing the target

In general, those in favour of a reduction in the target argued that there has been a 'material change' in economic conditions, the electricity market and the climate change policy environment compared with the anticipated settings when the initial LRET was established. Several participants have argued that the current LRET target should be reduced to:

- ensure that the scheme does not deliver more than 20 per cent of Australia's electricity generation by 2020, given the lower electricity demand forecasts that have been previously assumed; and
- reduce the cost burden of the RET.

Box 5 summarises alternative options for reducing the existing target that have been put forward by review participants.

Reduced electricity demand

Participants including Visy and the National Generators Forum noted the lower electricity demand forecasts as a rationale for decreasing the target. For example, Visy noted:

> *It is imperative that the target should be relative to total electricity consumption, to properly reflect the electricity market's dynamics and to attenuate otherwise unmitigated price increases. (Visy, sub.224, p.1)*

The Business Council of Australia stated:

> *We believe that the current level of the target is materially out of line with the stated objective of the policy mechanism. What is required is a return to the 20 per cent target based on current AEMO demand forecasts not the forecasts that applied at the commencement of the RET. (Business Council of Australia, sub.130, p.6)*

There has also been concern that reduced demand will lead to renewable generation displacing existing generation. For example, the Australian Coal Association stated:

> *Part of the burden of this increased generation cost is borne by baseload generators given the crowding out effect that the RET is having on their ability to despatch electricity competitively into the grid. (Australian Coal Association, sub.178, p.4)*

Box 5 Options for reducing the LRET

Review participants have put forward four main options for reducing the existing target:

- A once-off adjustment to the target, supported by participants including Origin Energy (sub.69, p.7) and the Business Council of Australia (sub.130, p.7).
- Incremental changes such as EnergyAustralia's (sub.102, p.8) suggested approach of establishing three years of fixed targets followed by a range of possible targets dependent on future demand forecasts.
- Annual adjustments to the target, to meet 20 per cent, reflecting projections of electricity demand in that year, supported by participants such as Ergon Energy (sub.88, p.6).
- Maintaining the current targets but including baseline generation (pre-1997 renewable generation) that is currently excluded from the LRET, supported by participants such as Eraring Energy (sub.146, p.1).

A common issue for the options is the considerable uncertainty surrounding the future path of electricity demand. Of the options, a once-off reduction is likely to have the least-worst impact in respect of policy uncertainty associated with a target that changes with movements in demand. Nonetheless, even a once-off change increases the risk that further changes could be contemplated in the future.

Electricity price impacts

Another key reason put forward by participants, such as the Major Energy Users Inc. and Stanwell Corporation Limited, in support of a reduced target was that the RET imposes additional cost pressure, on electricity consumers. For example, Stanwell Corporation Limited stated:

> *The substantial increase in renewable energy generation required to achieve the current target will have a material impact on electricity prices for consumers, through increases in both generation and network costs. (Stanwell Corporation Limited, sub.139, p.4)*

Electricity prices are difficult to forecast, especially over long periods. Any estimate is dependent on key assumptions such as future carbon, fuel and technology prices. Generators' bidding behaviour will also affect prices, and bidding incentives can change over time as degrees of market power shift and portfolio compositions evolve. For these reasons, any modelled estimate of electricity prices, particularly for periods far into the future, should be treated with appropriate caution. The Authority's approach has been to be transparent in relation to the modelling it has commissioned, publishing the assumptions, consultant's report and detailed output data, to encourage public scrutiny and debate.

Modelling undertaken for the Authority suggests that over the period 2012-13 to 2030-31, there is no material difference in the average retail price per megawatt hour (MWh) under the *updated 20% target* scenario compared to the *reference case 1* scenario.

The modelling shows an interaction between the wholesale price of electricity and RET certificate costs. The RET causes additional, subsidised capacity, into a market with slow growth, which tends to suppress wholesale prices. The modelling estimates that the cost of certificates was largely offset by this reduction in wholesale prices.

The impact of low wholesale prices was raised in the Australian Energy Market Commission's submission:

> *Prices in the wholesale electricity spot market have been at historically low levels in recent years due to a relatively high level of generation, given recent falls in demand levels. Modelling undertaken for the AEMC suggested that the Large Scale Renewable Energy Target (LRET) distorts the balance of supply and demand in the wholesale electricty market. This occurs as the additional revenue renewable generators have access to through the sale of certificates serves to increase the level of renewable generation beyound the quantity that would have been otherwise developed. This leads to lower prices in the wholesale electricty market than there would have otherwise been which results in lower revenues and profitability for all generators. This may affect incentives to invest in new generation and impact the longer term reliability of the electricity supply. (Australian Energy Market Commission, sub.64, pp.1-2)*

Some participants have questioned the Authority's modelling results and raised concerns that if the forecast lower wholesale prices eventuated, and were sustained, they would result in existing generators (rather than consumers) bearing the majority of the cost burden of the RET through low wholesale prices, higher risk premiums on existing debt as it matures and reduced asset values. For example, Macquarie Generation noted:

> *… existing generators bear 98% of the burden of the additional $6 billion cost of building the additional 15 TWh and consumers bear just 2%... However, SKM MMA results are highly dependent on the modelling assumptions, particularly in relation to how generators react. If generators retire/mothball units or bid more aggressively than the modelling assumes then the merit order effect will be less, wholesale prices will be higher and consumers will bear a greater share of the RET costs. (Macquarie Generation, sub.209, p.3)*

The Authority agrees that wholesale price outcomes are uncertain, and that changes in bidding behaviour or earlier retirements of existing plant may result in higher wholesale prices than those estimated.

The Authority therefore considers that price outcomes can best be estimated in terms of a range: at one end, prices could include a significant suppression of wholesale prices (as estimated), and at the other end, it could be assumed that retail prices would rise by the full certificate costs, with no offsetting suppression of wholesale prices. For any given electricity demand and carbon price scenario considered, the Authority considers the latter methodology to deliver an upper bound on likely price impacts, because:

- it seems unlikely that there could be no impact at all, in any period, on wholesale prices as a result of introducing new, subsidised, low marginal cost renewable generation into the market; and
- if wholesale prices were indeed higher for sustained periods, LGC prices would be expected to be lower than those included in these estimates.

The Authority investigated the impact on retail prices with and without the impact of lower wholesale prices. Table 2 shows the effect of maintaining the current target (*reference case 1* scenario) compared to moving to an *updated 20% target* scenario, is estimated to be between almost $0 and $2 per (MWh on average for the period 2012-13 to 2020-21 and between almost $0 and $4 per MWh on average in 2012-13 and 2030-31.

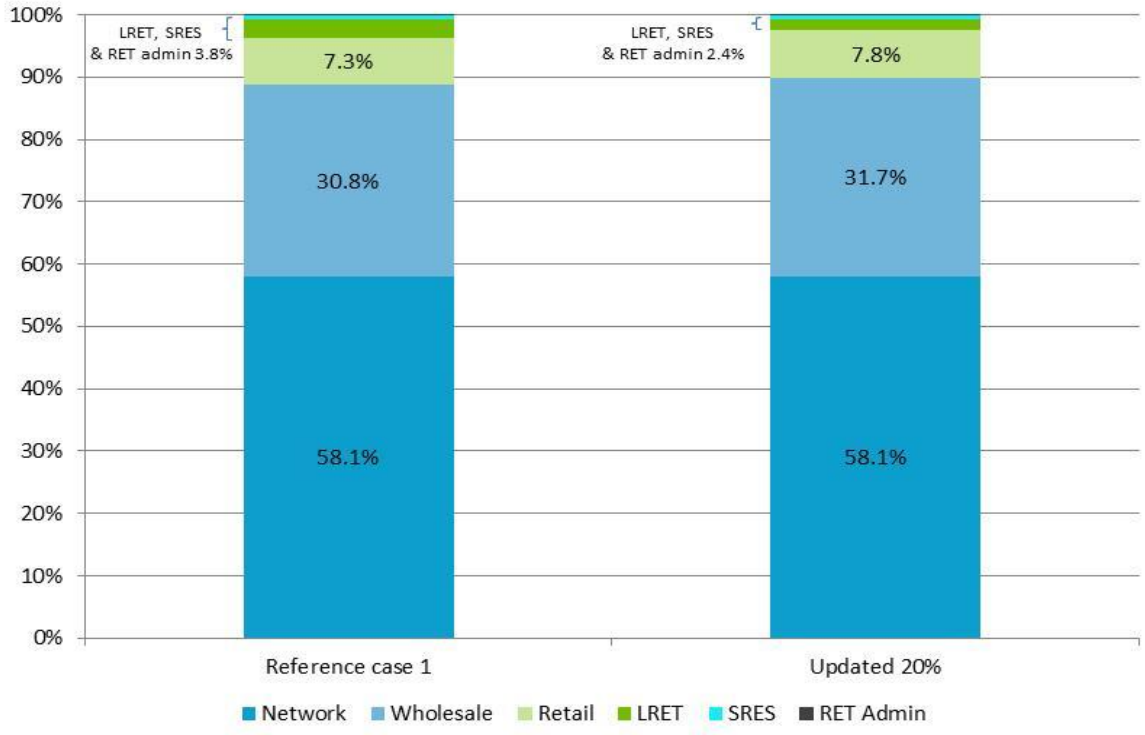
Table 2 The possible range of retail prices (dependent on the change in wholesale price)

	reference case 1 scenario		*updated 20% target* scenario	
	Retail price with wholesale price suppression	Retail price without wholesale price suppression	Retail price with wholesale price suppression	Retail price without wholesale price suppression
2012-13 to 2020-21 (average)	$228 per MWh	$235 per MWh	$228 per MWh	$233 per MWh
2012-13 to 2030-31 (average)	$265 per MWh	$273 per MWh	$265 per MWh	$269 per MWh

Source: SKM MMA and Climate Change Authority, 2012.
Note: For retail price without wholesale price suppression, the RET per MWh certificate cost was added to the retail price in the *no RET* scenario.

As a percentage of average retail electricity prices, as modelled for the Authority, moving to a lower target is estimated to reduce the contribution of the RET (including LRET and SRES certificates and administration costs) from around 3.8 per cent to around 2.4 per cent over the period (see Figure 24).

Figure 24 Estimated components of the average retail price over the period 2012-13 to 2030-31



Source: SKM MMA and Climate Change Authority, 2012.

By applying retail price outcomes to average annual household and small to medium enterprises (assuming seven MWh of electricity consumption per year and 140 MWh per year, respectively), the modelling forecasts that moving to a lower target will not have a material effect on electricity bills. In the case where no wholesale price suppression is assumed, the difference is more pronounced but is projected to remain relatively small.

Over the period 2012-13 to 2030-31 the average annual household bill is estimated to be $0.40 higher with wholesale price suppression in the *updated 20%* scenario compared to the *reference case 1*

scenario or $27 lower without wholesale price suppression. This represents an increase in the bill of around 0.02 per cent and a decrease of around 1.4 per cent respectively.

In relation to small to medium enterprises, over the period 2012-13 to 2030-31, the average annual bill is estimated to be around $13 lower with wholesale price suppression in the *updated 20%* scenario compared to the *reference case 1* scenario and $540 lower without wholesale price suppression. This represents a decrease in the average annual bill of up to a 1.7 per cent.

Ultimately, the actual contribution of the RET to individual household and business electricity bills will be affected by a range of factors including the actual mix and cost of renewable energy built, wholesale prices, individual consumer usage patterns and the level of retail competition/price regulation.

Some participants proposed that the Authority's modelling did not appropriately account for additional charges such as financial contracts to reflect the intermittency of wind, additional open cycle gas turbine requirements and transmission costs. For example, Origin Energy noted:

> *The wholesale cost of energy that is incorporated into retail prices reflects retailer's cost of hedging rather than the spot price. Due to their non-firm nature, wind farms are unable to write swap contracts against their capacity, and hence retailers are still required to source contracts written against firm thermal power stations…Additionally the cost to retailers of firming up intermittent wind generation in their hedge book do not appear to be taken into account. (Origin Energy, sub.213, p.3)*

Energy Users Association of Australia noted:

> *For completeness we would like to record that we consider many aspects of this modelling highly implausible. This includes:*
>
> - *that the RET will not affect the need for additional fast response open cycle gas generation. This seems completely unrealistic considering the introduction of more than 18,000 MW of additional variable renewable generation;*
> - *that significant transmission augmentation will not be required. Again this seems remarkable considering the geographically remote location of most renewable capacity. (EUAA, sub.226, p.5)*

In addition, participants such as EnergyAustralia raised market design concerns:

> *An obvious tension arises between the two market designs as the RET's proportion grows, because reliable generation capacity is not explicitly rewarded in an energy-only market and is heavily penalised by a mandated market for renewables. (EnergyAustralia, sub.196, p.3)*

With the exception of energy market design, which is outside the scope of the review, SKM MMA's modelling report responds to these issues.

- Hedging costs: The retail margin estimated by SKM MMA includes the cost of purchasing electricity hedge contracts and this cost is assumed to be the same across the scenarios modelled. The potential cost variation between scenarios, however, has not been explicitly modelled.
- Transmission costs: The modelling accounts for the cost of network connections and augmentations for electricity generators as part of the overall project cost. Consistent with other studies, including AEMO's National Transmission Networks and Distribution Planning (2012), it is assumed that the South Australia-Victoria (Heywood) transmission interconnector will be upgraded to a capacity of approximately 650 MW. Other than this upgrade, which is assumed in all scenarios

(including the *no RET* scenario), no other major inter-regional transmission augmentations are required.

- Reliability: SKM MMA analysed whether there were any reliability or network issues related to the degree of renewable development and the results indicated that the available renewable energy could be dispatched for the assessed scenarios. Furthermore, unserved energy did not exceed the 0.002 per cent reliability criteria in any cases.

Neither SKM MMA nor AEMO's National Transmission Networks and Distribution Planning report (2012) found that large amounts of new open-cycle gas turbine capacity was required due to the RET.

Costs to society

The Authority's modelling explored the RET's costs to society by examining the impacts on the cost of resources (capital, fuel and labour) deployed in electricity generation. Resource costs reflect the new renewable and gas-fired capacity installed over the modelling period to meet the LRET obligations and the thermal generation required. Some participants have focused on certificate costs as a measure of the overall cost of the RET. However, certificate costs do not represent the costs to society, rather they represent the additional revenue required to make renewable investments economically viable.

The resource cost savings from an *updated 20% target* scenario are estimated to be:

- around $2.5 billion in net present value terms over the period 2012-13 to 2020-21; and
- around $4.5 billion in net present value terms over the period 2012-13 to 2030-31.

4.4.2. Assessment of the costs of reducing the target

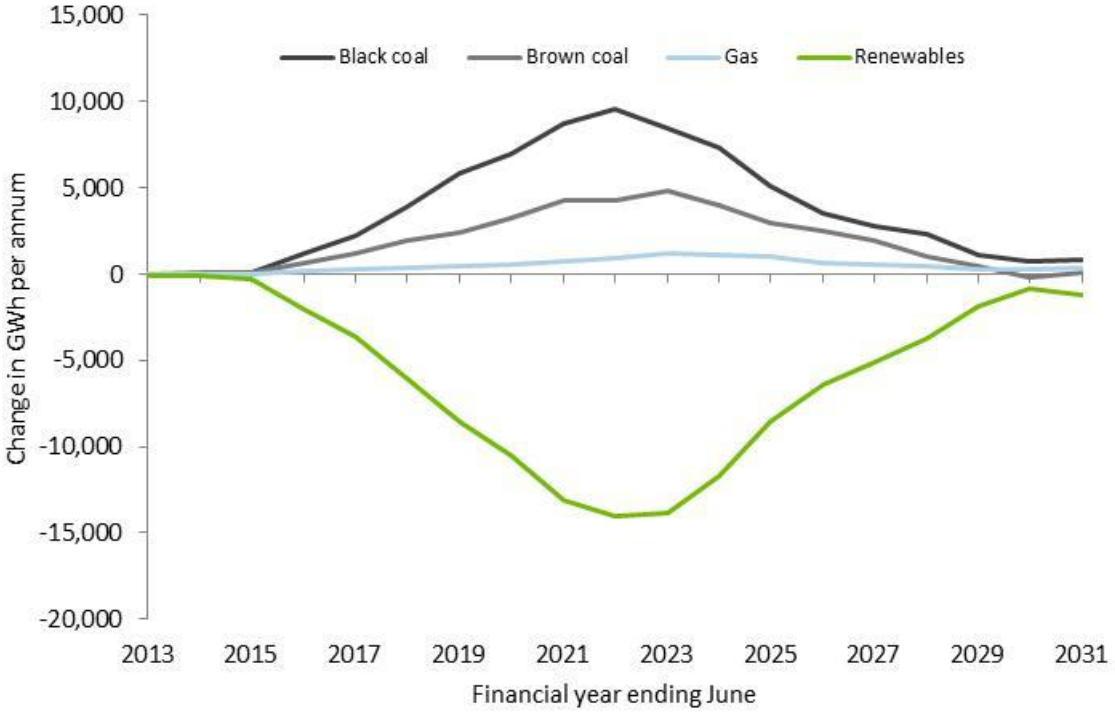
The costs associated with reducing the target relate to higher greenhouse gas emissions, reduced investor confidence, increased uncertainty over climate change policy, and additional health and environmental costs.

Additional renewable generation and emission abatement in the stationary energy sector

The objects of the *Renewable Energy (Electricity) Act 2000* (Cth) include encouraging additional renewable generation and reducing greenhouse gas emissions in the stationary energy sector.

Under an *updated 20% target* scenario, it is estimated there would be 111 422 GWh less renewable generation over the period from 2012-13 to 2030-31 (Figure 25).

Figure 25 Change in generation production mix – *updated 20% target* compared with *reference case 1* (GWh)



Source: SKM MMA and Climate Change Authority, 2012.
Note: A positive number indicates the value is higher in the *updated 20% target* scenario than in the *reference case 1* scenario.

The difference in renewable capacity is pronounced in 2021-22 when the targets in each scenario are most different (around 14 000 GWh less than under the *reference case 1* scenario). Moreover, by reducing the target to the *updated 20% target* scenario, the modelling estimates that this will result in a total of 119 Mt of additional emissions created in the electricity sector between 2012-13 and 2030-31, or an additional 47 Mt in the period to 2020-21. Compared to *reference case 1* this equates to an increase of around 3.3 per cent in emissions over the period 2012-13 to 2030-31 or 2.8 per cent in the period to 2020-21. This is due to the higher levels of fossil-fuel generation in the *updated 20% target* scenario.

Based on the modelled outcomes the additional abatement under the *reference case 1* scenario, compared to the *updated 20% target* scenario, is forecast to result in an average cost of abatement of $38 per tonne of CO_2-e over the period to 2030-31 and $53 per tonne of CO_2-e to 2020-21 (detail of the cost of abatement methodology can be found in Appendix D).

Investor confidence

If the Commonwealth Government were to make a one-off change to the target in the face of changed electricity demand, it would be difficult for the Government to argue convincingly that no further changes should be contemplated in the future. This was acknowledged by participants such as the Ai Group:

> *On the other hand, lowering the existing targets would raise serious questions. Would it be a one-off adjustment, or part of an ongoing process? How could confidence be established that an adjustment was for once and all, and what would happen if electricity demand projections declined further – or rebounded?*

Certainly, ongoing adjustments to the 2020 targets would mean intense uncertainty. The nature of investment decisions in long-lived, capital intensive assets means that such uncertainty would be severe for new investment, likely raising financing costs or leading to more frequent imposition of the shortfall charge. It would also mean heightened risks and lower returns for businesses that have invested on the basis of existing laws. (Ai Group, sub.46, p.8)

If there is a risk that future annual gigawatt hour targets could be adjusted in response to changes such as movements in energy demand, investors would likely to be reluctant to invest in plants that could potentially be stranded.

Assuming a decrease in demand, as renewable power stations are built, risks would increase with each subsequent investment that there will be a future reduction in the LRET and the market will be over-subscribed. Similarly, retailers would be unlikely to lock in future power purchase agreements that included the purchase of renewable certificates if there was a risk that those future certificates would not be required – not only by that liable party, but the market as a whole.

Along with the impact on commitment to future investments, a policy change would affect investments in the electricity market that have been made in the context of the current RET policy.

A number of participants including the Climate Markets and Investment Association and Pacific Hydro have argued against any change to the level of the LRET on the basis that it could increase the perception of future investment risk making renewable energy projects less attractive to investors. Others, such as the Energy Supply Association of Australia, argued for a lower target but acknowledged that reduced investor confidence could increase risk premiums:

The ESAA acknowledges that policy uncertainty can increase risk premiums, and that this increase can lead to significantly increased costs in such a capital-intensive industry. Whether this will outweigh the benefits from a lower target is unclear, as reflected in the differences in views amongst our members. (Energy Supply Association of Australia, sub.199, p.2)

Participants such as EnergyAustralia and Origin Energy have criticised the qualitative nature of the Authority's assessment of uncertainty. Concerns have also been raised that, given that reduced energy demand is depressing wholesale prices, increased certainty for investors in renewable generation comes at the cost of greater uncertainty for existing generators.

There is no easy or definitive methodology which can be relied upon to estimate the uncertainty premium related to the LRET in current circumstances. Nonetheless, while not comparable with the Authority's estimate of the impact on resource cost, participants such as AGL Energy and the Climate Institute have sought to quantify elements of policy uncertainty. AGL Energy conducted a survey to quantify the potential effect of policy uncertainty on the financing of power generation projects and noted 'these costs would likely manifest themselves as higher cost to consumers – up to $119 million (net present value) in the event of a significant amendment to the RET (for example, a reduction in the target)' (AGL Energy, sub.38, p.2). The Climate Institute noted that:

...the reduced costs of policy uncertainty noted above, [are] worth $266 million in 2020. (The Climate Institute, sub.86, p.13)

Participants including RAC and the Australian Sugar Milling Council express concern that investment uncertainty, along with other factors such as the limited liquidity in financial markets, is limiting the ability of planned investments. For example, RAC's submission stated:

Uncertainty about the future level of the RET is leading to caution in investment in renewables. Developers of renewable projects currently face difficulty in achieving financing for projects due to this uncertainty, as offtakers (primarily the electricity retailers) seek to pass on RET review risks to the project owners. In addition, offtakers are reticent to sign offtake agreements due to this uncertainty. (RATCH-Australia Corporation, sub.134, p.3)

Some participants such as Alinta Energy have argued that there will always be uncertainty related to the LRET, stemming from a history of policy change and ongoing scheme reviews, no matter the outcome of the review:

Alinta Energy does not agree that reaffirming Government support for the existing RET will deal with the current uncertainty and supports the targets revision to a real 20 per cent of generation. (Alinta Energy, sub.183, p.2)

Others have stated that the principal threat to meeting the target is continuing uncertainty. For example, in the context of current government energy and climate change policy, the Grattan Institute noted:

The process of RET reviews and the approach of the 2020 target date have contributed to uncertainty and therefore to the question of whether the target can be delivered. If such uncertainty was removed and the Government clearly re-committed to the target then there is no fundamental reason why the target should not be achieved.
(Grattan Institute, sub.165, p.2)

In addition to future investment, the value of investment made in the context of established policy settings should be considered. A number of participants noted the value of investment to date. Even participants that supported reducing the target such as Alinta Energy and International Power GDF-Suez Australia have acknowledged the need to account for investments that have already been made, although do not see this as a barrier to change. For example, International Power GDF-Suez Australia stated:

Over $6 billion has been invested to date in renewable generation, and in making those commitments, investors (both Australian and international) have relied on the Renewable Energy Target (RET) legislation remaining in effect. (International Power GDF-Suez Australia, sub.83, p.2)

Given the implications for investor confidence, participants including the Investor Group on Climate Change and Professor Garnaut conclude that the target should remain unchanged. For example, Professor Garnaut stated:

In [the current] set of circumstances, for reasons of business certainty, it would be wise to retain the Renewable Energy Target with the legislated parameters.
(Professor Garnaut, sub.167, p.2)

In addition, some participants have expressed concern that changes to the LRET could reduce investor confidence in climate change policies more broadly. The Investor Group on Climate Change stated:

Investors, particularly in infrastructure assets, seek policy settings that are long term, low risk, have low volatility and evolve predictably. Changes to the design or operation of the RET at this time will weaken the confidence of investors, not only about the future of the RET, but the stability of climate policy in Australia. This is likely to undermine investment plans, current and future, in renewable energy in Australia and would also likely have a negative impact on the

returns from existing energy infrastructure investments. (Investor Group on Climate Change, sub.70, p.4)

As discussed in Chapter 3, replacing fossil-fuel generation with renewable generation can lead to other benefits in terms of public health and the environment (although the Authority has not attempted to quantify these benefits).

4.5. Increase the target

Participants, largely individual respondents, non-governmental organisations and some renewable energy proponents have expressed the view that the RET should be increased to deploy more renewables into Australia's electricity mix.

Proposals for an increased RET target – of up to 100 per cent renewables – have been put forward by participants including Beyond Zero Emissions, the Australian Youth Climate Coalition, Hepburn Wind and Doctors for the Environment Australia Inc. Arguments for increasing the target included further reducing greenhouse gas emissions, promoting energy diversity, health and environmental benefits and ensuring sustained growth of the renewable energy industry.

The *People's RET Review* survey undertaken by 100% Renewables and the Australian Conservation Foundation (2012) found that:

93 per cent of respondents want a higher Renewable Energy Target … [and] 98 per cent want to see our renewable energy industry continue to grow with a 2030 target.

A number of submissions proposing an increase to the target have cited the additional investment in renewable energy that would be created by the activities of the CEFC as their rationale. This rationale is considered in more detail below.

4.5.1. Increasing the target for the Clean Energy Finance Corporation

Participants including GetUp, Australian Conservation Foundation, WWF and the Conservation Council of South Australia have argued that the LRET target should be increased to account for the additional LGCs that could be generated by projects under the CEFC. For example, GetUp put forward the view that:

… if the CEFC's projects are viewed as part of the RET there is a risk that the CEFC and RET will work in concert to actually limit investment and stall the growth of renewable energy in Australia. (GetUp, sub.168, p.3)

Concern was also expressed by participants such as RAC and LMS Energy about the uncertainty that may be imposed on the RET market should the target fail to be increased to account for CEFC projects. For example, LMS Energy stated:

If the [CEFC] does finance projects at significantly lower commercial rates, any LGCs created from these projects should be additional to the 41,000 GWh target, otherwise the CEFC financed projects could crowd out privately funded renewable energy projects. (LMS Energy Pty Ltd, sub.79, p.7)

Some participants, however, held a contrary view. For example, Alstom Limited stated:

CEFC financing simply displaces commercial financing, and there is no reason why it should be treated differently in terms of the target. (Alstom Limited, sub.10, p.3)

Infigen Energy also stated:

The CEFC does not begin operations until July, 2013 – just a few months before the next Federal election. As with the Carbon Price, there is some political uncertainty with regards to the future of the CEFC. Should the CEFC continue to operate well into this decade, as Infigen Energy agrees it should, then it is possible that this topic may be worth further consideration in future RET reviews. (Infigen Energy, sub.111, p.6)

4.5.2. Assessment of the costs and benefits of increasing the target

In examining how the LRET should account for CEFC activity, the Authority has considered:

- the differing roles of the RET and the CEFC; and
- the practical challenges in accounting for projects with a yet to be defined scope.

As discussed in Chapter 3, the Commonwealth Government has formed the CEFC to help bridge the gap between earlier stage innovation and deployment. This role could ultimately affect the mix of technologies that are deployed to meet the RET targets.

The CEFC Expert Review Report commented on the CEFC interaction with the RET and a carbon price (Commonwealth Government, Department of Treasury, 2012, p.ix). The report explained that:

The CEFC is part of a suite of Commonwealth Government initiatives designed to transform the Australian economy for a cleaner energy future. The RET and carbon price will be the primary drivers in this. (Commonwealth Government, Department of Treasury, 2012, p.9)

The intent that the CEFC and the RET should work alongside each other is reiterated by the Commonwealth Government Department of the Treasury in their evidence to the House Economics Committee:

The purpose [of the CEFC] is to overcome the financial barriers. The renewable energy target affects the pricing of renewable energy and what can be achieved, but the individual projects themselves may still have barriers which inhibit investment. The purpose of the CEFC is to address those barriers and not the target itself. (Commonwealth, House of Representatives, 2012, p.4)

Moreover, there are distinct practical challenges in changing the target to account for CEFC investments. In particular, there are significant uncertainties about:

- the level of renewable generation that the CEFC will support given its goal to invest 50 per cent or more of available funds in renewable energy;
- the types of technologies it would support given the definition of renewables includes hybrid technologies and technologies (including enabling technologies) that are related to renewable energy technologies; and
- when those investments will deliver electricity to the market.

The CEFC has not yet commenced operations (it starts in July 2013), and its investment mandate has not been finalised. The uncertainty about exactly what the CEFC is likely to fund could persist for some time.

Nonetheless, based on assumptions of future investments WWF and the Australian Solar Council (2012) have undertaken modelling of the CEFC in addition to the RET. In relation to this modelling the Australian Conservation Foundation stated:

Recent modelling undertaken by WWF and the Australian Solar Council demonstrates that the CEFC has the potential to unlock up to 11,000MW of large-scale solar energy by 2030, creating approximately $54 billion in investments and a total of 28,000 jobs, while having no impact on retail energy prices …

However if the CEFC is not additional to the 20% target, by 2030 Australia will have missed out on 7,800 GWh of renewable energy generation (the equivalent of 1300 wind turbines), $8 billion in private investment and 2000 jobs. (Australian Conservation Foundation, sub.179, p.1)

However, a number of participants such as the Clean Energy Council shared the view that until the CEFC's investment mandate is clear, an increase to the LRET should not be recommended.

The CEFC and future reviews of the RET may consider this matter once the CEFC is fully operational and beginning to make investment decisions. This impact and risk may also be addressed by considering increases in the RET target beyond 2020. Again, this should be done at a later stage. (Clean Energy Council, sub.12, p.13)

4.6. Conclusion

Almost all submissions commented on the level and form of the LRET target. Submissions regarding the target fell broadly into three camps:

- maintain the target to provide the regulatory certainty necessary to drive investment in renewable energy generation;
- reduce the target to reflect lower electricity demand forecasts, thereby saving costs; and
- increase the target to drive additional renewable energy deployment and account for the additional large-scale generation certificates that may be created by CEFC projects.

The Authority considered all submissions, commissioned electricity market modelling and has undertaken internal analysis to examine the costs and benefits of making potential changes to the current target.

On balance, the Authority considers that the existing target of 41 000 GWh should not be reduced. In arriving at this judgement, the Authority has given particular weight to stability, predictability and investor confidence for the LRET and climate policy more broadly. Since 2009, a number of significant changes were made to the RET, which have reduced investor confidence. While challenging to quantify, the Authority considers that a material adjustment to the target would exacerbate this situation and affect the likelihood and cost of meeting any given target. Reduced investor confidence is likely to affect existing projects, hamper access to finance and increase the risk premiums associated with finance and generate greater uncertainty about Australian climate change policy more broadly.

The Authority does not consider the target should be increased at this stage, again in order to promote stability and predictability, and recognising the unknown profile of renewable energy projects to be funded by the CEFC. Moreover, the presence of the CEFC provides greater confidence that the existing target can be met – an issue on which several participants have expressed doubts.

The Authority's view therefore is that the target should be maintained at its current level and in its current form. Nevertheless, the rationales for adjusting the target should be considered in the 2016 review, as recommended in Chapter 3, after:

- the existing RET policy has had sufficient time in which to operate as two separate schemes;

- the carbon price trajectory is clearer; and
- the CEFC has been operational for a number of years with an investment mandate that is clear to industry participants.

RECOMMENDATION

R.3. The existing Large-scale Renewable Energy Target of 41 000 GWh and interim targets should be maintained in their current form.

R.4. The Renewable Energy Target review in 2016 is an appropriate time to consider adjusting the targets beyond 2020 in light of the policy and economic conditions prevailing at that time.

CHAPTER 5. THE SMALL-SCALE RENEWABLE ENERGY SCHEME

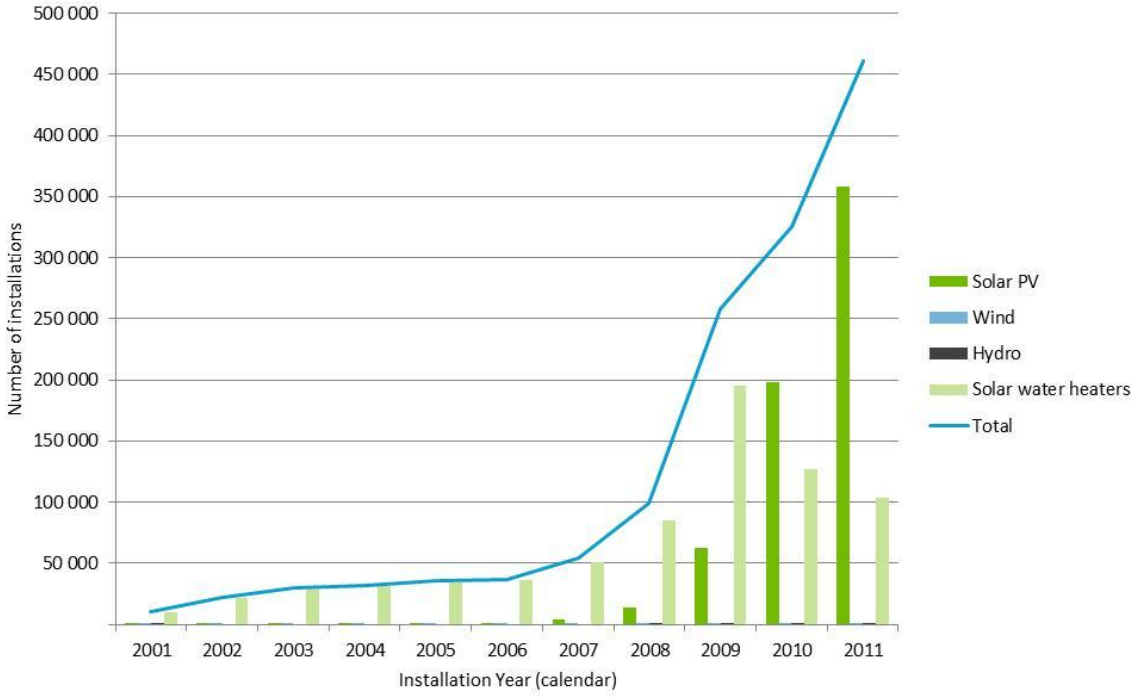
This chapter considers the architecture of the Small-scale Renewable Energy Scheme (SRES) and in particular its uncapped nature and lack of a legislated end-date. It considers the costs and benefits of different options for addressing these issues, including combining it with the Large-scale Renewable Energy Target (LRET), establishing a scheme end-date and capping the SRES. Finally, it considers potential enhancements to the clearing house and the utility of data currently collected by the Regulator.

5.1. History of the Small-scale Renewable Energy Scheme

Small-scale systems, in the form of solar water heaters and small generation units (small-scale solar photovoltaic (PV), wind and hydro), have been included in the Renewable Energy Target (RET) since its inception in 2001. Historically, the uptake of these systems was relatively low (see Figure 26). This changed in 2009 when the Commonwealth Government introduced Solar Credits to replace the Solar Homes and Communities Plan. Solar Credits was intended to provide an upfront capital cost subsidy worth around $7 500 by applying a multiplier – initially set at five – to certificates generated from small generation units (Swan et al, 2008). At the same time, system costs began falling rapidly, the value of the Australian dollar increased, and states and territories put in place generous feed-in tariffs (see Box 6). These factors contributed to a large increase in the installation of small generation units and, consequently, renewable energy certificates (exacerbated by the Solar Credits multiplier).

The rapid increase of certificates caused certificate prices to fall dramatically, creating uncertainty for both the large-scale and small-scale renewable energy sectors. The certificate price was not sufficient to support large-scale energy projects and investment stalled. Similarly, businesses selling small-scale systems were unable to provide accurate information to customers regarding the price they were likely to receive for certificates. As explained in Chapter 1, the Commonwealth Government responded by legislating to separate the RET into two schemes: the LRET – for large-scale projects – and the SRES, to assist households and businesses with the upfront costs of small-scale systems.

Figure 26 Number of installations of small-scale systems



Source: Clean Energy Regulator, 2012.
Notes: Installation numbers in 2011 are likely to be higher as owners/agents have one year to register the instalment of small-scale systems. Installations of small-scale wind and hydro systems are very low and are not visible – hydro ranges from zero to five installations per year from 2001-2011 and wind ranges from one to 136 installations per year over the same period.

Box 6 State and territory feed-in tariffs

Until recently, most feed-in tariffs offered by state and territory governments have been considerably above the wholesale price of electricity. The Productivity Commission's 2011 review *Carbon Emissions Policies in Key Economies* found that 'subsidy rates for solar PV often have been set at excessive levels, essentially providing windfall benefits to households that install solar PV.' (p.80). The NSW Independent Pricing and Regulatory Tribunal's (IPART) 2012 report on solar feed-in tariffs stated 'the generous subsidies offered by governments contributed to a much higher than anticipated uptake of PV in NSW, and led to higher than anticipated costs' (p.8).

Most states and territories have now revised their feed-in tariffs for new applicants to a level reflecting expected wholesale electricity prices. The Victorian Competition and Efficiency Commission's (VCEC) 2012 inquiry into distributed generation noted that 'advice to the Commission suggests the efficient and fair market price for 2013 to be, at a minimum, in the range of 6 to 8 cents per kilowatt hour (kWh) (compared with 25 cents currently for the Transitional Feed-in Tariff). This minimum range is consistent with rates announced in New South Wales, Queensland, South Australia and Western Australia over the past year.' (p.xxi)

5.2. Small-scale Renewable Energy Scheme design

There are a number of issues with the current design of the SRES:

- its uncapped nature means that the number of installations – and therefore total scheme costs – can be unpredictable and difficult to control;
- the subsidy provided to small-scale systems does not automatically reduce as technology costs fall and wholesale electricity prices rise (unlike in the LRET, where certificate prices would be expected to fall in such circumstances);
- there is no legislated end-date for the scheme; and
- the 15 year deeming periods are unlikely to be justifiable for larger solar PV systems that are currently below the 'small-scale' threshold (100 kilowatts (kW)).

To address these issues, the Authority has considered a number of potential changes to the SRES, including:

- recombining the SRES and the LRET into one scheme;
- lowering the solar PV threshold;
- capping the scheme by setting a gigawatt hour target, capping the small-scale technology percentage (STP), discounting the number of certificates that can be created, or lowering the existing price cap; and
- setting an explicit end-date for the SRES (in line with the LRET).

Some of these options address several of the issues raised with the scheme's design, others are focused on a particular aspect. The costs and benefits of each are assessed in turn.

5.2.1. Recombining the two schemes

Recombining the SRES with the LRET would address several of the issues raised with the SRES design: it would cap the scheme so that increased installations are matched with a price signal, and establish an end-date. Many of the distorting factors that led to separation of the RET into two schemes are no longer in play. The reduction of the Solar Credits multiplier has been brought forward and will end on 31 December 2012 (see Table 3) and state and territory feed-in tariffs are now generally comparable to the wholesale electricity price. In light of this, there could be a case for recombining the schemes.

Table 3 Solar credits multiplier

Time frame	Multiplier	Notes
9 June 2009 – 30 June 2010	5x	
1 July 2010 – 30 June 2011	5x	
1 July 2011 – 30 June 2012	3x	The Commonwealth Government reduced the multiplier from four to three times from 1 July 2011 to 30 June 2012 (Combet, Dreyfus 2011)
1 July 2012 – 31 December 2012	2x	
1 January 2013 onwards	1x (no multiplier)	The Commonwealth Government announced on 16 November 2012 that the Solar Credits multiplier would be phased out on 1 January 2013, six months earlier than planned (Combet 2012)

Source: *Renewable Energy (Electricity) Regulations 2001* (Cth) (REE Regulations 2001).

Cost and administrative requirements

Operating two separate schemes is likely to impose a greater cost on society than a single scheme. It effectively creates separate incentives – or 'bands' – for large-scale and small-scale renewable energy generation (see Chapter 8). This potentially increases the RET's overall costs as more expensive technologies may be deployed than if large and small-scale generation competed to meet the same target. Furthermore, it imposes greater administrative requirements, and therefore costs, for the renewable energy industry, liable entities, and the Clean Energy Regulator.

Most stakeholders that supported merging the schemes did so on the grounds that it was likely to lower costs. For example, Australian Paper submitted:

> *We would recommend … a wholesale review of the SRES and RET schemes as this aspect of the [RET] has created significant problems and expense for business. The uncapped nature of the [SRES], along with an inappropriate [feed-in tariffs] and deemed multiples resulted in unforeseen and uncontrolled cost imposts. (Australian Paper, sub.53, p.4)*

Ergon Energy also noted the administrative burden of complying with two schemes:

> *The separate scheme has posed an additional administrative burden on liable entities. Ergon Energy has been required to establish and maintain separate models to administer, track and settle both large and small certificates in two separate markets. (Ergon Energy, sub.88, p.8)*

The Authority's modelling estimates that the resource cost of maintaining separate schemes is higher than combining the schemes, costing almost $1 billion (in June 2012 dollars) more from 2012-13 to 2020-21 and around $2.4 billion more from 2012-2013 to 2030-31. This is because operating separate schemes is estimated to result in around 5 300 gigawatt hours (GWh) of additional renewable energy generation in 2020-21, resulting in around 16 million tonnes fewer greenhouse gas emissions compared to a combined scheme. However, combining the schemes is estimated to increase wholesale prices on average by around $1 per megawatt hour (MWh) over the period 2012-2013 to 2020-21, and $1.70 per MWh over the period 2012-2013 to 2030-31. It is projected that combining the schemes does not result in a reduction in retail electricity prices, as the increased certificate costs of separate schemes is offset by the decreased wholesale rates achieved through greater renewable energy generation.

Level and mix of renewable energy generation

The majority of submissions – including from environmental and business groups, liable entities, and the renewable energy industry – supported retaining two separate schemes. The main reasons put forward were regulatory certainty and concern that further changes might jeopardise the prospect of meeting the 41 000 gigawatt hour target. Some stakeholders also argued that merging the schemes would reduce investment in more efficient large-scale renewable energy projects.

Merging the schemes could affect the likelihood of meeting the Renewable Energy Target if it results in regulatory uncertainty and reduced investment in renewable energy projects. In the last three years, the RET has undergone several significant amendments – the expansion and inclusion of multipliers in 2009, and separation of the scheme in 2011. The Commonwealth Government has also twice brought forward the reduction of the Solar Credits multiplier. A constantly shifting regulatory framework (or the perception of one) may reduce investors' willingness to invest in further renewable energy, and increased perceptions of risk may increase the cost of making such investments.

Many stakeholders considered that a further change to merge the schemes could undermine policy certainty and investment confidence. For example, AGL noted:

> *The separation of the RET scheme was vital to … creating conditions conducive to investment in large scale renewable generation. If this separation was removed, the market for large scale renewable certificates could again face distortion, jeopardising the 20% target and stymieing large scale renewable electricity generation in Australia (particularly if any new State-based policies emerged)… There have been no fundamental changes to the market dynamics which made necessary the division of the RET scheme in 2010. Accordingly there is no rationale upon which to remove this separation now. (AGL, sub.38, p.4)*

Many stakeholders expressed concern that merging the schemes would affect the mix of renewable energy generation and potentially disadvantage large-scale projects, which require a greater degree of investment certainty due to the high capital investment and lack of deeming provisions. Hydro Tasmania submitted:

> *Any re-introduction of small-scale technologies into the LRET will almost certainly immediately stall investment in large-scale projects due to the recent experiences of certificate supply volatility and the increased market risk this would bring. (Hydro Tasmania, sub.40, p.8)*

5.2.2. Lowering the solar photovoltaic threshold

Even if the schemes remain separate, there may be a case for moving some small-scale systems into the LRET by reducing the threshold of small generation units in the SRES. The *Renewable Energy (Electricity) Act 2000* (Cth) (*REE Act)* sets the capacity limits for eligible small generation units under the SRES. While the capacity limits for small-scale wind turbine systems and small-scale hydro systems are relatively low (10 kW and 6.4 kW respectively), solar PV systems that have a capacity of 100 kW are still included in the SRES. This is considerably larger than the average size of solar PV systems installed in 2011 and 2012, which was approximately 2.6 kW (sourced from the Clean Energy Regulator, 30 September 2012).

To date, the vast majority of solar PV installations in Australia have been installed on residential dwellings (see Table 4). Over 99 per cent of small-scale PV systems installed are below 10kW. This is unusual compared to other countries where there are significant amounts of solar PV on commercial buildings (see Table 4). A number of stakeholders have highlighted the as yet untapped potential for commercial deployment of larger solar PV units on shopping centres, storage facilities, office blocks or farms. Potentially, these installations could generate a relatively high number of certificates compared to residential systems, increasing the overall cost of the scheme.

Table 4 Photovoltaic installations by country

2011 installations by country	Installed capacity MW	Residential proportion %	Residential capacity MW
Italy	9 301	8	744
Germany	7 500	9	675
China	2 200	27	600
US	1 867	37	698
France	1 634	16	261
Japan	1 296	90	1 166
Belgium	958	68	651
UK	899	56	503
Australia	865	95	822
Spain	345	5	17

Source: REC Agents Association, sub.47, p.11.

One option to guard against this potential cost increase, while still providing an incentive for commercial deployment, would be to lower the capacity threshold of solar PV so that larger installations are captured in the LRET – a capped scheme. Many of the disadvantages identified above with merging the schemes would not apply to lowering the solar PV threshold. In particular, business models for operating in this market are only now being developed – there is no existing, established industry that would be disrupted by the change.

A number of LRET participants raised concerns that including systems of greater than 10 kW in the LRET could crowd out investments in large-scale projects. However, the potential for disruption by two key 'artificial' sources – multipliers and generous state and territory feed-in tariffs – is now low.

The Authority considers that it is important to retain some level of deeming for all systems under 100 kW, regardless of whether they are included in the small-scale or large-scale scheme. Deeming provides an efficient method for allocating a meaningful number of certificates to smaller sized systems without the administrative burden of metering each individual system's output. Furthermore – unlike large-scale PV systems – there is generally no third party data to verify a systems owner's claim of generation.

Some LRET participants argued that deeming arrangements for these systems would give them an unfair advantage. Analysis by the Authority suggests that while deeming does bestow some benefit – by removing the risk associated with future regulatory change – there is no inherent financial advantage to receiving certificates up-front rather than having them issued periodically in line with generation. In a scheme with banking, the market can be expected to take account of the value of certificates in the future.

That said, there is a clear case for reducing the deeming period for larger solar PV units. The larger the system, the less justification there can be for long deeming periods, since the scope for inaccuracies is greater and the additional compliance costs as a proportion of total certificate revenue created by the system is lower. Participants who install larger systems are likely to have more capacity to respond to the greater administrative requirements of more regular deeming.

5.2.3. Capping the Small-scale Renewable Energy Scheme

As noted above, one issue with the SRES design is that, unlike the LRET, it is 'uncapped' with liability tracking certificate creation. Annual liability (set through the STP) is based on the number of certificates expected to be created that year, adding or subtracting any surplus or deficit of certificates from the previous year. This means that as installations increase, so does the STP and, consequently, the cost of the scheme to liable entities and, through them, electricity consumers.

The uncapped nature of the SRES has become particularly relevant because the number of installed small-scale systems, and therefore scheme costs, has been so much higher than expected. When the SRES was legislated in 2010, it set an 'implicit target' of 4 000 GWh of generation in 2020. It has already exceeded this target with current estimates of approximately 5 000 GWh per annum and the Authority estimates it will reach around 11 000 GWh in 2020-21.

Many review participants – particularly large energy users and liable entities – expressed concern regarding the cost of the SRES. IPART stated:

> *The design of the SRES, combined with generous State and Territory Government financial incentives, has put the annual costs of complying with the SRES at almost twice that of the LRET. The costs of complying with the SRES were a driver of retail electricity price increases, particularly on 1 July 2011. (IPART, sub.81, p.14)*

The modelling undertaken for the Authority estimates that the total SRES certificate cost was around $1.3 billion in 2011-12 and may fall to around $300 million in 2020-21.

The high uptake of small-scale systems might also suggest that the level of subsidy provided by the SRES is too high and that small-scale systems are becoming affordable in their own right. Origin Energy noted:

> *… the twin effects of falling solar panel costs and rising retail tariffs will create a situation where the subsidy required to support distributed solar PV will continue to reduce over time. There may be a point in the latter part of this decade when such subsidies are no longer required. (Origin Energy, sub.69, p.11)*

On the other hand, a number of review participants considered that, while the level of support may have been too high in the past, the cost of the SRES was likely to stabilise in the near future because the factors that drove the rapid growth in uptake are no longer at play. For example, in information provided to the Authority by Warwick Johnston from SunWiz, he commented that system costs were likely to stabilise:

> *While PV prices are hard to predict, clearly the massive price reductions in recent years cannot continue... the global market for PV grew extraordinarily in recent years, and recognising that scale was required to reduce manufacturing costs, a massive supply of PV manufacturing capacity was built... As a result we have an international oversupply of PV, which has created a price war that now sees panels being produced below-cost. The largest PV manufacturers are all struggling to turn a profit, a situation that cannot be sustainable… Hence, such rapid reductions in PV prices cannot be expected to continue. Instead, I expect that PV prices will stabilise within a year as wise companies turn their focus towards profit-based survival instead of attempting to capture market share through a price-war. Reductions in manufacturing costs will continue, but for the medium term prices should*

remain steady as major manufacturers pay down their debts. (SunWiz, email correspondence, November 2012)

The Australian PV Association supported this assessment.

Others, such as the Australian Aluminium Council pointed to the history of underestimating SRES generation, noting:

> *The cost burden on electricity users of the SRES component of the scheme has been many times greater than the modelling that was used by the Government to undertake the separation and the nominal 'assigned' target of 4 000 GWh for the SRES. Any statement or modelling about future SRES permit generation levels will therefore be treated with a healthy amount of scepticism. (Australian Aluminium Council, sub. 73, p.5)*

A number of participants suggested capping the SRES to provide certainty about the number of future installations – and therefore cost – of the scheme. This section considers the costs and benefits of four potential ways of controlling the compliance costs under the SRES – a gigawatt hour target, an STP cap, a discounting mechanism and lowering the existing price cap.

A gigawatt hour target

A gigawatt hour target for the SRES would cap the quantity of certificates that were required to be surrendered each year – in the same way the annual LRET targets currently work. Accordingly, if there were an oversupply of certificates, the price would be expected to fall. This option has the benefit of being simple and familiar to many RET participants.

A number of review participants expressed concern that a gigawatt hour target for the SRES would create a 'boom-bust' cycle because small-scale systems are relatively inexpensive and households are able to respond promptly to changes in incentives. For example, the Clean Energy Council stated:

> *If the scheme were to be capped you would see installations of small scale systems pulled forward (to avoid being outside the cap) which would create a cycle of boom and then bust, as once the cap was reached demand would plummet until the cap reset the following year. (Clean Energy Council, sub.12, p.17)*

The Ai Group expressed similar concerns in its submission, noting:

> *… in the context of the market for small-scale systems, a cap is likely to cause considerable problems and dislocation. The experience with other capped benefits, such as the former rebates for solar PV or state government grants and tariffs, is that demand spikes when the public believes that time is running out; governments often find it hard to enforce a cap; and neither government nor industry may have a clear picture of total activity or the pipeline for certificates. The risk is that the cap does not hold, and that the cap drives annual boom-and-bust cycles that damage the industry. (Ai Group, sub.46, p.16)*

Investing in small-scale systems is quite different from investing in large-scale renewable energy projects. Large-scale projects are generally planned and announced years in advance – investors are generally well-informed about the progress of projects that will contribute to the LRET target. By contrast, quantities of installed small-scale systems can change very rapidly, and accurate information is only available after the fact. For this reason, boom-bust cycles are more likely in a capped SRES scheme than a capped LRET.

An SRES boom-bust cycle would create difficulties for both households and businesses. In particular, in terms of equity, it would be unfair if non-expert participants, such as households, invested on the basis

of a certain set of circumstances and then discover they have missed out on the expected subsidy because the cap has already been reached and the price of certificates has plummeted. This was demonstrated with the off-grid multiplier that gave an additional incentive to off-grid systems. The incentive had an annual cap and in its first year of operation it led to a rush to install systems, which resulted in the scheme being oversubscribed. This resulted in many applicants missing out, leaving them significantly out of pocket.

In summary, while introducing a gigawatt hour target would likely limit the overall costs of the SRES, it would require a major structural overhaul, creating significant regulatory uncertainty. This would adversely affect the small-scale industry, as well as households and, ultimately, may not be sustainable.

A cap on the small-scale technology percentage

Annual SRES liability is determined by the STP, which is set each year based on the expected number of certificates that will be created that year, plus or minus any carry-over from the year before.

An STP cap could be used to set a maximum level for the STP and thereby limit the amount liable entities (and electricity consumers) had to pay on an annual basis. It would also – over time – limit the incentive to install more systems as the price of certificates would be likely to fall if the STP cap was reached.

The main disadvantage of an STP cap is that its effectiveness depends on setting it appropriately. If it were set too high, it would not bind and therefore would not limit liability. If set too low, it could cause the price of certificates to fall dramatically, potentially disadvantaging those that had already invested on the basis of a higher expected certificate price. This might threaten the viability of some small businesses and lead to arguments to increase the cap. Setting an appropriate cap would depend, to some extent, on being able to predict future STPs. This has been notoriously difficult in the past: the Clean Energy Regulator's non-binding estimates have tended to significantly underestimate the STP. For example, early in the year the non-binding estimates for the 2012 STP was 16.75 per cent (31 March 2011) and by the end of the year it had almost doubled to 23.96 per cent (16 December 2011).

If the STP cap was not set appropriately it could either be ineffective, or cause significant disruption to the SRES market.

Discounting certificates

A discounting mechanism would apply a multiplier of less than one to each certificate, effectively discounting the number of certificates created for each megawatt hour. For example, a multiplier of 0.5 would mean that each certificate represents two MWh of renewable energy generation. A discounting mechanism could control uptake of small-scale systems under the SRES, as demonstrated in reverse by the Solar Credits multiplier.

A discounting mechanism would be unlikely to create the potential boom-bust cycles of a gigawatt hour target or an STP cap because fractional reductions below one would translate into small changes in the level of support. A discounting mechanism also has the advantage of not affecting existing investors.

The main disadvantages of a discounting mechanism relate to its implementation. Applying it on a discretionary basis would allow it to respond to changing circumstances, but would be unpredictable and potentially disruptive for industry. On the other hand, a 'set-and-forget' approach has the advantage

of providing certainty but is essentially arbitrary and difficult to justify on the basis of principled analysis. The Clean Energy Council made this point, noting:

> *Implementation of the proposal to utilise average payback period as a criterion for lowering the SRES multiplier would be highly complex and problematic. If the approach were simplified, it would inevitably be perceived as unfair. (Clean Energy Council, sub.191, p.6)*

The Authority's preliminary view, as set out in its discussion paper, proposed the use of a discount mechanism to be applied at the Minister's discretion on the basis of:

- the payback period falling below ten years;
- changes in net system costs; and
- electricity prices and whether the SRES constituted more than 1.5 per cent of an average bill.

Many review participants expressed concern with this proposal. Some – such as the Ai Group – strongly supported the concept of discounting but were concerned that the proposed method of application could be too uncertain, depending on how the proposal was further developed. IPART expressed concern with the discretionary application, stating:

> *In our view, … providing the Minister with discretion to discount the number of certificates created by small-scale investors, [is] likely to significantly reduce investment certainty to small-scale investors and create further uncertainty for retailers and regulators in determining the costs of complying with the scheme. (IPART, sub.206, p.2)*

A number of stakeholders, including the REC Agents Association, opposed the application of a discount mechanism at all, considering it too extreme. These participants also argued that a discounting mechanism would put small-scale systems at a disadvantage vis-à-vis large-scale projects in the LRET.

Lowering the existing price cap

The SRES has a price cap of $40 set through the fixed clearing house price. The *REE Act* allows the Minister to lower the price cap, taking into account:

- whether the total number of small-scale technology certificates created in 2015 exceeded or is expected to exceed the equivalent of 6 000 GWh;
- any changes to the costs of small generation units and solar water heaters;
- the extent to which owners of small generation units and solar water heaters contribute to the costs of small generation units and solar water heaters;
- the impact of the clearing house price, and the number of small generation units and solar water heaters installed on the electricity market, including on electricity prices; and
- any other matters the Minister considers relevant.

To date, the Minister has not exercised this power, preferring instead to accelerate the reduction of the Solar Credits multiplier (Combet, Dreyfus 2011).

The price cap does not directly limit the number of installations; however, it does reduce the maximum price paid for each certificate and in this way may lower the overall cost faced by liable entities. If the certificate price falls, it might also affect uptake, as the return would be smaller.

There are a number of complexities regarding lowering the price cap. First, it affects investments that have already been made on the assumption that the price cap is $40. This was raised by the Clean Energy Council in its submission:

> *… if the $40 price were to be adjusted, the impact on the small scale technology market would be highly detrimental. Firstly, the value of STCs in the spot market would likely fall dramatically, as the expectation that the Clearing House will eventually come into play in a significant way over the next 12 to 24 months would be removed and this would lower estimates of the longer term value of STCs. Many investors from major banks to solar PV businesses and dedicated certificate trading businesses are holding substantial quantities of STCs. Material changes to the SRES or the Clearing House could devalue those assets and undermine the viability of those businesses. As these certificates trading businesses help to provide cash flow to PV businesses anything that harms these businesses or discourages new entrants in the STC market will harm the PV sector more broadly. At the very least it would reduce the value of their asset which is unfair to them. (Clean Energy Council, sub.12, p.23)*

On the other hand, the power to change the clearing house price cap is included clearly in the legislation and prudent investors in small-scale certificates could reasonably be expected to understand that the asset they hold is subject to this discretionary power.

Lowering the clearing house price will create transitional issues for the certificates already on the clearing house transfer list. If the decision were taken to lower the clearing house price, a decision would need to be taken regarding how to treat these certificates.

5.2.4. Phasing out the Small-scale Renewable Energy Scheme

Unlike the LRET, which ends in 2030, there is no legislated end-date for the SRES. Setting an end-date ahead of time – and establishing a clear, graduated path to it – would provide industry and investors with certainty regarding the future of support. It is also in keeping with the overall transitional nature of the RET (see Chapter 3) – as a temporary measure to provide industry support and encourage additional renewable energy generation ahead of an established, credible carbon price consistent with delivering on Australia's long-term environmental goals.

An argument can be made that the policy intent was for the SRES to end in 2020; at the time the SRES was split from the LRET, all discussion of the SRES contribution to the target was in terms of 2020 gigawatt hour generation (Wong 2010, Commonwealth Government 2010). Another possible option would be 2030, which would align the SRES with the LRET.

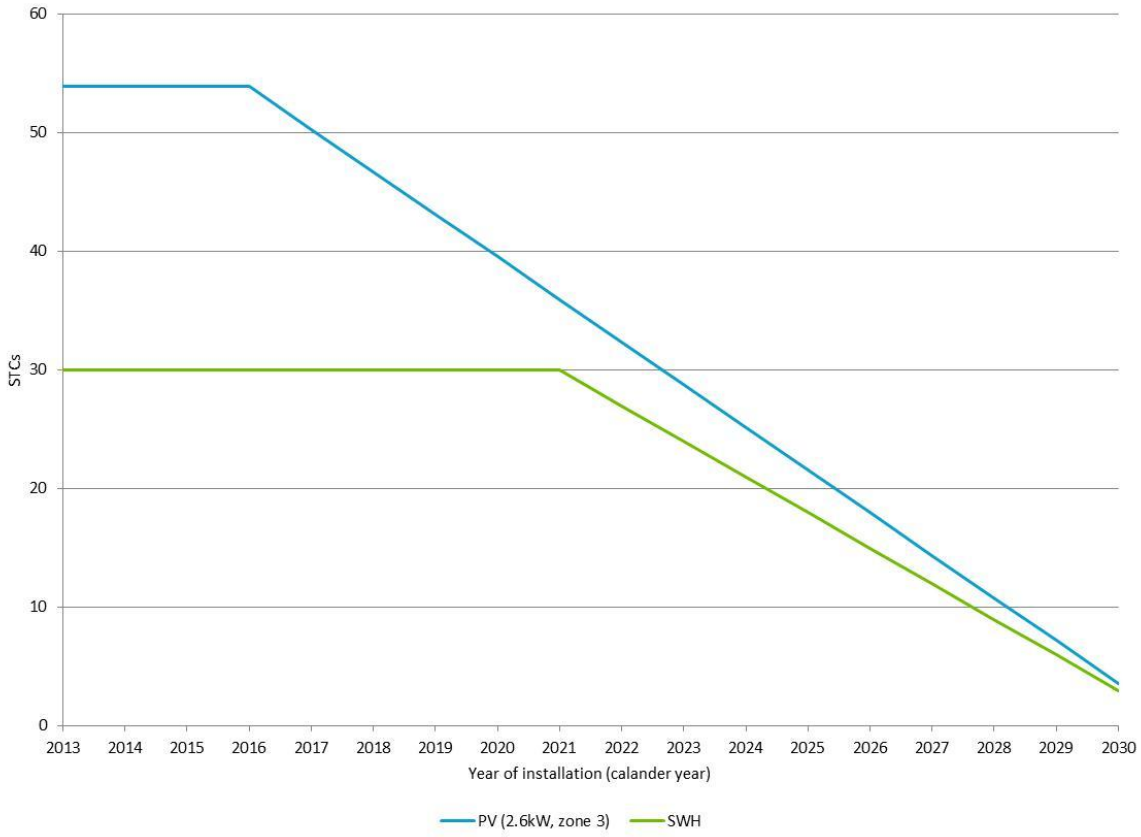
There are a number of possible ways to set an end-date to the SRES, including: reducing deeming periods so there is no subsidy past 2030, and prescribing an end-date for the scheme in the *REE Act*.

Reduced deeming

Under a reduced deeming approach, small-scale systems would only be provided with certificates for generation up to 2030. A solar PV unit currently receives 15 years' worth of certificates upfront. Reduced deeming would mean that a solar PV unit installed in 2019 would only receive 12 years' worth of certificates – rewarding generation up to and including 2030, but not beyond.

Reduced deeming would provide a predictable path to the end of the scheme. It would slowly phase out support over time, providing industry with both certainty regarding the future of the SRES and a graduated step-down that could be managed. Figure 27 illustrates how reduced deeming would affect certificate creation for an average solar PV unit and an average solar water heater.

Figure 27 Example of phase-out of deeming years on small-scale technology certificates



Source: Climate Change Authority, 2012.

A potential disadvantage of this option is that the administrative costs of providing certificates for very short periods (for example, less than five years) in the latter years of the scheme could outweigh the benefits. This could resolve itself naturally, as participants may not consider it worthwhile to apply for a small number of certificates.

No future small-scale technology percentage

The LRET ends in 2030 because the *REE Act* does not provide for any gigawatt hour targets beyond this date. The renewable power percentage (RPP) will therefore fall to zero and no further liabilities will be created. Although the SRES does not have a gigawatt hour target, a similar approach could be taken by stipulating that there will be no further small-scale technology percentage (STP) after a certain date.

The advantages of this option are that it is simple and would work effectively for either a 2020 or 2030 end date. The disadvantages are that it may provide a sudden drop in support as the STP may not fall smoothly up until the end date.

This option could be combined with reduced deeming to provide for a graduated phase-out over time to 2030, after which no further STPs would be set.

5.2.5. Conclusion

All of the proposed options have advantages and disadvantages. On balance, the Authority has assessed that the following combination is likely to provide the highest net benefit, while minimising disruption to the schemes and their participants:

- retaining separate schemes to maintain regulatory stability;
- lowering the SRES threshold for solar PV units to guard against a future boom in larger-scale installations (this essentially recombines a component of the SRES with the LRET);
- reducing deeming periods to provide a graduated and predictable phase-out of the scheme by 2030, after which no further STPs would be set; and
- retaining the ministerial power to lower the price cap in the event that there is another boom in installations of small-scale systems and a lower level of subsidy would be appropriate.

The Authority considers that while recombining the schemes would have addressed most of the issues associated with the SRES, it would also require significant regulatory change, which would affect both the small- and large-scale schemes. In light of this, the Authority considers there are less disruptive ways of addressing the issues associated with the SRES.

Similarly, while a gigawatt hour target, an STP cap or a discounting mechanism could all effectively contain the cost of the SRES, they also require significant changes and would likely result in considerable uncertainty for scheme participants. A gigawatt hour target or an STP cap could also create certificate price volatility and 'boom-bust' cycles.

Such measures would be justified if uptake of small-scale systems under SRES was likely to continue to grow rapidly. However, the factors that drove this boom (falling system costs, generous feed-in tariffs, and multipliers) are no longer at play and installations of small-scale systems are expected to stabilise and the cost of the SRES to fall. The Authority's modelling estimates that with the current policy setting in place, the contribution of SRES certificate costs to the average household bill will fall from 2.4 per cent in 2012-13 to 0.6 per cent in 2020-21 (see Table 5).

Table 5 Contribution of Small-scale Renewable Energy Scheme certificate costs to average household bill

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
SRES	2.4%	1.4%	1.1%	1.0%	0.8%	0.7%	0.6%	0.6%	0.6%

Source: SKM MMA, 2012.

In these circumstances, the Authority considers that the benefits of introducing a gigawatt hour target, STP cap, or a discounting mechanism are unlikely to exceed the costs of the significant disruption these options are likely to cause. The Authority's recommendations therefore focus on mechanisms to guard against a possible future boom in installations (and consequent scheme cost), rather than on mechanisms that actively limit the number of installations.

Solar PV on commercial buildings currently constitutes a very small proportion of total installations; future growth is possible but hard to predict. Should they remain in the SRES, a boom in such installations would lead to rapid increase in compliance costs given that larger systems create more certificates. The Authority therefore recommends lowering the SRES threshold of solar PV units from 100 kW, PV systems above this threshold would be eligible under the LRET. This would still provide support to commercially-installed solar PV – but in the context of a capped scheme.

Consultation with stakeholders suggests a threshold of somewhere between 10 kW to 30 kW would be appropriate – the Authority recommends the Commonwealth Government conduct further consultations with stakeholders to determine a precise threshold. In the Authority's view, a 10 kW threshold would be an appropriate starting point for these consultations.

In addition, the Authority considers that larger systems should be subject to five year deeming similar to the current five year deeming option available to small generation units in the SRES. This will encourage better accuracy around deeming arrangements – as is appropriate for larger systems – and also would not confer an unfair advantage on PV compared with other LRET participants.

The Authority recommends that the ministerial power to lower the price cap be retained. While not ideal, it could act as an 'emergency' cost containment measure if unexpectedly high levels of installations of small-scale systems continued, driven, for example, by further falls in technology costs or the continued rise of the Australian dollar. Lowering the price cap has the advantage of being known to scheme participants as it is part of the existing scheme design. Some of the disadvantages associated with lowering the price cap – such as transitional arrangements for certificates on the transfer list – may be reduced should the Commonwealth Government adopt the Authority's recommendations regarding the clearing house – discussed in Section 5.3.1.

Finally, the Authority notes that state and territory feed-in tariffs have a significant effect on uptake of small-scale systems under the SRES. Consultation with state and territory governments indicates that feed-in tariffs are unlikely to be increased in the future. Nevertheless, greater coordination of policies would be useful. The Council of Australian Governments' Standing Council on Energy and Resources is considering the merits and options for developing guidelines for a consistent national approach to fair and reasonable feed-in tariffs for small-scale renewable generation. Any such guidelines would aim to encourage competition, provide clear rights and obligations around the terms of connection and what constitutes a fair and reasonable return for a small-scale system (Standing Council on Energy and Resources 2012). The Authority considers the Council's work based on these principles will help promote the stabilisation of the SRES.

Recommendation

R.5. The Small-scale Renewable Energy Scheme should remain separate to the Large-scale Renewable Energy Target.

R.6. The threshold for solar photovoltaic units in the Small-scale Renewable Energy Scheme should be reduced from 100 kW to, say, 10 kW. The Authority recommends the Government conduct further consultation with stakeholders to determine an appropriate threshold. Units over the small-scale threshold would be included in the Large-scale Renewable Energy Target with five year deeming.

R.7. The ministerial power to lower the price cap should be retained to provide an immediate cost containment mechanism should installations of small-scale systems boom.

R.8. The Small-scale Renewable Energy Scheme should be phased out by reducing deeming so that renewable energy generation from small-scale systems is not rewarded after 2030.

5.3. Small-scale Renewable Energy Scheme administration

There are a number of administrative issues associated with the SRES that could also be amended to improve the operation of the scheme. This section considers:

- the clearing house;
- generation returns; and

- the collection of data regarding out of pocket expenses.

5.3.1. The clearing house

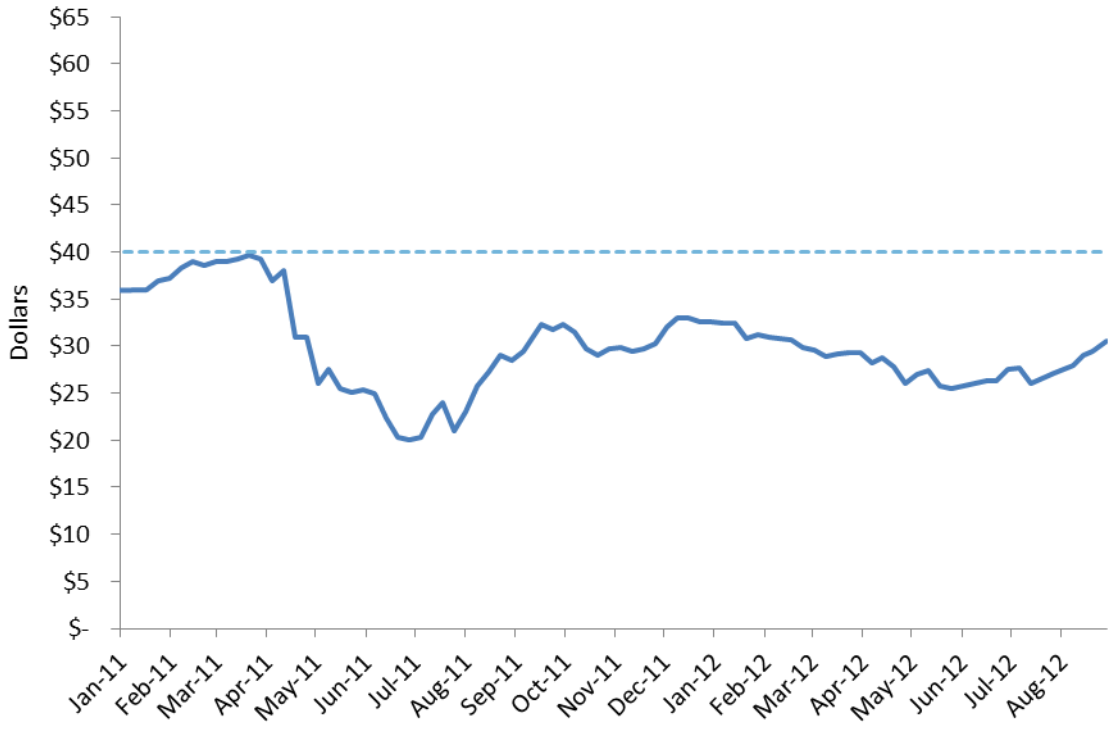
The 'STC clearing house' is a voluntary mechanism designed to facilitate the exchange of STCs between buyers and sellers (owners or agents) at a fixed price of $40. Sellers may enter their STCs on the 'transfer list'. The list clears as buyers purchase STCs from the clearing house. If there are no STCs listed, the Clean Energy Regulator will create an STC, which will be replaced with the next certificate entered on the transfer list. While the clearing house provides a set price per certificate, there is no guarantee how long it will take to sell.

The clearing house was designed to fulfil two purposes: to cap the price of certificates for liable entities (Commonwealth Government 2010) and to deliver a set subsidy of $40 per STC for households, small businesses and community groups (Department of Climate Change and Energy Efficiency 2010).

The clearing house operates as a price cap by allowing liable entities to acquire a limitless number of certificates from the clearing house for the set price of $40. The price cap role played by the clearing house is an important cost containment mechanism given the SRES has no quantitative cap.

While the clearing house has provided an effective price cap, it has failed to deliver a set subsidy of $40 per STC to owners of small-scale systems (or their agents). The clearing house is a voluntary mechanism and liable entities have chosen to acquire certificates outside the clearing house where STC spot prices are around $25 to $32 (see Figure 28). This has meant the clearing house transfer list has not cleared for 18 months (the last sale was on 25 February 2011).

Figure 28 Small-scale technology certificate spot price



Source: The Green Room – Next Generation Energy Solutions (NGES), 2012.
Note: In nominal prices.

Although the Commonwealth Government has never guaranteed a timeframe for clearance (and this is made clear on the Clean Energy Regulator's website), the existence of the clearing house has created an expectation among some non-expert participants that a $40 set price per STC is obtainable. The Authority received several submissions from individuals who had installed small-scale systems anticipating $40 per STC, but whose certificates had not yet cleared – in some cases, the individuals had waited a considerable period of time.

The Authority has considered a number of possible amendments to the clearing house that could address this issue and improve the operation of the SRES, including:

- amending the clearing house so that it is compulsory and therefore delivers the set $40;
- abolish the clearing house and use the shortfall charge as a price cap; and
- amend the clearing house to be a 'deficit sales facility'.

Amend the clearing house to be compulsory

A number of stakeholders proposed making the clearing house compulsory to '[stop] the market under-cutting [the clearing house price] and restore the price to a set $40 per STC' (Robin Morgan, sub.1, p.1).

When designing the scheme, a compulsory clearing house was considered (Commonwealth Government 2010). It was decided it should be voluntary on the grounds that it provided greater flexibility to liable entities – this remains a valid consideration. Importantly, making the clearing house compulsory would most likely increase the cost of the SRES and, given that cost is one of the primary concerns with the scheme, the Authority does not recommend this course of action.

If the objective is to establish a set subsidy for small-scale systems, other policy mechanisms – such as feed-in tariffs or rebates – would be more suitable than a certificate trading scheme. However, it is not clear that a set subsidy is needed to drive the installation of small-scale systems. Installation of small-scale systems has successfully continued, despite fluctuating certificate prices of $20 to $30 since the inception of the SRES.

Abolish the clearing house

Another option is to abolish the clearing house. This would effectively remove the 'promise' of a $40 set price, pushing all activity onto the secondary market. This would have the advantage of removing the unrealistic expectation regarding the attainment of $40 per STC in a timely manner.

Abolishing the clearing house may also have some benefits in terms of administrative savings. However, these are likely to be small. The largest cost associated with the clearing house was its establishment; its ongoing operating costs are relatively low.

At face value, abolishing the clearing house may not impact adversely on the market: there is a functioning secondary market and many householders now interact with the scheme through agents, (particularly given the clearing house does not deliver prompt payment for certificates). However, the clearing house may play a more active role should the SRES stabilise. The Clean Energy Council made this point in its submission, stating:

> *While the Clearing House has not necessarily played the role it was intended to play as part of the SRES, it is nevertheless now an important part of the scheme. The challenges in forecasting the uptake of small scale systems has limited the extent to which the clearing house has played an active role in the market to date. [The] Clearing House should remain in*

> *place and will over time play an increasing active part in the functioning of the SRES. If the Clearing House were to be changed or abolished … the impact on the small scale technology market would be highly detrimental. (Clean Energy Council, sub.12, p.23)*

Abolishing the clearing house would require potential complex transitional arrangements to be put in place for certificates currently on the transfer list.

Further, abolishing the clearing house would raise the question of how to cap the scheme price. This could be done through the shortfall charge (which could be lowered to match the tax-effective value of the clearing house price). There are, however, a number of disadvantages to using the shortfall charge as a price cap.

First, it is easier to lower the clearing house price. Lowering the shortfall charge would require an amendment to primary legislation, whereas the clearing house price can be lowered through a legislative instrument, which has a less onerous parliamentary process.

Second, the clearing house may also have advantages over the shortfall charge from a reputational perspective, which means it may be a more effective form of a price cap. Liable entities may be more willing to access a price cap in the form of set-price certificates from the clearing house than pay the shortfall change, which may carry connotations of non-compliance.

Finally, there may be benefits to the clearing house price over the shortfall charge in terms of environmental effectiveness. The 'regulator-issued' certificates are eventually replaced by real certificates representing one megawatt hour of renewable generation. Payment of the shortfall charge, however, is simply the payment of a tax and does not directly lead to any additional renewable energy generation.

On balance, the Authority does not believe there is a case for abolishing the clearing house.

Amend the clearing house to a 'deficit sales facility'

The clearing house could be amended to a 'deficit sales facility', whereby new certificates are only allowed to be entered in the clearing house when it is in deficit (that is when the Clean Energy Regulator has issued certificates to liable entities).

This would retain the clearing house as the price cap and all the associated advantages. It would, however, be clear to participants that the clearing house cannot guarantee a set price per certificate. This arrangement would essentially do away with the transfer list, certificates would clear through the clearing house on a 'first come, first served' basis as soon as the clearing house went into deficit. Participants who did not go through the clearing house would not be significantly disadvantaged because the secondary market price would most likely also be high if the clearing house were in deficit.

Of the options assessed, the Authority considers that the deficit sales facility option would most likely provide the greatest net benefit. It would allow the continued operation of the clearing house as a price cap, while making it clear that participants cannot expect to receive $40 per certificate in a timely fashion. Such an amendment would also allow the clearing house price to be more easily amended as there would not need to be transitional arrangements put in place for certificates on the transfer list. This option would be easy to implement and have low administrative costs.

RECOMMENDATION

R.9. The clearing house should be amended to a 'deficit sales facility' whereby certificates would only be placed in the clearing house when it is in deficit.

5.3.2. Generation returns

Section 23F of the *REE Act* requires any registered person that creates more than 250 certificates in a calendar year to lodge a 'solar water heater and small generation unit return' to the Clean Energy Regulator. The *REE Regulations* dictate what information must be included in the return. The growth in the solar PV market and the addition of the clearing house has led to more participants, particularly households, becoming liable to submit returns.

The solar water heater and small generation unit return is intended to provide the Regulator with quantitative and qualitative data such as:

- the number of systems and certificates the registered person created; and
- if any applications for certificates were failed by the Regulator and, if so, how many and why.

Nevertheless, the Authority understands that most of the information that is submitted as part of the above arrangements is already available to the Clean Energy Regulator through the REC Registry. Furthermore, the REC Registry provides more current and accurate details of a registered person or agents' activity than the generation returns.

The Clean Energy Regulator has advised the Authority that the time taken for a registered person to complete a return varies, depending on their level of activity and the quality of their record keeping, from 30 minutes to several hours. In addition, it is estimated that it will take the equivalent of half a year for a fulltime employee at the Regulator to assess and respond to the 600 returns due to be received in 2012. Accordingly, there appears to be a clear administrative burden associated with generator returns.

The REC Agents Association commented that the generation return may be a useful method for determining a fit and proper person for the purposes of the REE Act and should be maintained:

> *Agents should be required to demonstrate that they are a "Fit and Proper Person" in their annual generation return. In the annual return they should be required to declare that they have met the requirements of the new provisions. These Agents should not be able to create certificates until such time that they have submitted their generation return and declared that they are not in breach of these provisions. (REC Agents Association, email correspondence, November 2012)*

However, consultation with the Clean Energy Regulator suggests its assessment of the fit and proper test will not depend on information from generation returns.

The Authority's view is that the legislative requirement to produce a return should be removed on the grounds that the administrative costs are not justified given there does not appear to be a clear benefit from collecting the information required in the generation return.

RECOMMENDATION

R.10. The requirement to submit a solar water heater and small generation unit return should be removed from the *Renewable Energy (Electricity) Act 2000* (Cth).

5.3.3. Out of pocket expenses

One of the items the Minister must take into consideration when reducing the clearing house price is the contribution system owners make towards the cost of their system.

Regulation 19G of the *REE Regulations* requires that the net cost of the system (total cost of the system and installation, less the benefit from the small-scale technology certificates) must be provided to the Clean Energy Regulator at the time certificates are created in the REC Registry. This information must be published on the Regulator's website every quarter.

Many of the parties that create certificates are the same parties who install systems. Accordingly, there may be an incentive for these operators to provide the Regulator with a high estimate of the out-of-pocket expense to reduce the possibility of the clearing house price being reduced.

The Authority's view is that this information would be more effectively and efficiently collected through appropriate surveys.

RECOMMENDATION

R.11. The requirement to provide the out-of-pocket expense data for a small generation unit installation should be removed from the *Renewable Energy (Electricity) Regulations 2001* (Cth).

CHAPTER 6. LIABILITY AND EXEMPTION FRAMEWORK

This chapter considers the liability framework for the Renewable Energy Target (RET), including which entities are liable, the calculation of individual liability, the surrender timetable for certificates and the shortfall charge. It also explores the exemption arrangements, including the self-generator exemption and the partial exemption for emissions-intensive, trade-exposed (EITE) industries.

6.1. The liability framework

The RET creates demand for renewable energy by requiring certain entities to surrender a set number of certificates – each equal to one megawatt hour (MWh) of renewable energy generation for compliance purposes – each year. If an entity does not surrender a sufficient number of certificates, it must pay an administrative penalty (a shortfall charge). The scheme also creates a number of exemptions from this liability – for EITE businesses and self-generators.

The liability framework determines which entities must acquire and surrender certificates. The *Renewable Energy (Electricity) Act 2000* (Cth) *(REE Act)* defines liable entities as those that make a 'relevant acquisition of electricity', where a relevant acquisition refers to electricity acquired from the wholesale market (for example, from the National Electricity Market) or where an end-user acquires electricity directly from a generator. In practice, liable entities are primarily electricity retailers. An acquisition is not relevant if the electricity was delivered on a grid with a capacity of less than 100 megawatts (MW).

Individual liability is determined by applying a percentage (set annually by the Minister) to an entity's electricity acquisitions for that year. Entities acquit their liabilities by surrendering the required number of certificates to the Clean Energy Regulator by February of the following year, with interim quarterly surrenders required under the SRES. If a liable entity does not surrender a sufficient number of certificates required to acquit it's RET liability, it must pay the shortfall charge.

6.1.1. Liable entities and calculating individual liability

As described above, an acquisition of electricity is not liable under the RET if the grid from which the electricity was acquired has a capacity below 100 MW. The Renewable Energy Sub Group's 2012 report to the Council of Australian Governments' *Review of Specific RET Issues* explains the rationale for these settings, noting:

> *To minimise costs of compliance and administration, liability under the RET is imposed on wholesale acquisitions of electricity, mainly by retailers who are best placed to manage RET liabilities … To reduce compliance and administrative costs, grids of less than 100 MW capacity are exempt from liability. (Renewable Energy Sub Group, 2012, p.41)*

The Authority's view is that increasing the grid generation threshold, for example, to match growth in population and aggregate electricity demand or to leave additional renewable capacity out of the

calculation (as suggested by the Power and Water Corporation (sub.137, p.2)) could be inequitable as similar communities could be treated differently, depending on when their grid sizes grew.

The Authority's view is that the liability definitions and thresholds generally appear to be functioning effectively and strike a reasonable balance between comprehensiveness and administrative simplicity. Liability and threshold arrangements have been in place since the commencement of the Mandatory Renewable Energy Target (MRET) in 2001 and liable entities are accustomed to them and have established systems and practices in place for compliance.

RECOMMENDATION

R.12. There should be no changes to the primary point of liability or the size threshold for coverage of grids.

6.1.2. Opt-in liability arrangements

A number of stakeholders proposed allowing large electricity users to opt-in to manage liability under the RET for the electricity they consume. For instance, the Australian Industry Greenhouse Network submitted that an opt-in scheme would provide for:

- *Market liquidity: through increasing the number of buyers and (possibly) sellers that are covered under the RET, leading to lower cost of compliance and efficient market outcomes*
- *Flexibility: for energy users to evaluate the most cost efficient solution to manage their obligations under the RET. Large energy users should be able to evaluate how to best manage their aggregated liabilities to minimise the net cost to their business. (Australian Industry Greenhouse Network, sub.164, p.6)*

Stakeholders supporting opt-in arrangements also identified other potential benefits. The Climate Markets and Investment Association submitted that:

> *Market participants have already started decoupling electricity and REC costs during the development of Power Purchase Arrangements (PPA). However, the current arrangement which mandates the wholesale purchaser of electricity to manage the RECs for all liable entities makes decoupling more difficult to agree. The ability for liable entities to opt-in would remove this complexity. (Climate Markets and Investment Association, sub.94, p.2)*

The Association also noted that:

> *The limited number of wholesale market participants impacts the liquidity of the RET. The ability for liable entities to opt-in would create greater market liquidity and also provide project developers a greater range of participants with which to agree a PPA. (Climate Markets and Investment Association, sub.94, p.2)*

The additional flexibility provided by opt-in arrangements may have benefits from an economic efficiency perspective. In some circumstances, electricity suppliers may have a reduced incentive to seek out opportunities for least-cost compliance with RET obligations as they are able to pass-through RET costs to consumers. Allowing electricity consumers to opt-in would allow the party that has the clearest incentive to minimise costs of RET compliance to source and purchase certificates. This should encourage cost-effective compliance and reduce the overall costs of the RET. For similar reasons, opt-in arrangements have been allowed in other certificate-based schemes, such as the carbon pricing mechanism and the New South Wales Greenhouse Gas Reduction Scheme (GGAS).

In terms of costs, opt-in arrangements would lead to increased administrative and compliance costs associated with measurement, reporting and verification. It would also potentially increase uncertainty for existing liable entities regarding their own liability. These costs could be at least partly addressed through the design of the opt-in arrangements. A sufficiently high participation threshold should be set to ensure that the number of additional participants is manageable. Also, a sufficient period of notice of intention to opt-in should be required to provide certainty for existing liable entities. Finally, if a party has opted-in, then it should be clear that that party alone is responsible for compliance, with no recourse to the original retailer in the event of non-compliance.

On balance, the Authority considers that the benefits of providing for opt-in liability arrangements are likely to outweigh the costs if appropriately designed.

The Authority notes that key design features that need to be put in place for an opt-in scheme would include:

- specification of which entities are eligible to opt-in for example, size threshold (specified in terms of electricity consumption), plus metering requirements;
- deadlines for opting in (or out again, but not within a compliance year), and notification arrangements for electricity suppliers;
- administrative processes to create a liability to surrender certificates for the relevant supply of electricity for the consumer, and removal of liability for that supply from the electricity supplier;
- requirements for measurement, reporting and verification of electricity consumption by the opted-in entity; and
- processes for the surrender of units by the opted-in entity.

A number of electricity users and retailers have commented that the model for opt-in for large electricity users under the GGAS was effective (see Box 7). For instance, Origin Energy Ltd submitted that:

> *[Opt-in] arrangements appear reasonable. Origin would welcome further engagement in the design of the opt-in arrangements to ensure that they are efficient for all parties involved. From a retailer's perspective one of the key considerations is the notice period given regarding changes of retailer. We note that the large user provisions in NSW GGAS have worked reasonably well. (Origin Energy Ltd, sub.213, p.7)*

Box 7 Greenhouse Gas Reduction Scheme opt-in arrangements

Under GGAS, large consumers of electricity were allowed to opt-in to assume scheme obligations for meeting emissions intensity benchmarks from liable electricity suppliers. To measure the amount of electricity consumption that is opted-in the GGAS used metering points with national metering identifiers administered by the Australian Energy Market Operator. The GGAS administrator received reports of annual electricity consumption at the relevant meters from both the electricity user and the retailer. In practice, both parties relied on electricity sales data, and resolution of any discrepancies did not prove difficult. The GGAS had around 32 default liable entities and 12 opted-in participants, and administration of reporting and verification under the GGAS was estimated to take approximately one month for two full-time staff.

Several stakeholders also highlighted the importance of consultation on the detailed design features of an opt-in scheme to ensure that it is effective and taken up by potential participants. The Australian Industry Greenhouse Network submitted that:

> *… we recommend a thorough consultation process be carried out to determine an efficient RET opt-in scheme design that avoids duplication and minimises the administrative burden on both the end user and supplier/retailer to maximise value and uptake. (Australian Industry Greenhouse Network, sub.164, p.6)*

Experience with the development of opt-in schemes for natural gas users and other large fuel users under the carbon pricing mechanism by the Department of Climate Change and Energy Efficiency suggests that, while conceptually relatively straightforward, opt-in schemes can entail considerable complexity in practice.

The Authority considers that further analysis and consultation by the Government will be important to establish the detailed design features of an opt-in scheme, and that the GGAS opt-in model provides an appropriate starting point for this detailed design work. In developing the opt-in approach it will be important to ensure that it is effective for large electricity users and retailers, while maintaining the environmental integrity of the RET and ensuring administrative costs are efficient. Some of the key issues that the Authority considers will need to be addressed are outlined in Box 8.

Box 8 Key design issues for Renewable Energy Target opt-in

Threshold: Setting a minimum size threshold for electricity users eligible to opt-in is likely to be an effective way to limit the number of participants. This would reduce administrative costs and enhance the workability of an opt-in scheme. The GGAS allowed for opt-in by large electricity users with over 100 gigawatt hours (GWh) of annual electricity consumption, including at least one site with over 50 GWh. The GGAS had 12 participants opting-in for New South Wales and the Australian Capital Territory and relatively low administration costs. However, some large electricity users have submitted that the GGAS threshold is too high and would exclude facilities that could effectively opt-in to manage obligations.

The Authority considers that in setting a threshold it will be important for the Government to strike an appropriate balance between allowing large consumers to manage their own costs more efficiently and the increased administrative burden associated with verifying opt-in arrangements and increased numbers of participants in the RET.

Notice Period: Providing an adequate notice period for opt-in will be important to minimise costs for both the Clean Energy Regulator and electricity retailers. Liable retailers will require sufficient time to cross-check information relating to metering points and to make adjustments to billing systems when a customer opts-in to manage their own liability under the RET. The Clean Energy Regulator will also need time to process applications and verify information. The GGAS functioned effectively with a 6 month notice period, and a requirement that opt-in be for full compliance years.

Measurement and verification of electricity consumption: Effective measurement and verification arrangements are important to ensure environmental integrity and to provide certainty of obligations for opt-in participants and other liable entities. Among other things, losses on distribution networks would need to be accounted for to ensure equivalent treatment for retailers and firms that opt-in.

RECOMMENDATION

R.13. Large electricity consumers should be permitted to opt-in to assume direct liability for Renewable Energy Target obligations. The Commonwealth Government should consult further with stakeholders to develop a detailed approach to opt-in that is efficient for both large electricity users and retailers. The Authority considers that the New South Wales Greenhouse Gas Reduction Scheme opt-in model would be an appropriate starting point for this detailed design work.

6.1.3. Calculating individual liability

The annual Large-scale Renewable Energy Target (LRET) and Small-scale Renewable Energy Scheme (SRES) targets are divided among liable entities on the basis of their reduced acquisitions of electricity. Reduced acquisitions relate to the electricity acquired on grids above 100 MW capacity, minus any reduction in liability (in megawatt hours) which is provided in partial exemption certificates (see Section 6.5.1). The annual targets are set as a percentage which is multiplied by an entity's reduced electricity acquisitions in the compliance year, in order to determine the number of certificates that must be surrendered. The percentages are known as the renewable power percentage (RPP) for the LRET and the small-scale technology percentage (STP) for the SRES, and are explained in more detail below.

Large-scale Renewable Energy Target

The RPP is required to be set annually no later than 31 March in the *Renewable Energy (Electricity) Regulations 2001* (Cth), and applies to the entire calendar year in which it is set. When determining the RPP, the Minister must take into consideration:

- the LRET gigawatt hour target for that year;
- the estimated total electricity sold on liable grids for that year;
- any surplus or deficit of certificates from previous years; and
- the amount of all partial exemptions.

Once the RPP is announced and partial exemption certificate (PECs) are received by liable entities, they are able to estimate their accumulated liability for the LRET at any point in the compliance year.

The RPP for 2011 was 5.62 per cent (approximately 10 400 000 LGCs) and for 2012 is 9.15 per cent (approximately 16 763 000 LGCs). The default RPP in 2013 is 10.42 per cent (approximately 19 088 000 LGCs). Annual fluctuations in the RPP are due largely to changes in the annual LRET target, which are prescribed in the *REE Act*.

Small-scale Renewable Energy Scheme

The STP is also required to be announced by 31 March of the compliance year, but is calculated somewhat differently to the RPP, as the SRES scheme has an uncapped target with a quarterly surrender of certificates (see Section 6.2 for surrender timing). The STP is largely based on the expected number of certificates to be created in the compliance year, adjusted for any differences between the estimated and actual certificates from the previous year, so that the STP tracks certificate creation.

Under SRES, a liable entity must surrender a set percentage of its STCs each quarter. As the actual electricity acquisitions for the compliance year are not known in the first three quarters, an estimate is used to determine how many STCs must be surrendered, based on the previous year's liable electricity

acquisitions multiplied by the STP for the compliance year. The actual SRES liability is trued-up in the fourth quarter when the actual compliance year's liable electricity acquisitions are known.

Flexibility is provided if a liable entity believes their liable acquisitions this compliance year will be sufficiently different to last year's actual acquisitions. If desired, the liable entity can apply to the Clean Energy Regulator to have a proposed amount, instead of the previous year's liable acquisitions, used to determine quarterly surrender requirements in the first three quarters (with true-up still occurring against actual acquisitions in the fourth quarter). This revised estimate can only be provided once per compliance year. To prevent a liable entity from deliberately underestimating their STC surrenders in the first three quarters, penalties in the form of quarterly shortfall charges can be applied by the Clean Energy Regulator retrospectively to quarters in which the actual liability for the compliance year exceeded the proposed amount by more than ten per cent.

The STP for 2011 was 14.80 per cent and for 2012 is 23.96 per cent. The non-binding estimate for 2013 is 18.76 per cent, equivalent to 34 457 000 STCs. STP fluctuations are due to changes in the forecast number of certificates that are expected to be created and adjustments for any difference (surplus or deficit) between the forecast and actual certificate creation figures from the year before. Certificate creation in 2011 was greater than expected, meaning the 2012 STP had to be set higher to account for the resulting surplus.

6.1.4. Timing of publication of the renewable power percentage and small-scale technology percentage

In submissions from stakeholders, a number of liable entities and large energy users proposed changing the timing of the publication of the RPP and STP, from 31 March of the compliance year, to before the commencement of the compliance year. These stakeholders noted that earlier publication of the percentages would reduce risks, facilitate planning for compliance with liabilities, and allow consumers to enter into price pass-through arrangements with electricity retailers prior to the commencement of the year. For instance, Qenos Pty Ltd stated that:

> *LRET and SRES liability is not finalised until 31 March each year. This makes it more difficult for a company to accurately determine its likely RET costs and introduces greater risk for liable entities. This higher risk generally results in higher costs, via the imposition of risk premiums of RET liability. This risk could be reduced, and companies would be able to better manage their RET obligations if the relevant percentages were able to be declared at or before the beginning of each calendar year. (Qenos Pty Ltd, sub.60, p.5)*

Similarly, the Major Energy Users Inc. stated that:

> *Setting the RPP 3 months into the year in which it applies, provides no ability for incorporation into cost budgets. It would be more use if the RPP was set prior to the start of the year in which it applies to allow consumers to build the cost into its future budgets. (Major Energy Users Inc., sub.103, p.20)*

The timing of the RPP and STP requires balancing certainty for industry participants with the accuracy of the percentages. The RPP and STP are based on forward estimates of a number of factors – including the estimated amount of electricity that will be acquired in relevant acquisitions and the estimated amount of all partial exemptions. They also rely on some inputs from previous years, such as the surplus or deficit of STCs. The earlier the RPP and STP are set, the less accurate they are likely to be and these inaccuracies will need to be accounted for in setting the next year's percentages.

The RPP is able to be predicted with a relatively high degree of accuracy ahead of the compliance year, because the RPP does not follow certificate creation and the interim LRET targets are published within the *REE Act*. The STP is harder to predict with accuracy, as it involves the estimation of more variables, with a key area of uncertainty being the forward estimate of the number of STCs likely to be created in the compliance year. This factor is inherently difficult to estimate, regardless of timing.

The Clean Energy Regulator advised that there would be only a small loss of accuracy if the RPP was set earlier, provided this was not before November preceding the compliance year. An earlier announcement of the STP would be expected, however, to result in a less accurate estimate of the number of certificates expected to be created in the following compliance year. It would also result in a longer lag time between over and under surrendered certificates from previous years flowing through to the STP, due to less data being available. The overall effect of an earlier announcement of the STP is therefore greater certainty for liable entities ahead of the compliance year, but potentially wider variations in the STP between compliance years, as corrections from previous years flow through.

The Authority sees benefit in the percentages being announced before the commencement of the compliance year. Such a change would allow a liable entity to be able to estimate its cumulative LGC liability throughout the compliance year with a higher degree of accuracy, and to be more informed when managing its certificate purchases. An earlier announcement of the STP would also allow a liable entity to estimate the number of certificates it must surrender for the whole of the first quarter of the compliance year, based on its previous year's reduced acquisitions.

Most stakeholders that responded to the Authority's preliminary view that the RPP and STP should be set earlier were supportive of the approach. Australian Power and Gas submitted that:

> *APG strongly supports the Authority's view to set the renewable power percentage and small-scale technology percentage ahead of the compliance year…*
>
> *By imposing a requirement on the Clean Energy Regulator… to set both the RPP and STP prior to the start of the compliance year (suggested by 1 December of the previous year) will greatly assist retailers with the management of their liabilities under the Schemes as well as their budgeting of certificate costs and negotiations in wholesale arrangements. (Australian Power and Gas, sub.188, p.2)*

The Authority's view is that it is desirable for the percentages to be announced by 1 December of the previous year. In light of this recommendation, the Government may also wish to consider whether to continue setting the RPP and STP in regulations, which can have relatively long lead times, or whether another instrument such as a determination, may be preferred to set the RPP and STP.

RECOMMENDATION

R.14. No changes be made regarding the process for calculating individual liability.

R.15. The relevant renewable power percentage and small-scale technology percentage should be required to be set prior to a compliance year, and preferably by 1 December of the preceding year.

6.2. Certificate surrender

Liable entities acquit their annual obligation by surrendering the required number of certificates to the Clean Energy Regulator.

Under the LRET, surrender occurs annually as part of a liable entity's annual 'energy acquisition statement', which must be submitted on or before 14 February. The statement allows the Clean Energy

Regulator to confirm that the entity has surrendered the appropriate number of certificates to meet its obligations. If the liable entity does not surrender the number of certificates required, a shortfall charge applies to the outstanding amount.

Surrender occurs quarterly under the SRES. The surrender is weighted toward the first quarter with a surrender requirement of 35 per cent of the STCs (due 28 April), followed by 25 per cent in the second and third quarters (due 28 July and 28 October respectively). The last quarter is around 15 per cent of the STCs (due 14 February) although this may vary as the liable entities' actual electricity acquisitions are known by this time and there is a need to true-up in this quarter. According to the *Enhancing the Renewable Energy Target Discussion Paper*, the rationale for this approach was to provide more regular cash flow to small-scale certificate holders (Commonwealth Government, 2010). This was considered necessary as, if certificates cleared at a set price through the clearing house, there would be no impetus for liable entities to make regular acquisitions of small-scale certificates.

The timing of surrender affects liable entities and certificate holders in opposite ways. Any cash flow benefit to certificate holders is potentially at the expense of liable parties. There are also higher administrative costs as the liable entity must demonstrate compliance four times a year.

In submissions to the issues paper, some stakeholders advocated for more frequent LGC surrender, on the basis that it would improve market liquidity. Meridian's submission stated that:

> *Forward prices for LGCs, with LGCs primarily being sold forward or through long-term off-take arrangements, tend to be set in a manner that reflects current spot LGC prices. Where the LGC spot price is suppressed or inflated during period of low liquidity, the LGC forward price will be similarly suppressed or inflated. Market participants with cheap access to cash can drive spot price outcomes through relatively small trades, in a manner which moves forward prices, in order to achieve more favourable pricing on larger contracts for forward delivery. For example, a well-positioned participant might deflate (inflate) spot prices in order to buy (sell) large forward volumes at deflated (inflated) pricing.*
>
> *Amending the LRET such that LGCs are surrendered on a quarterly basis (with an annual shortfall assessment in the same way that STCs are surrendered) would eliminate these anomalies and market inefficiency. (Meridian Energy Australia, sub.159, pp.14-15)*

Qenos, however, advocated for less frequent surrender of STCs, on the basis that it increased compliance costs (Qenos, sub.60, p.5). Qenos' submission also advised that requirements to determine quarterly surrender based on the previous years' consumption can create difficulties where electricity consumption varies significantly from year to year.

The Authority made a draft recommendation in its discussion paper that the current surrender timing (quarterly for SRES and annual for LRET) should be maintained. Feedback from stakeholders on the discussion paper has been generally supportive of the Authority's justifications for maintaining the current regime. The Clean Energy Council advised:

> *Having consulted with a cross sector of the PV industry the very strong response was that a shift to annual surrender periods would have a strongly detrimental effect on the industry by hurting cash flow, particularly to smaller businesses. While some in the industry would like more frequent surrender periods, all agreed that the current quarterly surrender periods stuck a good balance between compliance costs and cash flow, and subsequently that no change to the current regime was necessary. (Clean Energy Council, email correspondence, November 2012)*

Meridian Energy Australia wrote:

> *While Meridian stands by its suggestion [to increase LGC surrender to quarterly]…, it respects the Authority's conclusion that "the potential for additional compliance costs for quarterly surrender of LGCs" dilutes the benefits of a change. (Meridian Energy Australia, sub.211, p.2)*

The Authority's final view is that the current surrender arrangements should be maintained.
The Authority also notes that recommended changes to the announcement of the STP (R.15) may help to reduce some of the compliance cost burdens of liable entities under the SRES, as they will have greater certainty of their first quarter liability earlier in the compliance year and may therefore be able to manage certificate purchases in a more economically efficient way.

RECOMMENDATION

R.16. The current arrangements for surrender of certificates (annual surrender for the Large-scale Renewable Energy Target; quarterly surrender for the Small-scale Renewable Energy Scheme) should be maintained.

6.3. Refund of over-surrendered certificates

Currently, any certificates that have been surrendered in excess of a liable entity's actual liability are automatically held-over by the Clean Energy Regulator and are used to offset that entity's liability in future years. Origin Energy raised concerns with the current provisions that prevent the Clean Energy Regulator from refunding over-surrendered certificates, particularly in cases where a liable entity ceases to trade but cannot recover the value of over-surrendered certificates. Origin Energy's submission stated that:

> *Provisions in the LRET and SRES restrict or prevent the Regulator from returning surrendered certificates. In LRET and SRES any excess of certificates surrendered can be carried forward to offset future liabilities. However where a company ceases to trade "accepted" certificates cannot be recovered resulting in a financial loss to the company. (Origin Energy, sub.69, p.14)*

Over-surrender of certificates is more likely under the SRES than under the LRET because a liable entity must surrender certificates based on the previous year's liable acquisitions (or another estimate). A liable entity may therefore have over-surrendered certificates in a year in which they cease to trade because their estimated liability differs from their actual liability in a compliance year. This situation cannot be avoided without risking additional costs being accrued by the liable entity, as a shortfall charge may be applied if certificates are under-surrendered. By comparison, as the LRET scheme has annual certificate surrender, the liable entity knows its actual liability before it is required to surrender certificates in the February following the end of the compliance year.

The Authority considers that it is equitable to refund over-surrendered certificates in cases where a liable entity ceases to trade, or to transfer over-surrendered certificates where a liable entity is acquired by another entity which takes on a RET liability. Such a change would benefit liable entities by providing them with assurance that the value of over-surrendered certificates would not be lost if they ceased to trade. This assurance may be important if a liable entity is deciding between a possible over-surrender based on last year's reduced acquisitions, or providing the Clean Energy Regulator with a proposed amount on which to base SRES quarterly surrenders, which may attract retrospective quarterly shortfall charges if actual acquisitions are higher than the proposed amount. The precise features of the refund arrangements should be developed in consultation with stakeholders.

RECOMMENDATION

R.17. The Clean Energy Regulator should be able to refund over-surrendered certificates to a liable entity that ceases to trade, or to transfer over-surrendered certificates if a liable entity is acquired by another entity which takes on a Renewable Energy Target liability.

6.4. Shortfall charge

If a liable entity does not surrender the number of certificates required under the LRET or the SRES, a shortfall charge applies to the outstanding amount. The shortfall charge for both the LRET and SRES is fixed at $65 per MWh. Costs incurred by purchasing certificates are tax deductible, while the payment of the shortfall charge is not. Therefore, liable parties could purchase certificates up to a (tax effective) price of around $93, assuming a company tax rate of 30 per cent, before they were financially worse off than paying the shortfall charge.

The shortfall charges are not indexed, and therefore fall in real terms over time. This was a deliberate policy decision, reflecting the nature of the RET as a transitional measure to bridge the gap between fossil-fuel and renewable energy costs in the short- to medium-term. It is expected that as the cost of renewable energy technologies decline, and the carbon price increases, it will allow renewable energy technologies to compete in their own right.

Stakeholders that commented on the level of the shortfall charge in their submissions had varied opinions on whether the current shortfall charge was appropriate. The Clean Energy Council, Climate Markets and Investment Association, and Windlab Systems Pty Limited were all of the opinion that the current shortfall charge was appropriate. Infigen Energy further advised that:

> *The current tax effective shortfall penalty price of $92.86 [per] MWh is appropriate and sufficient to enable the 41 000 [GWh] renewable energy target to be achieved – as long as investors and the industry have confidence that the LRET target will not be reduced or stretched out. (Infigen Energy, sub.111, p.6)*

The Authority also received a number of submissions suggesting the current shortfall charge was either too high or too low. Major Energy Users Inc. stated in its submission that:

> *Historically, forecasts for the cost of providing renewable energy in the future show that renewable energy could cost much the same as non-renewable generation by 2030. This implies that the future cost of LGCs could fall from current levels. On this basis, the shortfall charge is probably too high. (Major Energy Users Inc., sub.103, p.20)*

By comparison, CleanSight Pty Ltd, LMS Energy Pty Ltd and Evans and Peck advocated for a higher shortfall charge which is increased annually to account for inflation so that in real terms the level of the shortfall charge stays the same.

Whether the shortfall charges are set at the appropriate level depends on their desired role. The RET shortfall charge potentially performs two functions:

- first, as an administrative penalty for liable parties that do not meet their obligations to surrender certificates; and
- second, as a price cap to limit the overall cost of a scheme or mechanism.

If the charges are set very high they will not operate as a price cap in practice as it will rarely be more financially attractive to pay the charge than to purchase certificates.

If the shortfall charges operate as a price cap, they have the benefit of reducing price uncertainty for liable entities and ensuring the costs of the scheme are contained. It also makes explicit the policy response in the event of extreme pricing outcomes. For example, if the price rises, there will become a point where it is undesirable to continue to impose the cost of the scheme and a price cap provides an explicit indication of where that point is.

The disadvantage is that the amount of renewable energy generated is reduced if liable entities choose to incur shortfall charges rather than purchasing certificates from eligible generators.

To date, the price of certificates has never risen above $93 and therefore the shortfall charges have only been used when entities have mismanaged their liability or lacked sufficient funds to purchase certificates. Even if the price of certificates were to rise above $93, entities may choose to acquire certificates, rather than pay the shortfall charges, for reputational reasons.

At its current level, the shortfall charge operates more as an administrative penalty, rather than a price cap. It is high enough to dissuade entities from accessing it on a regular basis. However, it also provides a 'safety valve' that can be accessed in unforeseen circumstances (for example, in the event of a short-term lack of supply of certificates or finance).

The modelling work commissioned by the Authority indicates that the price of certificates is not expected to increase to a level where the LRET shortfall charge would operate as a price cap, except under scenarios where there is no carbon price or electricity demand is significantly lower than currently anticipated (see Appendix D). In response to the Authority's draft recommendation to retain the shortfall charge, Sinovel wrote:

> *Sinovel is of the opinion that the shortfall charges should not be touched. The current shortfall charges are demonstrably high enough to stimulate new generation and with technology and scale gains likely to offset the reduction in resource quality over time this [is] likely to always be the case. The argument for stability over change has already been made in regards to other recommendations. (Sinovel, sub.219, p.3)*

The Authority's view is that the shortfall charge is set at an appropriate level given the current policy context. However, in the event that the carbon price or electricity demand is significantly lower than currently anticipated, there is a risk that the shortfall charge would not be high enough to encourage compliance, in which case the 2020 target of 41 000 GWh would not be met. The Authority will consider these issues in its 2016 review, or earlier if circumstances warrant.

RECOMMENDATION

R.18. The current settings for the shortfall charges should be maintained. However, the level of the shortfall charge should be reconsidered by the Authority as part of its 2016 review of targets beyond 2020, or earlier if circumstances warrant.

6.5. Exemptions

There are two forms of exemptions under the *REE Act*. The first is a partial exemption for EITE activities; the second relates to self-generation (that is, where the end-user and generator are the same entity).

The broader the base for liability, the smaller the impact for any individual liable party. For this reason, it is generally more efficient and equitable to keep exemptions to a minimum.

The exemption framework does not affect the environmental effectiveness of the RET, because the number of certificates required to be surrendered under the scheme does not reduce by the extent of the exemptions. Instead, the exemptions have the effect of reducing or removing liability from some electricity users, and redistributing that liability to other entities that remain liable. Each exemption under the RET scheme is considered in more detail below.

6.5.1. Emissions-intensive, trade-exposed activities

Businesses carrying out eligible EITE activities may apply annually for a PEC under the RET. These exemptions were introduced in 2009 when the RET was expanded, and took force in 2010. A PEC application must be made to the Clean Energy Regulator by 30 March (or by 29 April for certain EITE activities).

The general rationale for providing assistance to EITE activities is that these businesses are competing in an international setting where their competitors do not face a similar impost. EITE businesses are unable to pass on the additional cost of the RET to their customers, to remain competitive, and must absorb the additional cost of the RET. This may cause EITE businesses to move the activity to a country that does not have a RET (or other such cost imposition), which is undesirable from an Australian industry perspective.

The partial exemption framework under the RET is similar to, but not the same as, the Jobs and Competitiveness Program under the carbon pricing mechanism. The information and data required to determine the assistance are largely the same – for example, the same list of EITE activities applies and the energy and production data required is the same. The resulting exemption, however, is calculated differently. This is primarily because the RET exemption focuses on electricity use, while the Jobs and Competitiveness Program focuses on emissions.

The RET partial exemption framework works by first identifying EITE activities. Eligible trade-exposed activities are assessed for their overall emissions intensity on the basis of historical data, regardless of the extent to which those emissions are related to electricity use. Under the RET, activities that are classified as highly emissions-intensive receive an assistance rate of 90 per cent, while activities that are assessed as moderately emissions-intensive receive an assistance rate of 60 per cent. There are currently more than 30 eligible EITE activities, including aluminium smelting, integrated production of lead and zinc, manufacture of newsprint, carton board manufacturing and petroleum refining.

An EITE business can apply to the Clean Energy Regulator for a PEC. The Clean Energy Regulator calculates the value of the PEC taking into account the assistance rate and a range of other inputs including:

- electricity use per unit of output for the activity – each activity has a specified electricity baseline, the value of which is predetermined from historical data and is set in the Regulations;
- output – the quantity of relevant product is submitted to the Clean Energy Regulator by the EITE organisation every year; and
- proportion of electricity use from a given site that is related to the EITE activity and thus could be eligible for a PEC – this is only relevant if multiple activities or processes are carried out on the one site.

A PEC is awarded to an EITE business as a volume of electricity (in megawatt hours) for which they are not liable under the RET. The volume of partial exemptions is significant. In 2011, partial exemptions of around 27.5 million MWh of electricity were exempted from RET liability, equal to approximately

13 per cent of the total relevant acquisitions of electricity for the RET in 2011. This equates to an exemption worth approximately $184 million at the average 2011 price of $38.80 per LGC and $30.30 per STC. EITE exemptions result in increased costs for other RET liable entities, because they must share the RET liability for the electricity exempted in the PECs. As a rough guide, dividing the value of the 2011 partial exemptions by the reduced number of liable acquisitions (estimated to be 180 million MWh), the exemption would have been expected to add approximately $1.02 per MWh to the price of non-exempt electricity consumption.

The existence and level of the emissions-intensive, trade-exposed exemption

The Authority received over 20 formal submissions plus additional feedback regarding the current level of the EITE partial exemption. A number of the submissions stated that the RET places a substantial burden on EITE industries that are struggling to remain viable in current economic conditions, and emphasised the importance of continuing, or expanding, the current exemptions for those industries to maintain viability. For example, the Australian Aluminium Council stated that**:**

> *…even with the existing exemptions, RET costs the aluminium industry approximately $80 million per annum or $40 per tonne of aluminium at a time when the Australian aluminium industry is loss making and the viability of most facilities is under question and requiring severe cost reduction strategies in order to survive. (Australian Aluminium Council, sub.73, p.8)*

Conversely, a small number of submissions supported reviewing exemptions and reducing, or removing, them if appropriate. For instance, the Australian Network of Environmental Defender's Office New South Wales submitted that:

> *Both the EITE partial exemption and the 'self-generator exemption' should be reviewed, with a view to further limiting or phasing out these exemptions, and increasing their transparency. (Australian Network of Environmental Defender's Office NSW, sub.141, p.3)*

Treatment of the Mandatory Renewable Energy Target for emission-intensive, trade-exposed exemptions

As currently framed, the partial exemption only applies to an EITE entity's liability above the original MRET – EITE businesses are fully liable for their share of RET costs for the first 9 500 gigawatt hours of renewable energy created under the RET (and have been since the commencement of the MRET in 2001). The partial exemption for EITE industries was announced in 2009 in the context of the then proposed Carbon Pollution Reduction Scheme.

The purpose of the partial exemption above the first 9 500 GWh target was to recognise that EITE industries would be affected by a carbon price in the context of other cost pressures, such as the global recession (Commonwealth House of Representatives 2009). While legislators provided EITEs with a partial exemption from the liability associated with the expanded RET, they considered it was reasonable to require all businesses to make some contribution towards renewable energy generation (Commonwealth House of Representatives 2009). This position was reiterated by the Senate Standing Committee on Environment, Communications and the Arts, which held an inquiry into the *Renewable Energy (Electricity) Amendment Bill 2010* and found that:

> *In relation to the proposition that EITE activities should receive exemption for their liabilities under the former MRET, there was no evidence presented to the inquiry that the industries were significantly or disproportionately disadvantaged by that scheme. On that basis, there*

would seem to be no particular reason why they should now be exempted from liability for their share of the former target. (Commonwealth Senate, 2010, paragraph 4.17)

However, given the concerns expressed by the aluminium and cement industries and the emissions intensity and export oriented nature of the aluminium industry in particular, the committee would expect that the matter of the exemptions for EITE activities will be covered in the 2014 statutory review of the scheme. (Commonwealth Senate, 2010, paragraph 4.19)

The Authority received feedback from EITE industries and peak bodies that advocated for the extension of partial exemptions for EITE industries to the MRET liability. Advice from the Australian Aluminium Council stated:

…the RET imposes significant costs on our industry today, in a commercial environment where the low aluminium price and high Australian dollar make facilities extremely vulnerable to the imposition of additional costs. (Australian Aluminium Council, sub.177, p.1)

The Authority recognises that the MRET proportion of the RET imposes significant costs to EITE industries, particularly the aluminium industry, which has the highest electricity acquisitions and accounted for 65 per cent of the partial exemptions awarded in 2012. Assuming an STC price of $32 and an LGC price of $48.26 (used in the Authority's modelling), the MRET related costs on EITE industries would be approximately $66 million in 2012. In principle, the justifications for EITE industries receiving a partial exemption (being higher costs imposed by the carbon price and international competitiveness concerns) apply to the MRET component as they do to the expanded RET. The trade effectiveness of Australia's EITE industries will be influenced by all policies and inputs that increase the costs of EITE production, including the MRET liability.

The Authority also recognises that extending the partial exemption arrangements to the MRET will result in higher RET costs for all other liable entities, because they would need to pick up those costs in order for the target to still be met. Based on the STC and LGC prices estimated above, the cost of the RET for all liable electricity would increase by approximately $0.36 per MWh. The extent of the costs and benefits of such a change in EITE liability require careful consideration in the context of international competitiveness for EITE industries and electricity costs for all electricity users, which the Authority considers cannot be conducted comprehensively within the timing of the RET review.

The Jobs and Competitiveness Program is the EITE industry assistance measure under the carbon pricing mechanism, and is due to be reviewed by the Productivity Commission in 2014-15. As the rationale for the RET EITE partial exemption and the method of calculating its value is based on the Jobs and Competitiveness Program, the Authority considers that it would be more appropriate if the Productivity Commission also considered the level of RET EITE assistance arrangements as part of the Jobs and Competitiveness Program review. The existence and level of the RET EITE exemption (including the MRET liability) are best assessed in the context of carbon price assistance, as the Jobs and Competitiveness Program and EITE exemption measures work together to provide a level of protection against carbon leakage, whereby Australian industries move offshore to avoid the burden of greenhouse gas reduction policies.

Following the release of the discussion paper, the Australian Aluminium Council raised concerns that the proposal that the Productivity Commission review the EITE exemption under the RET in 2014-15 was 'too late'. Their feedback stated:

Our initial submission highlighted that the RET imposes significant costs on our industry today, in a commercial environment where the low aluminium price and high Australian dollar

make facilities extremely vulnerable to the imposition of additional costs. There is potential that significant damage will be caused to the sustaining investment in, and even ongoing operation of, Australia's aluminium smelters and alumina refineries before the proposed review in 2014-15.

…we ask that the final report recommend the EITE exemption be extended to cover the MRET component from 2013. This change could, if necessary, then be reviewed more broadly in 2014-15 by the Productivity Commission as per the original recommendation. (Australian Aluminium Council, sub.177, p.1)

Similar sentiments were raised by CSR:

CSR is disappointed that this has not been addressed in this review, where electricity intensive industries suffer a considerable burden from RET when international commodity prices are extremely low and competing economies do not have such Government imposts. The matter should be addressed now, not in two years. (CSR, sub.195, pp.2-3)

On this issue, the Authority notes that the *Securing a Clean Energy Future* policy statement notes that 'once the carbon pricing mechanism has been released, firms may make a request to the Government to have the impact of the mechanism on their sector assessed' (Commonwealth Government, 2011, p.112). The Government has since released guidelines which set out when such requests will be referred to the Productivity Commission and the terms of reference for the reviews. The guidelines state that the aim of a Productivity Commission review is to:

…establish whether the introduction of the carbon pricing mechanism, taking into account associated assistance arrangements, is having a materially adverse and unexpected impact on the competitiveness of the industry that the firm is operating in, that is likely to persist in the medium to long term. (Commonwealth Government 2012)

In order for the Government to refer an industry assistance review to the Productivity Commission, the industry is required to provide evidence of adverse impacts as a result of the carbon pricing mechanism, with such evidence able to include, but not limited to, 'analysis demonstrating that the direct or indirect carbon costs arising from the carbon price mechanism comprise a significant proportion of revenue (or value added), and a demonstrated inability to either pass-through these costs to customers nor take action to abate them' (Commonwealth Government 2012).

The Authority considers that the relevant considerations for EITE assistance under the RET are much the same as under the carbon pricing mechanism, as the purpose of both EITE assistance measures is to reduce the impact of the schemes on the competitiveness of EITE industries. Along with the recommendation for the Productivity Commission to consider RET EITE assistance as part of the Jobs and Competitiveness Program review, the Authority's view is that the guidelines for whether an industry can request an earlier review of the Jobs and Competitiveness Program should also take into consideration evidence of adverse impacts of the RET on the competitiveness of the EITE industry, when determining whether to refer the matter to the Productivity Commission. This would provide EITE industries that are concerned about the level of assistance provided under the RET a possible recourse to have their assistance levels reviewed sooner.

RECOMMENDATION

R.19. The level of the emissions-intensive, trade-exposed exemption under the Renewable Energy Target should be considered by the Productivity Commission as part of its broader review of the Jobs and Competitiveness Program.

R.20. The Commonwealth Government should take into consideration the impact of the Renewable Energy Target on the competitiveness of an emissions-intensive, trade-exposed industry in any request to the Productivity Commission's review of the level of industry assistance under the carbon pricing mechanism and the Renewable Energy Target.

6.5.2. Technical amendments to the emissions-intensive, trade-exposed partial exemption framework

The Authority has considered a number of technical amendments to the operation of the EITE partial exemption framework, including flexibility regarding the use of PECs and alignment of reporting requirements under the PEC scheme and the Jobs and Competitiveness Program.

Partial Exemption Certificate flexibility

As previously described, the exemptions for EITE businesses are issued in the form of PECs, which remove RET liability for the volume of electricity (in megawatt hours) which is specified in the PEC. EITE businesses are not usually liable entities under the *REE Act*, so the PEC also nominates a liable entity (typically the EITE business's electricity retailer), against which the exemption can be recognised.

Because the electricity retailer's annual RET liability is reduced by the volume of electricity specified in the PEC, it is assumed that the full reduction in liability is passed through to the EITE customer. In reality, however, the value of the PEC is negotiated between the EITE business and its electricity retailer, and may be influenced by assumptions regarding the price of renewable energy certificates, as well as any differences in bargaining power. There is therefore a risk that a liable entity does not pass the full value of the exemption through to the EITE business. Such a situation could undermine the objective of providing the EITE assistance, which is to reduce the RET burden of the EITE business, not the electricity supplier.

A number of submitters requested that PECs be made 'tradeable' in some way. The Australian Industry Greenhouse Network submitted that:

> *One option to ensure the full opportunity value of PECs is realised is through access to an open market – potentially by formally linking the value of a PEC to the value of a LGC. This will lead to more efficient price discovery, avoid value destruction and allow the intent of the PEC to be met. (Australian Industry Greenhouse Network, sub.164, p.6)*

Although many submissions requested that PECs be treated in the same way as certificates, PECs operate differently from certificates. Certificates can be surrendered to meet obligations under the RET, whereas a PEC reduces the overall amount of generation acquired by a retailer that is subject to RET liabilities, rather than directly meeting RET obligations. Consequently, PECs and certificates are not directly interchangeable. Furthermore, if PECs could be used to meet liabilities in the same way as certificates, this would reduce the amount of renewable generation that is achieved by the RET, which would reduce the environmental effectiveness of the scheme.

The Authority's view is that an EITE business could potentially obtain greater value for their PECs if they could be traded with any liable entity, rather than just the electricity retailer that sells electricity to

the relevant EITE firm. This approach would create a market for PECs, with multiple sellers and buyers, and would allow liable entities to compete for PECs based on their willingness to pay. By doing so it could reduce the effect of any differences in bargaining power between an EITE business and their electricity retailer, as the EITE business would have the option to not trade their PECs with their retailer if they believed that could get better value elsewhere.

The Authority included a draft recommendation in its discussion paper to introduce tradeability of PECs. The draft recommendation was generally well received, particularly by EITE industries and their peak bodies. The Australian Aluminium Council advised:

> *The Council supports the Authority's recommendations that large electricity consumers should be able to opt-in to assume direct liability for RET obligations and that the Partial Exemption Certificates should be tradable. These initiatives would strengthen the market-based, least-cost aspect of the RET, within the policy's other limitations. (Australian Aluminium Council, sub.177, p.2)*

Some stakeholders advised that PEC tradeability, while a good idea to improve flexibility for large energy users, may not be necessary if large energy users can opt-in to manage their own RET liability. In such cases, a liable entity which is also an EITE business may choose to offset it's RET liability using its own PECs. Notwithstanding that this may occur, the Authority considers that PEC tradeability remains important in its own right, as the threshold for opt-in may exclude some EITE businesses from managing their own RET liability. Some EITE businesses may also find it more economically efficient to trade their PECs irrespective of whether they have opted-in, particularly if their liability in a compliance year is less than the value of their PEC, which is based on the previous financial year's production.

The Authority does not consider that there are material costs associated with making PECs tradeable. However, the Authority acknowledges that there may be some current contracts between electricity suppliers and EITE businesses that do not allow for pass-through of RET related costs to the EITE customer. While these contracts are expected to be few in number, PEC tradeability may impose costs on the electricity supplier if their EITE customer chooses to trade their PECs with a different liable entity or requests payment for the PECs, even though no RET costs were ever being passed on. In such cases, the electricity supplier would be required to pay for the costs of the RET for the liable electricity acquisitions, with no reduction in liability that would otherwise be provided by PECs. This may result in a significant increase in RET costs for the electricity supplier, and a windfall gain for the EITE customer.

Under the carbon pricing mechanism, the *Clean Energy Regulations 2011* require a minimum pass-through rate of the carbon price between an electricity retailer and certain very large energy users, before the large energy user is eligible to receive free carbon units. The average pass-through of carbon pricing mechanism related costs need to be more than 0.7 carbon units per MWh before the large energy user is eligible to receive free carbon units. To demonstrate compliance, the EITE business and its contracted electricity supplier are required to provide the Clean Energy Regulator with a written statement that the pass-through rate is expected to exceed the minimum threshold for the life of the contract or until 30 June 2021 years, whichever is earlier.

The Authority considers that an approach to ensuring that PECs are not tradeable in circumstances where EITEs are not actually bearing the costs of the RET should be developed.

The Authority recognises that there may need to be some administrative changes to issuing and surrendering PECs, to ensure their trading is efficient and transparent, and to assist liable entities to demonstrate compliance as easily as possible. Those changes would be expected to incur some

additional administrative costs for Government. On balance, however, the Authority's assessment is that the benefits of allowing additional flexibility for EITE entities outweigh the administrative costs.

RECOMMENDATION

R.21. In cases where the RET costs are passed through to emissions-intensive, trade-exposed businesses, partial exemption certificates should be tradeable, and thereby able to be used by any liable entity to reduce liable electricity acquisitions.

Alignment of Jobs and Competitiveness Program and partial exemption certificate processes

Currently EITE entities are required to submit separate applications to the Regulator to receive PECs under the RET and to receive free carbon units under the Jobs and Competitiveness Program. Applications are due by 31 October of the relevant carbon pricing mechanism (financial year) compliance year, and RET applications are due by 30 March of the RET (calendar) compliance year.

The requirements for data used in the Jobs and Competitiveness Program and PEC applications are similar. Both PEC and Jobs and Competitiveness Program applications require provision of information about the amount of production in the previous financial year. Although PEC allocations are made on a calendar year basis and free carbon units are allocated on a financial year basis, both processes use production information from the last completed financial year (that is, both PEC allocations for the 2013 calendar year and Jobs and Competitiveness Program allocations for the 2012-13 application year rely on production information from the 2011-12 financial year). The PEC application also requires additional information about the amount of liable electricity consumed at the site in the previous year.

Auditing and assurance requirements for PEC and Jobs and Competitiveness Program applications are generally the same. However, in some cases where an application is in relation to a new site or a significant expansion to an existing site, entities are able to use estimates of future production. In these cases more stringent audit and assurance requirements are applied to the estimates for PEC allocation than those applied to Jobs and Competitiveness Program allocations.

A number of submitters requested that EITE processes for the Jobs and Competitiveness Program and RET be aligned to reduce compliance costs. For instance, Amcor Packaging Australia submitted that:

> *All EITE businesses must apply to the Clean Energy Regulator for [PECs] for each EITE activity, based on prior year's actual production. The application for assistance must be audited by a registered auditor as per the REC Regulations.*
>
> *Now that the carbon pricing mechanism has been introduced with a similar [Jobs and Competitiveness Program] application procedure, the application process for the 2 forms of assistance should be harmonised and streamlined so only one application and one 3rd party audit of the energy and production data is required. (Amcor Packaging Australia, sub.55, p.5)*

The timing differences between PEC and Jobs and Competitiveness Program applications mean that it is unlikely that a single application could be made for both. The key driver of timing differences is the date by which liabilities can be determined for the RET, which cannot be done accurately until after the setting of the RPP and STP. Even if the date for publication of the RPP and STP is brought forward to December before a compliance year, as proposed by the Authority, this will not be sufficiently early to allow for a single application. It is unlikely that liable entities would wish to take the alternative approach of delaying decisions on Jobs and Competitiveness Program free carbon unit allocations to allow a single application to be made.

As much of the information used is the same between the applications, however, it should be possible to streamline the two application processes to minimise duplication of work and allow sharing of information between applications. A potential limitation that may need to be addressed is that the eligible applicants for the RET and Jobs and Competitiveness Program will often be different entities, which may create legal impediments to sharing information between applications. In addition, the concept of a 'site' at which electricity is consumed that is used as a basis of RET allocation is not exactly the same as a 'facility' that is used for allocation under the Jobs and Competitiveness Program, and there may be benefits to matching these two definitions to align the scope of information to be given in applications.

Opportunities also exist to streamline audit and assurance processes between the Jobs and Competitiveness Program and PEC applications. In particular, the audit and assurance requirements under the RET and the Jobs and Competitiveness Program for estimates of future production could be matched, as there do not appear to be any reasons for more onerous requirements to be applied under the RET. Consistent with the improvements recommended above for application processes, there may also be opportunities to seek permission for the sharing of data between the audit processes where different legal entities are involved in providing the data, and to removing differences between the definition of site and facility to align the scope of audit and assurance requirements. The cost savings for consolidating audit requirements where possible are likely to provide a noticeable reduction in compliance costs for EITE businesses.

In response to the discussion paper and preliminary views of the Authority, Rio Tinto and CSR advocated greater alignment where it would reduce administrative burden. CSR submitted:

> *All efforts to remove red tape and streamline processes are supported. (CSR, sub.195, p.3)*

The Authority understands that the Clean Energy Regulator is already examining a number of the opportunities under the current legislation for the proposed alignment identified above, and encourages the Government to implement administratively efficient options.

RECOMMENDATION

R.22. The Commonwealth Government should consider opportunities for efficiencies through the alignment of application processes and data requirements for emissions-intensive trade-exposed industries under the Jobs and Competitiveness Program and Renewable Energy Target.

6.5.3. Self-generator exemptions

The second form of exemption under the RET applies to entities that generate their own electricity. To be exempt, a self-generator (on a grid of greater than 100 MW capacity) must:

- produce and use the electricity for themselves with no take-off from a third party; or
- in cases where the self-generator is the primary, but not the only, user, the electricity must be used within a one kilometre radius of its production by the entity that generated it.

The self-generator exemption has been included in the MRET since its commencement in 2001. It was retained with the expansion of the RET and the inclusion of the EITE exemption in 2009.

Limited information is available on the amount of self-generation that occurs in Australia, as parties that fall under the self-generator exemption are not required to report the volume of electricity produced under the *REE Act*. The Explanatory Memorandum to the *Renewable Energy (Electricity) Bill 2000* estimated the impact of self-generation to be 'between 4-5 [per cent] of generated electricity, with up to

75 [per cent] of this electricity being consumed internally (that is, by the self-generating business itself)' (Commonwealth Government, 2000, p.8). While it is difficult to accurately estimate the true impact of self-generation, electricity produced by self-generators would only comprise a small proportion of the total electricity generated in Australia.

The Authority's preliminary view, as outlined in the discussion paper, was that the self-generation exemption imposes higher RET costs on other liable entities, and is therefore undesirable from a first principles basis. EITE industries, which have the greatest exposure to higher electricity costs that cannot be passed onto customers without reducing their competitiveness, are already protected from the full impacts of the RET through partial exemptions. EITE industries therefore do not, of themselves, appear to require a further self-generation exemption. The Authority also found that the original justification for including the self-generation exemption was unclear – publicly available documentation on the policy's development did not set out the rationale for the original inclusion of the self-generation exemption, except to say that self-generation may use more efficient technologies.

The Authority's discussion paper provided a draft recommendation that the self-generation exemption should be retained for currently exempt self-generators, but that the exemption should not be extended to new self-generation projects. Considerable feedback was provided by stakeholders on this draft recommendation, and further issues were identified regarding the effect of repealing the exemption for new self-generators. These issues are addressed below.

Environmental considerations

Several stakeholders commented on the fact that large-scale self-generation typically produces fewer emissions than coal-based electricity generation, and creating a RET liability for new self-generators would significantly reduce the economic benefits of investing in those less emissions intensive technologies. In its response to the discussion paper, AGL advised:

> *The [Climate Change Authority] proposes to remove the exemption from RET liability for new self-generation on the grounds that there is no strong case for this exemption to exist particularly given the carbon price will encourage less emissions-intensive self-generation where it is cost-effective to do so.*
>
> *The considerable uncertainty that currently exists around the future of the carbon price discourages significant investment in and the development of low emissions-intensive energy generation. With this uncertainty largely muting the price signal that the carbon price would otherwise create, cost-effective, low emissions-intensive self-generation is strongly incentivised by the exemption from RET liability that current exists. (AGL, sub.181, p.2)*

The Major Energy Users Inc. further advised that:

> *Self-generation is most commonly focused on maximising the efficiency of conversion of the fuel used (thereby reducing carbon emissions) and maximising efficiency of energy use is a state policy of all State and Federal governments. Applying the RET to self-generation will make such projects less commercially viable (even non-viable) and perversely reduce the ability of enterprises implementing actions to achieve what the entire process of efficiency targets and carbon emissions reduction. Therefore applying the RET to self-generation is a self-defeating exercise. (Major Energy Users Inc., sub.210, p.14)*

Stakeholders raised concerns that investment in cogeneration technologies in particular would not occur if the self-generation exemption was not available to new self-generators. Cogeneration technologies capture waste heat from onsite electricity production and use that heat for other industrial

purposes, such as to heat water. Cogeneration technologies are typically high cost electricity generation investments. Stakeholders advised that cogeneration technologies would never be taken up if RET liability applied to the electricity produced by those units, because it would further reduce the economic benefits of investing in the technology, despite its high energy efficiency outcomes.

The Authority considers that it would be a perverse outcome if the application of the self-generation exemption prevented the uptake of lower emissions technologies, reducing the environmental effectiveness of the RET.

Threshold issues in relation to the self-generation exemption

Removing the self-generation exemption would involve substantial administrative complexities and therefore costs. Although conceptually straightforward, implementation of the self-generator exemption would require substantial amendments to the operation of the *REE Act* and its administration by the Clean Energy Regulator.

As described previously, no RET liability is currently imposed on an entity which is connected to a grid above 100 MW capacity that consumes its own generation with no off-take, or is the primary consumer of the self-generation and consumes the electricity within one kilometre of where it is produced. Based on this definition, electricity produced from small generation units such as household or commercial solar photovoltaic (PV) is covered by the self-generation exemption. This means that removing the self-generation exemption would automatically impose a RET liability on new small-scale generation units, unless the *REE Act* explicitly stated otherwise. Other new medium to large solar and other generators which would have otherwise obtained the self-generation exemption would also be liable for the RET.

Currently, the self-generation exemption is effective at constraining the number of liable entities to those which are large electricity users or acquirers (such as electricity retailers). This reduces the administrative burden of the RET, because the many small self-generators (such as household PV) and other medium to large commercial generators are not required to manage their own RET liability.

The Authority considers that applying RET liability to electricity produced by household PV units and other small self-generators is undesirable, due to the relatively high administrative costs that would be imposed on those parties, and the additional costs to government of administering the scheme to those parties if they were considered liable entities. Therefore, any repeal of the self-generator exemption for new self-generators would need to include a threshold on the size of the generation unit or amount of electricity produced. The Authority considers that the development of such a threshold would require considerable analysis to determine its effects on the parties who may become liable for the RET. The choice of threshold would also invariably involve some degree of arbitrariness, particularly around which parties are ‘just in’ versus ‘just out’.

There would also be increased costs for both the Clean Energy Regulator and potentially liable entities to monitor and enforce the threshold and new liability requirements.

On balance, the Authority considers that, given the small proportion of electricity estimated to be produced by self-generators, and complications regarding the setting of an appropriate threshold to determine which new self-generators would need to be assessed for the exemption, it is likely to be more environmentally effective and economically efficient if the self-generation exemption continued in its current form.

Self-generator offtakes

As previously discussed, to be eligible for the self-generator exemption on a grid above 100 MW capacity, the self-generator must not provide any offtakes to third parties, or must be the primary consumer of the electricity generated and consume that electricity within one kilometre of where it was generated.

In submissions to the issues paper, several stakeholders raised concerns that the current definition of self-generation prevents any offtakes for third parties. The Australian Aluminium Council submitted that:

> *In many resource projects there are related services (e.g. emergency services, telecommunications) or communities that have few alternatives for electricity other than the self-generated electricity supply for the resource project. The company is left with a perverse incentive to either incur a significant RET liability (by supplying electricity to the services and communities), or seek to save costs by disconnecting related services that use a minor amount of electricity. (Australian Aluminium Council, sub.73, p.6)*

This concern was reiterated by the Chamber of Minerals and Energy of Western Australia (sub.106, p.2).

The Authority considers that, while it is not an objective of the RET to ensure electricity is provided for remote community purposes, it is economically inefficient for small organisations in remote locations to develop their own electricity generation sources when a self-generator can supply the incidental electricity at low cost and lower emissions. It is also a perverse social and policy outcome if services that benefit the community, particularly emergency services, are not established or must incur higher costs due to self-generators not being able to provide incidental electricity offtakes. Notwithstanding this position, the Authority acknowledges that any change to allow electricity offtakes while retaining the self-generation exemption should be limited and transparent. Providing a wide definition of allowable offtakes would reduce the equity of the RET by extending exemptions to other electricity users, to the detriment of those liable under the RET.

The Authority therefore recommends that the Department of Climate Change and Energy Efficiency, in consultation with the Clean Energy Regulator and affected stakeholders, develop an approach for defining when incidental offtakes in remote locations may be allowed without disqualifying the self-generator from the exemption it would otherwise receive. Considerations for allowable offtakes may include the size of the offtake relative to the amount of electricity generated by the self-generator, the purpose of the offtake, and the remoteness of the location.

RECOMMENDATION

R.23. The self-generation exemption should continue in its current form.

R.24. Arrangements should be developed to allow for incidental electricity offtakes under the self-generation exemption which provide community benefits in remote locations.

CHAPTER 7. ELIGIBILITY

This chapter considers the eligibility of sources under the Large-scale Renewable Energy Target (LRET) and technologies under the Small-scale Renewable Energy Scheme (SRES), with specific regard to the eligibility of waste coal mine gas and biomass from native forests under the LRET, and whether additional technologies including displacement technologies should be eligible under the SRES.

7.1. Eligibility framework and accreditation of power stations under the Large-scale Renewable Energy Target

Certain eligibility, registration and accreditation requirements must be met before certificates can be created under the Renewable Energy Target (RET) scheme. For the LRET, the energy source must be listed as "eligible" under the *Renewable Energy (Electricity) Act 2000* (Cth) *(REE Act)*, the owner (or nominated person) must be registered with the Clean Energy Regulator, and the power station must be accredited.

The LRET takes a 'list' approach to eligible sources. There are currently 19 eligible renewable energy sources listed in the *REE Act* including hydro, wind, solar, geothermal-aquifer, ocean, wave, certain biofuels and biomass sources, and landfill and sewage gas. Additional renewable sources may be added by regulations.

The *REE Act* specifically states that fossil-fuels and materials or fossil-fuel waste products derived from fossil-fuels are not eligible renewable energy sources. This effectively means that these sources cannot be added through regulations; to do so would require an amendment to the *REE Act*. Although the RET is designed to promote renewable energy, there is one waste product derived from fossil-fuels, waste coal mine gas, that is included as an eligible source until the end of 2020.

A number of submissions supported the list approach as an appropriate method of providing the basis for accrediting power stations. Further, those who commented on the approach in response to the discussion paper were also supportive. The Authority agrees that the list of eligible sources is extensive and allows for a variety of technologies to be deployed.

The Australian Geothermal Energy Association has commented that the definitions for two currently eligible sources, geothermal-aquifer and hot dry rocks, are out of date and should be changed to hot sedimentary aquifer and hot rock respectively. In the discussion paper, the Authority noted two considerations with regards to whether the current definitions should be changed:

- whether the Clean Energy Regulator can accredit power stations based on current definitions with the view that they are broadly similar, as this would not require any legislative change; or
- whether an amendment to the *REE Act* may be required, or if new definitions can be added through regulations, which may be a simpler way of updating the definition.

The Clean Energy Regulator has advised the Authority that it would interpret the current definitions to include hot sedimentary aquifer and hot rock. If greater clarity was required on application for

accreditation, the Clean Energy Regulator also advised that this could be done using existing provisions in the *REE Act* that allow for regulations to be made to clarify eligible sources.

The view of the Authority is, therefore, that existing definitions for sources used for geothermal energy are satisfactory and no changes need to be made to the *REE Act* to incorporate new definitions.

7.1.1. Registration and accreditation process

The accreditation process establishes that a given power station is eligible to create large-scale generation certificates. The accreditation process is outlined in Box 9. The Authority has considered whether the process is robust and effective, accessible, and timely.

Requiring one point of contact ensures efficient communication throughout the application process and minimises processing time. Pre-approval arrangements provide flexibility for power stations that are in development or are seeking financial support on the basis that they will be approved.

The timeframes for approving applications are set out in legislation, which provides a level of confidence for applicants. The Clean Energy Regulator advised the Authority that decisions on some power stations can take longer than six weeks, however any delays are usually due to verifying supporting documentation.

One objective of the *REE Act* is that renewable energy generated is ecologically sustainable. The requirement for applicants to provide evidence that their power station conforms to planning and environmental laws ensures that accredited renewable power stations relate to this objective.

Registration and accreditation fees are clearly set out in regulations, and are listed according to the size of the power station and related accreditation requirements. This approach is equitable for applicants, ensuring that they only pay for the cost associated with their circumstances.

The Clean Energy Regulator advised the Authority that it had not had any significant issues accrediting eligible power stations to date. Comments received by the Authority in response to the discussion paper supported the accreditation process.

Box 9 Establishing a power station under the Large-scale Renewable Energy Target

The Clean Energy Regulator is responsible for accrediting power stations under the LRET, and provides a step by step process on its website for applicants.

The Clean Energy Regulator requires one point of contact throughout the accreditation process, and applicants must register a nominated person prior to applying for accreditation. Applicants can register online, and a nominal registration fee of $20 applies.

A registered person may apply for a power station to be accredited based on renewable sources listed in the *REE Act*. Applicants can apply for accreditation by downloading relevant forms from the Clean Energy Regulator's website. An application fee applies, and varies depending on the size of the power station and complexity of the accreditation process.

The applicant is required to specify the components of the electricity generation system that make up the power station. The Clean Energy Regulator applies boundaries around the power station and determines which components are included in the power station, using guidelines outlined in regulations.

The Regulator is required to make a decision on an application within six weeks of it being properly made. Once accredited, LRET power stations may create large-scale generation certificates. Provisional accreditation is also available for projects in development to assist developers secure appropriate financing.

The accreditation process also establishes a power station's baseline. The *REE Act* was designed to encourage additional renewable energy generation. Therefore, large-scale generation certificates are only issued for renewable generation above the existing generation at the time the Mandatory Renewable Energy Target (MRET) was established. The baseline is generally the average amount of electricity generated over the 1994, 1995 and 1996 calendar years. For power stations established after 1 January 1997 the baseline is zero.

As part of the accreditation process, applicants must provide evidence that their proposed power station conforms to State and Federal regulations including environmental laws. For example, applicants applying for accreditation for power stations using wood waste must meet additional eligibility requirements and are provided additional assessment criteria for this resource.

The Authority considers that the existing LRET eligibility and accreditation arrangements are appropriate, and ensure that power stations are established in accordance with relevant regulations and are registered to create large-scale generation certificates.

RECOMMENDATION

R.25. No change is necessary to the list of eligible sources or the accreditation process for the Large-scale Renewable Energy Target.

7.1.2. Adding additional non-renewable or non-generation technologies to the Renewable Energy Target

A key issue for the review is whether there are additional energy sources that should be made eligible. As discussed below, numerous submissions requested that eligibility be extended to either:

- non-renewable (but low emissions) generation sources, such as new waste coal mine gas projects or cogeneration projects using waste industrial heat, originally created from non-renewable sources; or
- additional 'displacement' technologies, which generate no electricity themselves, but displace the use of electricity.

In both cases, proponents argue that using such technologies will reduce greenhouse gas emissions from the electricity sector, in accordance with one of the objectives of the *REE Act*. Purely from an environmental effectiveness point of view, it is difficult to argue that eligibility should not be extended to these other activities.

These arguments highlight the differences between the use of a sector-based policy, such as the RET, compared with a broad-based measure like the carbon price. A chief advantage of the carbon price is that it automatically creates an incentive for all low-emissions or displacement technologies. Under the RET, however, boundaries are drawn. If they are not drawn, then the RET increasingly resembles a second broad-based carbon price – and it is difficult to see why such a mechanism could ever be justified alongside a carbon price.

Boundaries around eligibility under the RET are drawn to further the other key objective of the *REE Act* – to promote additional renewable generation. As discussed in Chapter 3, this is essentially an industry development objective, designed to promote the growth of an industry that is predicted to play a significant role in Australia's electricity supply in a carbon constrained future, and whose growth may currently be curtailed by uncertainty regarding the future of a carbon price and the credibility of governments' commitments to making long-term, deep cuts to greenhouse gas emissions.

The issue of boundaries around renewable generation eligibility is complicated by the fact that there are already exceptions to the rule – solar hot water systems (which have been included from the start of the scheme) and certain waste coal mine gas generation projects. These existing exceptions make it more difficult to argue that no further exceptions should be made, and encourage continual lobbying to this effect.

The Authority has taken the view that the RET is not a second broad-based carbon price, and eligibility should not be expanded to cover other non-generation or non-renewable technologies. The Authority's deliberations on specific matters including waste coal mine gas, wood waste from native forests and eligibility of technologies under the SRES is considered as set out below.

7.1.3. Waste coal mine gas under the Large-scale Renewable Energy Target

A key issue that has been raised during the review is the eligibility of waste coal mine gas in the LRET. Waste coal mine gas is a by-product of coal mining and is not a renewable energy source. Nonetheless waste coal mine gas was added to the RET in 2009 as a transitional measure following the cessation of the New South Wales Greenhouse Gas Reduction Scheme on commencement of the carbon pricing mechanism. In reviewing the eligibility of waste coal mine gas under the LRET the Authority has considered:

- whether to maintain eligibility for waste coal mine gas power stations that are currently eligible; and
- whether additional waste coal mine gas power stations should also be made eligible.

Eligibility for waste coal mine gas began on 1 July 2012 and is limited to seven existing waste coal mine gas power stations that were operating in 2009 and receiving support under the New South Wales Greenhouse Gas Reduction Scheme, with separate annual targets of 425 gigawatt hours (GWh) from 1 July 2012 to 30 June 2013, and 850 GWh each year from 1 July 2013 to 2020.

These targets are in addition to the LRET target of 41 000 GWh. This is to ensure that waste coal mine gas does not displace renewable generation under the scheme. This means that the inclusion of these waste coal mine gas power stations has increased the cost of the RET. As a benefit to renewable generation, any unutilised waste coal mine gas allowance is added to the LRET target each year. Waste coal mine gas cannot receive certificates for any generation above its total allowance.

EnviroGen argued that while waste coal mine gas is not a renewable energy source, it should be eligible:

> *As [waste coal mine gas] generation can be classified as a zero additional emissions source of generation achieving the same reductions in greenhouse gas emission as other renewable generators, the outcome of [waste coal mine gas] generation is similar to that of other generation which is assisted by the RET. (EnviroGen Pty Ltd, sub.44, p.6)*

Energy Developments Limited supported continuing to allow existing waste coal mine gas in the scheme, noting that waste coal mine gas has zero additional emissions (assuming the gas would otherwise have been flared) and its eligibility is consistent with one of the objectives of the *REE Act.* Conversely, a number of submissions to the issues paper (including IPART, WWF, and the Tasmanian Government) called for the removal of waste coal mine gas as an eligible source, primarily because it is not renewable. For example, the Conservation Council of South Australia submitted that:

> *The cost effectiveness of [waste coal mine gas] capture and use should be considered under fossil fuel policies not the RET…Only renewable energy should be eligible to create LRET certificates. (Conservation Council of South Australia Inc., sub.72, p.3)*

The Authority is of the view, as a general principle, that waste coal mine gas should not be an eligible source under the RET because it is not a renewable source, and that the use of waste coal mine gas for power generation should be sufficiently encouraged by the carbon price.

Eligible waste coal mine gas power plants under the RET were, however, included because it was assessed that the financial returns to these projects would have been reduced by the introduction of the carbon price compared to the returns had the New South Wales Greenhouse Gas Reduction Scheme continued. The additional revenue from the RET was therefore intended to ensure these projects were not adversely affected by the change in policy framework. The removal of these projects from the RET would mean that the Government would need to consider alternative transitional arrangements for these projects not to be made worse off. It is not clear that any alternative arrangements would cost less than maintaining the existing arrangements under the RET.

Policy-makers have placed clear boundaries on the support for waste coal mine gas under the LRET. Only existing waste coal mine gas power stations are eligible to create renewable energy certificates and (only until 2020), with separate targets that are additional to the broader LRET target. Given this contained support, the Authority recommends maintaining the current LRET arrangements for existing waste coal mine power stations.

In response to the discussion paper, Macquarie Generation opposed the provision for unutilised waste coal mine gas allowance to be added to the LRET on the basis that any waste coal mine gas allowance increases the cost of the RET and should be minimised. On this matter, the Authority does not see a material benefit in the form of cost reductions by removing the transference of unutilised waste coal mine gas allowance. The additional target was calculated on the basis of existing power station generation so it is unlikely any material proportion of allowance would be transferred in any year. In addition liable parties will have calculated their certificate requirements taking into account the additional target for waste coal mine gas.

7.1.4. Inclusion of new waste coal mine gas

Some waste coal mine gas generators have proposed allowing new waste coal mine gas projects into the RET. For example, EnviroGen supported the inclusion of new waste coal mine gas in addition to the 850 GWh allowance for existing waste coal mine gas on the basis that it 'would make a further contribution to emission reductions' and to ensure continued investment in the sector (Envirogen, sub.44, p.7).

On the other hand, while Energy Developments Limited supported the continued inclusion of existing waste coal mine gas, it did not consider that new waste coal mine gas projects should be eligible under the RET scheme:

> *… whilst support is warranted to promote the significant greenhouse gas abatement potential of new [waste coal mine gas] clean energy projects, the RET is currently not the appropriate mechanism for these new projects … (Energy Developments Limited, sub.75, p.3)*

In its *Review of Specific RET Issues*, the Renewable Energy Sub Group recommended against including new waste coal mine gas on the grounds that it would increase the cost of the RET scheme and shift the focus of the RET scheme away from renewable energy (Renewable Energy Sub Group 2012, p.67).

Including new waste coal mine gas within the overall target could potentially reduce the overall cost of the scheme if waste coal mine gas displaced more expensive renewable energy. However, since waste coal mine gas is not renewable, inclusion of further waste coal mine gas in the RET would reduce the effectiveness of the scheme in relation to its objective of promoting additional *renewable* electricity generation.

Further, if new waste coal mine gas were to be added to the RET, there is the possibility that eligibility could be extended to other non-renewable sources. Bluescope Steel stated that if waste coal mine gas continued to be eligible, it would be logical to extend eligibility to other industrial gases that can be burned to generate electricity.

Other industrial waste energy sources have been proposed for eligibility on the basis that they reduce emissions and reduce demand for grid electricity (for example, Ai Group, sub.46, p.14). For example, waste heat has been proposed as it can be used as either a displacement heat source or to generate electricity via steam turbines. As discussed in Section 7.1.2, allowing additional non-renewable waste energy sources to be eligible would undermine the objectives of the RET. Industrial gases are largely covered by the carbon pricing mechanism, which in itself provides an incentive for businesses to find the most cost effective way of minimising emissions from these gases.

Existing waste coal mine gas power stations were only included in the LRET as a transitional measure following cessation of the New South Wales Greenhouse Gas Reduction Scheme and on the

commencement of the carbon pricing mechanism. There is no strong rationale for new waste coal mine gas projects to be eligible under the RET because the carbon price will provide the incentive for these projects.

RECOMMENDATION

R.26. Existing arrangements for waste coal mine gas should be maintained under the Large-scale Renewable Energy Target.

R.27. There should be no change to the *Renewable Energy (Electricity) Act 2000* (Cth) to allow for new waste coal mine gas to be eligible.

7.1.5. Wood waste from native forests under the Large-scale Renewable Energy Target

The Authority has received submissions calling for wood waste from native forests to be eligible under the RET.

Wood waste from native forests was originally eligible under the MRET, and was removed from the RET in 2011 following agreement of the Multi-Party Climate Change Committee as part of the Clean Energy Future plan (Multi-Party Climate Change Committee 2011). As part of its removal, regulations were added to provide for transitional arrangements to preserve existing eligibility provisions for power stations already accredited by the Clean Energy Regulator to use wood waste derived from native forest biomass subject to specified conditions (*REE Amendment Regulations 2011 no.5*).

Wood waste from plantation forests is eligible to generate certificates under the LRET, and this includes non-endemic native species, but must be taken from land that is cleared of native vegetation before 1 January 1990 to establish the plantation.

Under the original MRET, criteria were applied to wood waste from native forests requiring it to: comply with local government planning and approval processes, to be harvested under a Regional Forestry Agreement, and to demonstrate that the waste is genuine (that is, the native forest was logged for a higher value use and that the biomass used was a by-product of that logging) (*REE Regulations 2001*). Further to this, logging of native forests is managed under State Government forestry plans which place limits on the amount of logging activity allowed. This effectively caps the amount of wood waste that can be used for generation.

The eligibility of biomass from native forests has been a controversial issue. The 2003 MRET review received diverging submissions on the issue, and identified two options – removing wood waste from native forests from the scheme, or leaving it in but separating it from other eligible wood waste sources so that the value of RECs from plantation wood waste generation would not be affected. In support of removing the energy source, the 2003 MRET review noted that the objectives of the *REE Act* would be more easily achieved by removing such a contentious element. In support for leaving wood waste from native forests in the scheme, the 2003 MRET review noted that, at the time, there was no compelling evidence that it would alter forest management practices or accelerate the growth of logging. The Government decided to maintain the eligibility of wood waste from native forests under the RET at that time.

During the design of the enhanced RET in 2009, there were a number of submissions calling for the removal of wood waste from native forests. During the House of Representatives debate following the passing of the Clean Energy Future legislation an unsuccessful motion was put forward by Rob Oakeshott MP to block the removal of wood waste from old native growth forests from the RET (Commonwealth, House of Representatives, 2012).

Arguments supporting its eligibility are that the use of native forest biomass is a zero-carbon emissions rated energy source that replaces fossil-fuel generation and that wood waste from forests is generally burned anyway. Proponents argue that forests have a high level of regulation to ensure they are sustainably managed and there are no impacts on biodiversity by burning wood waste for electricity generation. The Australian Forest Products Association submitted that:

> *The objective of the RET is to create a guaranteed market for renewable energy therefore it should provide opportunities for all renewable energy sources, including sustainably managed natural forest biomass. (Australian Forest Products Association, sub.14, p.6)*

It also stated:

> *The harvesting of native forests in Australia is supported by an existing regulatory framework that is internationally recognised as world's best practice. (Australian Forest Products Association, sub.180, p.5)*

The main concern about the eligibility of wood waste from native forests under the RET is that it would create an added incentive to log native forests, especially if the value of electricity generation becomes higher than other uses of native forest timber and wood waste.

It is not clear that allowing wood waste from native forests would encourage further logging of these forests for electricity generation. In practice, despite its eligibility under the MRET, very few certificates were ever created from native forest biomass. There was also a market preference against these certificates, which traded at a substantial discount to other renewable energy certificates.

A higher level of forestry and environmental regulation has, however, been necessary to ensure that wood waste from native forests is harvested in an ecologically sustainable manner. The Australian Network of Environmental Defender's Offices recommended:

> *Maintaining the exclusion of native forest waste, and re-evaluating the ongoing eligibility of wood waste as a renewable energy source, and whether it should be further limited to ensure the RET does not contribute to the environmental impacts of logging – such as loss of biodiversity, loss of 'carbon sinks', and particulate pollution from burning sawmill waste. (Australian Network of Environmental Defender's Offices, sub.141, p.6)*

In terms of public interest, the protection of native forests is of high importance in Australia, which is captured in a recent report to the Commonwealth Government titled *Social Values and Considerations for Effective Reserve Management.* The report noted:

> *The social value of natural forests is more than the direct uses of their resources. Many people gain satisfaction from knowing that an area, including its landscapes, plants, animals and cultural heritage, is sustained in a certain condition. Such satisfaction can be intensely personal and simply related to the existence of an area (and hence is often termed existence value). It can also stem from a conviction that forests should be retained for future generations to appreciate and enjoy. (Independent Verification Group Report, 2012, p.3)*

An objective of the RET is to encourage additional renewable generation that is ecologically sustainable. The Authority's preliminary view set out in the discussion paper was that, without a clear process to ensure that electricity generation using wood waste from native forest would be ecologically sustainable, it should not be re-included in the RET.

Taking this view a step further, the Authority's final view is that the key issue is the *incremental* environmental impact of allowing wood waste back into the RET. If a forest would have been logged in

any event, then burning the wood waste in a power station is a better environmental outcome – in greenhouse gas emission terms – than burning the waste alone or allowing it to decompose.

The Australian Forest Products Association has argued that inclusion in the RET will not lead to more logging than would have occurred in any event:

> *Waste is defined as a by-product of normal forestry operations, which are primarily are for integrated sawlog and pulpwood production and incentives for energy generation will not replace these higher value market drivers. (Australian Forest Products Association, sub.14, pp.6-7)*

The Authority recommends that the Government should consider commissioning a new study of the likelihood that the logging of native forests would increase if wood waste were an eligible fuel under the RET. If LRET eligibility is not likely to increase the rates of native forest logging, then eligibility should be reinstated, subject to appropriate accreditation processes.

RECOMMENDATION

R.28. The Commonwealth Government should explore whether the Renewable Energy Target eligibility for native forest wood waste is likely to increase the rate of logging of native forests. If it is not, then wood waste eligibility should be reinstated, subject to appropriate accreditation processes designed to ensure that no additional logging occurs as a result.

7.2. Eligibility and accreditation arrangements under the Small-scale Renewable Energy Scheme

Eligible technologies under the Small-scale Renewable Energy Scheme (SRES) are set out in the *REE Act,* which provides that 'solar water heaters' and 'small generation units' may generate small-scale technology certificates. There are three types of small generation units – solar photovoltaic (PV) with a capacity limit of 100 kilowatts (kW), micro hydroelectric systems up to 6.4 kW, and small wind turbine systems up to 10 kW. Solar water heaters are eligible if they meet relevant Australian and New Zealand standards, which cover both solar water heaters and air source heat pumps. To be eligible, a heat pump cannot have a volumetric capacity of more than 425 litres. Eligible technologies must meet certain standards.

Small-generation units must be installed by qualified technicians. The Clean Energy Council, a peak national industry body representing the clean energy sector, is solely responsible for managing the accreditation of designers and installers of small generation units under the SRES. Installers and designers of small generation units must be accredited with the Clean Energy Council in order for the owners of those systems to be eligible to create small-scale technology certificates under the SRES. In addition, solar PV and solar water heaters require accredited components, while small wind and hydro systems do not (see Table 6).

Table 6 Technology type and accreditation arrangements

Small-scale technology	Accredited installer?	Accredited components?
Solar PV	Yes	Yes
Wind	Yes	No
Hydro	Yes	No
Solar water heaters	No	Yes

Source: Climate Change Authority, 2012.

To become accredited with the Clean Energy Council a minimum level of training is required. The training is provided by registered training organisations throughout Australia. Once the required training has been completed a practical assessment of an installer's work is undertaken before full accreditation is granted. Accredited installers are required to renew their accreditation annually, and this is supported by a continuous improvement program the Clean Energy Council has introduced that installers must follow to stay up to date with developments in the industry.

The Clean Energy Council also maintains a list of solar panels and inverter products that meet relevant Australian standards. Accredited installers can only install products from this list otherwise they are in breach of the Clean Energy Council's Code of Conduct.

7.2.1. Opening accreditation to competition

Under legislation, the Clean Energy Council is the sole organisation that can accredit small generation unit designers and installers for the purposes of creating small-scale technology certificates. The appropriateness of a single accreditation body has been raised in submissions by the solar industry. The Australian Solar Council stated:

> *The Act creates a legislated monopoly for the accreditation of small-scale renewable energy technologies, ensuring that only one non-government agency has been given that power. Legislated monopolies are poor public policy, and the lack of competition appears to have resulted in some less than best practice outcomes. (Australian Solar Council, sub.62, p.10)*

In the discussion paper, the Authority's preliminary view was that accreditation should be opened up to certified bodies beyond the Clean Energy Council. The Authority suggested that introducing such competition could allow installers and designers to choose the accreditation provider that best meets their needs, rather than imposing one particular model of quality assurance. It could also help ensure that an accreditation body remains focused on enhancing the relevance, quality and value of the services for their members.

There is a risk of opening up accreditation to multiple organisations, as greater competition could drive poor outcomes for customers. This could occur if accreditation bodies competed on the basis of price at the expense of quality or rigour. In response to the discussion paper, LMS Energy noted:

> *Whilst more accreditation bodies could reduce accreditation wait times, the accreditation bodies could also have the incentive to relax the robustness of their accreditation standards in an effort to attract more business away from other accreditation bodies – resulting in a market failure. (LMS Energy, sub.208, p.6)*

In addition, it could be difficult for the Government to administer multiple accreditation bodies, as a strict set of provisions would need to be implemented to ensure that the quality of installations is maintained. In response to the discussion paper, CSR noted:

Experience with building codes enforcement and the proliferation of private assessors suggests that broadening the accreditation is likely to weaken and not strengthen accreditation based on CSR experience. Building industry enforcement of codes is now beyond the ability of Government and a "super" enforcement model is unlikely to be successful with solar. The [Clean Energy Council] should be required to strengthen its enforcement program nationally before alternative models are considered. [The] Government has only one point of contact today and that is the great strength of the present model. (CSR, sub.195, p.4)

In order to allow others to become accreditation bodies it would be necessary to have common guidelines that any accreditation body would be required to use. Common guidelines would need to ensure consistency and create a minimum quality of training. The guidelines would need to represent industry best practice and be dynamic in nature to respond to changes in the industry.

The Clean Energy Regulator would be required to put in place an effective regime to ensure that accreditation bodies are of an appropriate standard. This would need to include a transparent process by which the Clean Energy Regulator could approve and revoke an accreditation body's participation in SRES.

In addition, the RET, and consequently the Clean Energy Regulator, does not have oversight for electrical safety, which is the responsibility of relevant state and territory safety authorities. Any new accreditation bodies would need to ensure that accredited installers comply with relevant laws. It was raised in roundtable discussions that the current accreditation process managed by the Clean Energy Council provides sufficient safeguards for systems that create small-scale technology certificates.

The Clean Energy Council has advised the Authority that it seeks to continually improve its accreditation process, and has established an installer reference group which provides advice and feedback on the accreditation scheme and overall industry enhancements. The Clean Energy Council has a process in place to manage any disputes that may arise, and is currently consulting with members with the aim of improving this process.

On further investigation, at this time, the Authority considers that the potential benefits of allowing multiple bodies to accredit installers and products do not outweigh the additional administrative costs and potential risks. In addition, no organisations indicated particular interest in taking on accreditation, and the Clean Energy Council has introduced measures to improve the accreditation process.

The Authority considers that the risks associated with opening up accreditation to multiple bodies in terms of possible poor standards and higher costs of oversight, appear too large to warrant changing the current arrangements of a single national accreditation body at this time.

RECOMMENDATION

R.29. Maintain the Clean Energy Council as the sole accreditation body for installers under the Small-scale Renewable Energy Scheme.

7.2.2. Additional small-scale technologies

The two key issues to be considered in the review relating to additional small-scale technologies relate to:

- the addition of new small-scale renewable generation technologies; and
- the inclusion of (existing and new) displacement technologies.

This section will discuss the addition of any new technologies into the scheme generally, displacement technologies both currently eligible and the proposition of adding new displacement technologies.

As the RET scheme has progressed, new small-scale technologies have been added to the scheme, and more recently new technologies have been proposed for inclusion.

The Regulatory Impact Statement attached to the Explanatory Memorandum of the Bill to split the RET identifies the RET Review as a possible mechanism for recommending the addition of new technologies. As part of recommendations from the Regulatory Impact Statement, the review would also consider a framework for determining eligibility under the RET, particularly for small-scale technologies.

The Authority has considered if, in principle, new small-scale technologies should be considered for inclusion in the RET and, if so, what framework should be used to assess potential technologies. It has then considered if there are currently any new technologies that could be considered for inclusion.

The scheme was originally intended to be technology-neutral as a way of ensuring the target was met at the lowest possible cost, and that the mix of technologies used to generate energy from renewable sources could evolve over time.

The uncapped nature of the SRES means that cost minimisation is no longer automatic: additions of new technologies could potentially add to the cost of the scheme as new technologies would not necessarily displace existing small-scale technologies, but may be deployed in addition to them. This will always mean that a judgement would need to be made when adding new technologies to the scheme.

The addition of new technologies was considered in the Renewable Energy Sub Group's *Review of Specific RET Issues* to the Council of Australian Governments in 2012. The review recommended that no new small-scale technologies should be eligible, on the basis that the SRES is uncapped, so any additional small-scale technologies would add to costs for electricity consumers. The extent of uptake of these new technologies was highly uncertain, and hence so was the potential impact on consumer prices.

It is also important to consider any implications eligibility arrangements might have on competition. For example, if a new small-scale technology was developed that would directly compete with those small-scale technologies that are eligible; it would be at a competitive disadvantage if it was not also made eligible.

The Authority is of the view that, in principle, new small-scale technologies should be allowed to be included in the SRES. It may already be possible to add new technologies, as there is a general provision under the *RRE Act* for the Minister to include by regulations "emerging renewable energy technologies" in the RET scheme.

It is not clear, however, that this provision applies specifically to small-scale technologies under the SRES or whether it is sufficient to allow for the addition of small-scale renewable and displacement technologies under the SRES. The Authority is of the view that the Government should consider whether a new regulation making power is necessary for the *REE Act* to explicitly allow for the addition of new small-scale technologies.

An alternative approach would be to include any new small-scale technologies into the LRET. The advantages of this approach are that it would not add to the overall cost of the RET and it would be easier to add technologies by regulations.

The Authority proposes that new small-scale technologies could be considered by the Minister on a case by case basis for inclusion in the SRES, and that a framework to guide the decision could be developed, based on the following considerations:

- is the proposed technology currently not eligible (that is, is it truly a new type of technology);
- does the proposed technology generate renewable energy;
- is the proposed technology a small-scale technology; and
- is the proposed technology commercially ready.

In addition, a judgement would need to be made taking into account the likely cost implications of making the technology eligible and any competitive distortions of not making the technology eligible. A clear process taking into account the above considerations would effectively assist proponents of new small-scale renewable energy technologies for proposing their technology for eligibility under the SRES. The Minister could receive proposals for new technologies directly or refer them to the appropriate accreditation body for detailed consideration and advice.

While the Authority recommends that new small-scale technologies should be allowed to be included, no new technologies that would satisfy the above criteria have been proposed to the Authority. The only new technologies that have been proposed are displacement technologies and are discussed in the following section.

RECOMMENDATION:

R.30. New small-scale technologies should be considered on a case by case basis for inclusion in the Small-scale Renewable Energy Scheme.

R.31. No additional new small-scale technologies should be made eligible in the Small-scale Renewable Energy Scheme at this time.

7.2.3. Displacement technologies

Displacement technologies are alternative forms of energy generation that displace electricity consumed from the grid. For example, a solar water heater uses the sun to directly heat water, without the need for a solar PV electricity generation system to convert the suns energy into electricity that would create heat through electrical resistance.

There are two technologies eligible to create small-scale certificates under the SRES are displacement technologies – solar water heaters and heat pumps, both of which have been eligible since the MRET was established. Solar water heaters were historically the most popular small-scale technology under the RET; however, they were overtaken by solar PV units in 2010 (see Chapter 2).

Since the establishment of the SRES, displacement technologies have made up a small amount of deemed certificates that have been created. In 2012, heat pumps and solar water heaters accounted for 1.1 per cent and 4.7 per cent of small-scale technology certificates generated, respectively.

In some submissions, it has been proposed that other displacement technologies should be eligible under the SRES, such as ground sourced heat pumps. Arguments for including displacement technologies include that they provide similar benefits to small-scale electricity generation technologies, and that they compete directly with those technologies.

Conversely, a number of submissions have called for removing displacement technologies from the RET. The main arguments against the inclusion of displacement technologies in the RET are that they

are not electricity generation technologies, that they increase the cost of the scheme for consumers, and that they should be supported through other incentives outside of the RET. A group of individual participants submitted that the inclusion of displacement technologies does not reflect the policy intent of the RET:

> *As the RET was developed as a means to achieve the Commonwealth commitment to "at least 20 [per cent] of Australia's electricity from renewable sources by 2020", displacement technologies would not be included in this definition. (Hallenstein et al, sub.19, p.20)*

One objective of the RET is to encourage additional electricity generation from renewable sources. Including displacement technologies in the SRES raises a question about whether the objective is to add electricity generation only or also to displace electricity use. If the SRES remains uncapped, additional technologies including displacement technologies could increase the cost of the RET. Moreover, the policy objective of the RET to drive renewable electricity generation is diluted by adding additional displacement technologies.

There may also be overlaps with energy efficiency schemes. Some states and territories have energy efficiency certificate schemes (commonly known as 'white certificate schemes') in place, some of which cover solar water heaters and heat pumps (see Table 7). These schemes are certificate trading schemes similar in form to the RET, except that each certificate relates to an amount of energy saved, rather than renewable energy produced.

Table 7 Current state-based energy efficiency schemes

State/territory	Energy efficiency scheme in place?	Coverage of renewable water heaters?
New South Wales	Energy Efficiency Scheme (ESS)	No
Victoria	Victorian Energy Efficiency Target (VEET)	Yes
Queensland	No	No
South Australia	Residential Energy Efficiency Scheme (REES)	Yes
Western Australia	No	No
Australian Capital Territory	Energy Efficiency Improvement Scheme (from 1 January 2013)	Yes
Tasmania	No	No
Northern Territory	No	No

Source: Climate Change Authority, 2012.

The Commonwealth Government is also considering whether it should seek to implement a national energy efficiency white certificate scheme (a National Energy Savings Initiative), which would subsume existing state-based schemes. If it were implemented, a National Energy Savings Initiative would be a more obvious home for displacement technologies (new and existing) than the RET.

In its *Review of Specific RET Issues*, the Renewable Energy Sub Group recommended against the addition of two new technologies – geothermal ground-source heat pumps and solar-assisted cooling systems – on the grounds they were displacement technologies. The Renewable Energy Sub Group recommended that:

> *[these technologies] would be better suited for support under an energy efficiency scheme rather than a scheme that is primarily designed to support renewable electricity generation. (Renewable Energy Sub Group 2012, p.35)*

In response to the discussion paper, the Gas Industry Alliance submitted that:

> *… a simple proactive option would be to remove solar and heat pump water heaters from the SRES and include them, together with gas water heaters in a new national water heater replacement scheme. (Gas Industry Alliance, sub.201, p.2)*

The Authority is also aware that existing displacement technologies compete with electric and gas water heaters, but still at much higher equipment costs. Electric water heaters are being phased out in most states and territories, and the inclusion of renewable forms of water heating in the SRES supports this transition. While gas competes with electric water heaters and renewable water heaters that are eligible under the SRES, it is not readily available in all parts of Australia. Supporting renewable water heaters either through the RET or through other incentives also encourages the take up of these technologies in gas-exclusive areas.

The Authority considers that existing displacement technologies should remain in the SRES, and should be phased out if and when a national energy efficiency scheme that would cover them is established. Similarly, if the broader regulatory framework that applies to these technologies at the state and territory level changes in the future, so that any of these technologies no longer needs the RET to encourage uptake, then the technology should be phased out of the RET.

The Authority considers that additional displacement technologies should not be added to the SRES. While it is recognised that this potentially places these technologies at a competitive disadvantage to existing displacement technologies, they do not contribute to the objective of the *REE Act* of additional generation of electricity from renewable energy sources, and given the uncapped nature of the SRES their inclusion would increase the cost of the scheme to consumers.

RECOMMENDATION

R.32. Existing arrangements for displacement technologies should be maintained.

R.33. No change should be made to the *Renewable Energy (Electricity) Act 2000* (Cth) to allow additional displacement technologies.

CHAPTER 8. DIVERSITY

This chapter considers the current mix of renewable energy generation and diversity of renewable energy access to the Renewable Energy Target (RET). It explores whether there is a case to amend the RET to promote a more diverse range of renewable energy technologies through the scheme.

8.1. Diversity of access and uptake

As discussed in Section 7.1, access to the RET scheme is provided to a wide range of renewable sources and additional sources can be added by regulations. Given that a strong level of 'diversity of access' already exists in terms of legal access, the Authority has focussed on reviewing the diversity of technologies deployed.

The RET is a market based scheme with a technology neutral approach that encourages the deployment of the lowest cost technologies. From an economic efficiency perspective, this approach encourages competition between technologies and minimises costs to consumers.

While the scheme includes a range of renewable generation technologies, the ability of each potential technology to participate in the wholesale market and generate certificates depends on its market readiness and competitiveness. The Large-scale Renewable Energy Target, by design, does not preference higher cost technologies over lower cost alternatives. Beyond Zero Emissions highlighted this in its submission to the issues paper:

> *The RET aims to deploy renewable technologies at lowest cost through a market mechanism. By definition, the lowest cost technologies will be deployed, in direct contrast to the need to develop a suite of technologies. Due to this market focused, least-cost design, the RET cannot address the barrier of cost difference between technologies. (Beyond Zero Emissions, sub.104, p.15)*

Under the Small-scale Renewable Energy Scheme, however, Solar Credits have been used to promote the deployment of particular small-scale technologies (see Chapter 5).

8.1.1. Current mix of renewable generation capacity

New generation under the RET has primarily come from large-scale wind, which accounted for around 18 per cent of total installed renewable generation capacity in 2012 (see Chapter 2, Figure 1). There has also been a significant increase in the uptake of small-scale solar photovoltaic (PV) systems and solar water heaters under the Small-scale Renewable Energy Scheme, with solar PV systems providing approximately 2 gigawatts of generation capacity or around 11 per cent of installed renewable capacity in 2012, according to the Clean Energy Regulator. Further, the proportional contribution of hydro to total renewable generation has reduced from over 80 per cent in 2000-01 to around 34 per cent in 2012.

When the Mandatory Renewable Energy Target commenced operation in 2001, it was projected that biomass (particularly bagasse, the waste from sugar cane milling) would account for most of Australia's

additional renewable electricity generation by 2010 (Commonwealth, 2000). However, this did not eventuate because the cost of wind generation fell faster than expected to become the most competitive technology, and almost all new generation required to meet the targets has come from wind and small-scale solar technologies.

Acciona submitted:

> *Wind for the time being remains the lowest cost technology. However… a range of other technologies including solar PV and concentrating solar thermal are experiencing dramatic reductions in cost. (Acciona, sub.85, p.4)*

Given the decline in costs for wind and solar PV is projected to continue, they appear likely to remain the lowest cost technologies and therefore dominate new investment to 2020 – but there are no guarantees this will be the case.

8.2. Desirability of greater diversity

Participants have suggested that the RET design should be changed to promote a more diverse range of renewable energy technologies and have suggested some options to this end (see Section 8.3). The main arguments for greater diversity are to support:

- the development of a particular renewable industry sector;
- the development of higher cost technologies that may become lower cost in the long-term; or
- the achievement of a higher renewable energy target once the capacity for existing renewable has been exhausted.

It is not clear that amendments to the RET are likely to be the most appropriate policy response if greater diversity of renewable technologies is necessary or desired. The Authority notes that measures to promote diversity within the RET alter the scheme from a technology neutral approach that favours the lowest cost technologies to one that favours particular technologies that may not meet the RET's policy objectives or do so at a higher cost.

In its submission, the Clean Energy Council argued that changes to the RET to promote diversity risks harming investor confidence in the scheme and could jeopardise the industry's ability to deliver on the target. It noted that:

> *… a production based incentive such as the RET is often of little value to technologies that face a range of challenges and funding hurdles before they reach production stage of their development. (Clean Energy Council, sub.12, p.25)*

In addition, the Major Energy Users Inc submitted:

> *If a new technology is developed that provides a lower cost option than the current technologies, then this should be allowed, but not receive greater incentives. (Major Energy Users Inc., sub.103, pp.28-29)*

The Grattan Institute (2012) examined measures within climate change policies to promote diversity of low-emissions technologies and noted that approaches to low-emissions technology development, including green certificate schemes such as the RET, do not naturally promote technology diversity.

The Authority considers that a change in its design to encourage a more diverse range of renewables would only be in the public interest if:

- there are market failures impeding the uptake of some renewable technologies that are not being addressed by other policies, and these can be efficiently dealt with through changes to the RET (Section 8.2.1); or
- a change to the renewable energy mix and a resulting change to the RET is a cost-effective way to ensure energy independence, reliability and security is maintained (Section 8.2.2).

8.2.1. Market failures

As for other technologies, market failures can potentially reduce private incentives to conduct research and development. Beyond the RET scheme, there is a range of measures at the national, state and territory level to support the development and deployment of renewable energy technologies, such as research and development tax credits, grant funding and financing (see Chapter 3).

The Australian Renewable Energy Agency is specifically designed to support research, development, and demonstration and address the market failures that might result at these earlier stages of the innovation chain. It will provide early-stage grant and financing assistance for projects that strengthen renewable energy and energy efficiency technologies and make them more cost competitive.

The Australian Renewable Energy Agency is providing almost $750 million for 31 renewable technologies and measures in bioenergy, geothermal, wave, solar thermal and solar PV across the various stages of renewable energy technology innovation. (The Australian Renewable Energy Agency total budget is $3.2 billion).

Regarding the deployment of market ready technologies, there may be information failures that increase perceptions of risk among financiers. It may be harder or more costly to secure finance for technologies that are not well understood.

The Clean Energy Finance Corporation has been established to overcome capital market barriers that hinder the financing, commercialisation and deployment of renewable energy, energy efficiency and low emissions technologies. The Clean Energy Finance Corporation is designed to bridge any gap between technology which is ready for deployment, but is not currently able to commercially source the requisite level of finance.

The Australian Conservation Foundation noted the contribution the Clean Energy Finance Corporation will have in promoting diversity of technologies under the RET. In its submission to the issues paper, it stated:

> *Importantly, the [Clean Energy Finance Corporation] will also drive diversity in Australia's clean energy generation mix, and therefore complement the RET (which favours wind and domestic solar investment). (Australian Conservation Foundation, sub.7, p.2)*

EnergyAustralia commented in its submission to the issues paper:

> *Greater diversity…should be delivered outside of the RET…through the funding of research and development, providing greater availability of funds to projects which have not been proven commercially viable in Australia. The funding provided to [Australian Renewable Energy Agency] and the [Clean Energy Finance Corporation] should be used to achieve diversity in RET outcomes. (EnergyAustralia, sub.102, p.11)*

The Authority considers that any perceived market failure associated with the market readiness of technologies is being addressed by government support and that no change to the RET is required.

8.2.2. Energy dependence, reliability and security

Renewable energy becomes more important for countries with growing dependence on imported energy where energy security may be an issue. As discussed in Chapter 3, a substantial net exporter of energy, Australia does not face any energy security concerns relating to dependence on imports of generation fuels.

It is possible that the intermittency of renewable energy generation could affect the stability, reliability and security of the electricity network in the future. The Commonwealth Government's *Energy White Paper* noted:

> *High levels of intermittent generation (such as wind or solar) may also pose additional operational challenges in balancing supply and demand in the system. While this is considered manageable at current and projected levels, in the longer term there may be a need for additional backup capacity or innovative system management and storage solutions. (Commonwealth, Energy White Paper 2012, p.157)*

The Australian Energy Market Operator has in place arrangements for the National Electricity Market, which are subject to ongoing refinement, that require all significant intermittent generation to participate in central dispatch processes to control the output of such generation at times when that output would otherwise violate secure network limits.

In the Western Australian South West Interconnected System, arrangements are also in place to allow the system operator the flexibility to control dispatch of intermittent generation in such a way that power system security will be preserved.

The Authority considers that it is appropriate to deal with energy reliability and security issues through energy market reforms rather than by changing the RET to encourage the deployment of more diverse, and relatively less intermittent, portfolio of renewable energy technologies.

8.3. Assessment of options to promote greater diversity within the Renewable Energy Target

RET review participants have suggested that measures within the RET can be utilised to promote greater diversity, such as the use of multipliers and banding to promote particular technologies. Options for altering the RET design to promote certain technologies are discussed below, including multipliers, caps and banding.

8.3.1. Multipliers

As outlined in Chapter 5, multipliers have been used in the RET scheme to encourage the installation of small generation units such as small-scale solar panels, wind and hydro systems by multiplying the number of small-scale technology certificates that these systems would usually be able to create under the Small-scale Renewable Energy Scheme.

Multipliers can be applied to certificates from particular technologies to influence their uptake. The use of a multiplier greater than one will preference a technology – as seen with the Solar Credits multiplier under the Small-scale Renewable Energy Scheme.

Time-of-day multipliers have also been used in California to encourage the delivery of renewable energy at times of high demand.

In the small-scale scheme, any multiplier greater than one will impose additional cost on consumers as liable entities will pass-through the cost of certificates. The environmental effectiveness of the scheme is also reduced because the additional certificates created have not been backed by actual generation. The Australian PV Association submitted:

> *[multipliers have] reduced the effectiveness of the RET by creating large amounts of "Phantom" certificates, with no associated renewable energy generation. It also flooded the renewable energy certificate market, making it difficult for larger projects to be built. (Australian PV Association, sub.101, p.10)*

In its submission, Hepburn Wind proposed that multipliers should be applied to large-scale generation certificates to support community based renewable energy projects to help them compete with larger commercial projects (Hepburn Wind, sub.56, p.5). Hepburn Wind further suggested that community projects could be capped to manage their development.

The Authority considers that multipliers should not be reintroduced to the RET. Multipliers reduce the environmental effectiveness of the RET, encourage a more expensive generation mix, and in the uncapped SRES, add to the costs borne by consumers. If the Commonwealth Government wanted to encourage particular project types, such as community wind farms, it could do so in other, more transparent means (such as grant funding).

Similarly, encouraging generation that supplies energy at peak periods is a matter for energy market design more broadly, and piecemeal approaches in the RET risk creating unanticipated distortions.

8.3.2. Caps

A cap could be used to limit the total amount of generation from a particular technology. Once the cap has been reached, support would not be given to any additional generation from that technology and the deployment of other technologies could increase.

There could also be perceived equity issues regarding how a cap might be applied. For example, if it operated on a 'first-in, first-served' basis – it would preference first movers. Caps are likely to be difficult to administer, since future output is uncertain.

Further, if a cap was combined with a band between two technologies to discourage one while promoting another, it would present a collective risk that the lower cost technology will be suppressed while the higher cost or emerging technology may not be able to meet the target.

8.3.3. Banding

Banding sets a quota of total generation for each technology and is one method to encourage diversity. By assigning particular targets to different technologies, banding allows those technologies the space to evolve without the potential of being crowded out by other technologies that are cheaper in the short term. In practice, the Small-scale Renewable Energy Scheme operates as a band within the RET – in effect it provides a separate incentive for small-scale systems.

In its submission to the issues paper, WWF proposed that the RET should include banding, as it will support the development of renewable energy that becomes low cost energy in the longer term:

> *Banding or weighting the RET will give less developed/more costly resources a leg up to develop and bring down their cost curves…banding mechanisms [are] also useful for economic efficiency as a means of phasing industries out of the RET as they become competitive in the open electricity market. (WWF, sub.129, p.12)*

The Authority considers that reasons for supporting technologies, such as those proposed by the WWF, could be more effectively addressed by policies outside of the RET. This would not create additional administrative burden or risk to the target being achieved.

If banding involves both a minimum and a maximum quota for each banded technology, it faces all of the difficulties associated with caps with additional problems associated with minimum targets. If minimum targets are not achieved, then the overall target would not be met. Banding affects the economic efficiency of the scheme by potentially forcing more expensive technologies into the mix, increasing the overall costs to energy consumers.

The Clean Energy Council stated in its submission:

> *Banding requires a level of foresight and prediction into the specific timelines and capabilities of emerging technologies that is near impossible to do accurately … [for example] if the RET were banded to provide a band for a particular technology, it may be that this technology would not be technically capable of delivering that scale of deployment in the timeframe required. This would put achievement of the 20 per cent target at risk. (Clean Energy Council, sub.12, p.25)*

The geothermal industry has argued for banding to be applied to geothermal technology to allow it to contribute to the RET without being 'crowded out' by predominantly lower cost technologies. In its submission, the Australian Geothermal Energy Association recommended:

> *… setting aside a reasonable proportion of the incentive offered through the RET scheme to support emerging technologies as they enter the commercialisation phase. (Australian Geothermal Energy Association, sub.52, p.4)*

However, in a report by the Australian Bureau of Agriculture and Resource Economics and Geoscience Australia (2010) it was noted that:

> *There are uncertainties in the outlook for geothermal power over the next two decades. A major uncertainty is the cost of electricity production as the technology has yet to be proven commercially viable. Present estimates show a wide range in the cost of geothermal electricity generation, reflecting the current pre-commercial stage of the industry, as the cost of electricity generation is highly dependent on future technology developments and grid connection issues. The geothermal industry in Australia is progressing, with proof-of-concept having been attained in one project and expected to be achieved in at least two others within one to two years. Several pilot projects are expected to be completed within five years. (ABARE and Geoscience Australia, 2010, p.205)*

8.4. Conclusion

The RET allows a diverse range of technologies to generate certificates. The current mix of generation capacity reflects technologies that have been deployed at the lowest cost.

Any measure within the RET to promote diversity, such as expanding the use of multipliers, or introducing banding or caps, will increase the cost of the scheme to society overall and to consumers, and, in some cases, may reduce the scheme's environmental effectiveness. The Authority considers that the current approach should continue and that the current level of diversity of access is appropriate.

Other policy initiatives, particularly the Australian Renewable Energy Agency and the Clean Energy Finance Corporation, are better placed to promote diversity.

RECOMMENDATION

R.34. No change should be made to the Renewable Energy Target framework to promote diversity.

APPENDIX A RECOMMENDATIONS

Key recommendations

- The frequency of scheduled scheme reviews should be amended from every two years to every four years, so that the next scheduled review would be in 2016 (R.1).
- The form of the Large-scale Renewable Energy Target should continue to be expressed in legislation in terms of a fixed gigawatt hour level (R.2) and the existing Large-scale Renewable Energy Target of 41 000 GWh and interim targets should be maintained in their current form (R.3).
- Given the uncertainty currently surrounding a number of policy issues – which, hopefully, will be clarified somewhat over the next few years – the Renewable Energy Target review in 2016 would be an appropriate time to consider adjustments to the targets beyond 2020 (R.4).
- The Small-scale Renewable Energy Scheme should remain separate from the Large-scale Renewable Energy Target (R.5), but be amended in the following ways:
  - The threshold for solar photovoltaic units in the Small-scale Renewable Energy Scheme be reduced from 100 kilowatts to, say, 10 kilowatts. The Authority recommends the Commonwealth Government conduct further consultations with stakeholders to determine an appropriate threshold. Units over the small-scale threshold would be included in the Large-scale Renewable Energy Target, with five year certificate deeming (R.6);
  - The Ministerial power to lower the price cap should be retained to provide an appropriate cost containment mechanism should installations of small-scale systems accelerate unsustainability (R.7);
  - The Small-scale Renewable Energy Scheme should be phased out by reducing deeming so that renewable energy generation from small-scale systems is not rewarded after 2030 (R.8); and
  - The clearing house should be amended to a 'deficit sales facility' whereby new certificates would only be placed in the clearing house when it is in deficit (R.9).
- Large electricity consumers should be permitted to opt-in to assume direct liability for Renewable Energy Target obligations. The Commonwealth Government should consult further with stakeholders to develop a detailed approach to opt-in that is efficient for both large electricity users and retailers. The Authority considers that the New South Wales Greenhouse Gas Reduction Scheme opt-in model would be an appropriate starting point for this detailed design work (R.13).
- In cases where the Renewable Energy Target costs are passed through to emissions-intensive, trade-exposed businesses, partial exemption certificates should be tradeable, and thereby able to be used by any liable entity to reduce liable electricity acquisitions (R.21).

Other recommendations

- To better manage liability, the relevant renewable power percentage and small-scale technology percentage should be set prior to a compliance year, and preferably by 1 December of the preceding year (R.15).
- In regard to the arrangements for emissions-intensive, trade-exposed entities:

- the level of the exemption for these entities under the Renewable Energy Target should be considered by the Productivity Commission as part of its broader review of the Jobs and Competitiveness Program (R.19);
- the Commonwealth Government should consider the impact of the Renewable Energy Target on the competitiveness of an emissions-intensive, trade-exposed industry in any requests to the Productivity Commission's review of the level of industry assistance under the carbon pricing mechanism and the Renewable Energy Target (R.20); and
- the Commonwealth Government should consider opportunities for efficiencies through the alignment of application processes and data requirements for emissions-intensive trade-exposed industries under the Jobs and Competitiveness Program and Renewable Energy Target (R.22).

- The Commonwealth Government should explore whether the Renewable Energy Target eligibility for native forest wood waste is likely to increase the rate of logging of native forests. If it is not, then wood waste eligibility should be reinstated, subject to appropriate accreditation processes designed to ensure that no additional logging occurs as a result (R.28).
- The Clean Energy Regulator should be able to refund over-surrendered certificates to a liable entity that ceases to trade, or to transfer over-surrendered certificates if a liable entity is acquired by another entity which takes on a Renewable Energy Target liability (R.17).
- The requirement to submit a solar water heater and small generation unit return (R.10) and the requirement to provide the out-of-pocket expense data for a small generation unit installation (R.11) should be removed from the *Renewable Energy (Electricity) Regulations 2001* (Cth).

Recommendations to maintain existing arrangements

- In the Authority's judgement many aspects of the existing arrangements are operating satisfactorily and no changes are recommended in respect of the following:
  - the primary point of liability or the size threshold for coverage of grids (R.12) or the process for calculating individual liability (R.14);
  - the current arrangements for surrender of certificates (annual surrender for the Large-scale Renewable Energy Target; quarterly surrender for the Small-scale Renewable Energy Scheme) (R.16);
  - the current settings for the shortfall charges (the level of the shortfall charge should be reconsidered by the Authority as part of its 2016 review of targets beyond 2020, or earlier if circumstances warrant (R.18));
  - the self-generation exemption (R.23) (but it is proposed that arrangements be developed to allow for incidental electricity offtakes under the self-generation exemption which provide community benefits in remote locations (R.24));
  - the list of eligible sources or the accreditation process for the Large-scale Renewable Energy Target (R.25);
  - the present eligibility arrangements for existing waste coal mine gas (R.26) and new waste coal mine gas (R.27);
  - the existing arrangements for displacement technologies (R.32) or to allow additional displacement technologies in the Renewable Energy Target (R.33); or
  - to promote diversity (R.34).

- The Clean Energy Council should be maintained as the sole accreditation body for installers under the Small-scale Renewable Energy Scheme (R.29).
- New small-scale technologies should be considered on a case by case basis for inclusion in the Small-scale Renewable Energy Scheme (R.30). No additional new small-scale technologies should be made eligible in the Small-scale Renewable Energy Scheme at this time (R.31).

APPENDIX B LETTER FROM THE MINISTER TO THE CLIMATE CHANGE AUTHORITY CHAIR

Minister for Climate Change and Energy Efficiency
Minister for Industry and Innovation

Mr Bernie Fraser
Chair
Climate Change Authority
GPO Box 1944
MELBOURNE VIC 3011

Dear Mr Fraser Bernie

I write to you concerning the Climate Change Authority's statutory review of the Renewable Energy Target (RET) scheme.

I first of all would like to take the opportunity to once again thank you for agreeing to lead the Authority and note the very important role it has to play in advising the Government on the operation of the key components of the Clean Energy Future plan. I intend writing to you again in the near future to set out the Government's expectations generally in relation to the role the Authority, its relationships with the Government and Department of Climate Change and Energy Efficiency, and issues of corporate governance, communication and financial management.

As you are aware, the Authority's first significant task is to review and report on the operation of the RET scheme (the Review) before the end of 31 December 2012. The parameters of the Review, including its scope, consultation requirements and timelines, are set out in Section 162 of the *Renewable Energy (Electricity) Act 2000*. This includes the requirement that the Climate Change Authority's recommendations cannot be inconsistent with the objects of the Act.

The Government recognises that renewable energy will play a crucial role in a clean energy future. As such, promoting innovation and investment in harnessing our abundant renewable energy resources is a key element of the Clean Energy Future plan.

The RET scheme, as an integral part of the Government's plan, is designed to deliver the Government's commitment that the equivalent of at least 20 per cent of Australia's electricity supply will come from renewable sources by 2020. Renewable energy investors have been assured by the Government of our ongoing commitment to this target, to provide confidence for their investment decision making.

The RET scheme will work alongside the carbon price, the Australian Renewable Energy Agency and the $10 billion Clean Energy Finance Corporation (CEFC) recently established through legislation, to speed up the deployment of renewable energy technologies, helping smooth Australia's transition to a clean energy future. These policies and institutions are intended to be mutually supportive and work together to enhance clean energy outcomes for all Australians.

In the long term, transformation of our electricity supply to renewable and low emissions sources is essential to cutting our national emissions and remaining competitive in a carbon constrained world. The carbon price will drive investment in clean energy sources such as

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solar and wind. However in the near term, the RET is intended to complement the carbon price by accelerating the deployment of market-ready renewable technologies at least cost through a technology-neutral, market based scheme. It will also help diversify our energy mix which is currently highly reliant on emissions-intensive coal-fired generation.

Under the RET scheme, and its smaller precursor which commenced in 2001, over 300 power stations have been accredited, increasing renewables-based generation by around 5 times, albeit off a small base. In terms of small-scale renewable energy systems, over 600,000 rooftop solar photovoltaic (PV) installations and 700,000 solar and heat pump water heaters have also received support since 2001.

The Government has recently made policy changes to the RET to improve its operation. In mid-2010, the RET was separated into two components - the Large-scale Renewable Energy Target (LRET) and the Small-scale Renewable Energy Scheme (SRES) - to provide greater certainty for large-scale renewable energy project investors, households and installers of small-scale renewable energy systems. The Solar Credits mechanism under the SRES boosts upfront support for eligible solar PV systems by multiplying the number of tradable certificates able to be created. The multiplier reduces over time, reflecting declining costs of small-scale solar PV.

In response to unsustainable growth in small-scale solar, driven by declining system costs, the strong Australian dollar and economy, and incentives such as state and territory feed-in tariff schemes, the Government has brought forward the phase-out of Solar Credits by two years to mid-2013. These changes were aimed at maintaining a balance between supporting households with the upfront cost of installing solar panels, the impact on electricity prices, and the sustainable development of the industry.

In light of the above, the Government is continuing to monitor the efficiency of the SRES and the clearing house which operates to cap the price of certificates in the small-scale market. In addition, the Government considers that it is important the requirements relating to the creation of small-scale technology certificates ensure that only systems of appropriate quality are supported with regard to compliance with State and Territory legislation, relevant Australian standards and industry practice. This framework also needs to take into account the responsibility of State and Territory Governments and industry accreditation schemes have for electrical safety and quality matters.

The Government is also interested in how the RET, as a market-based scheme, is performing in terms of encouraging generation of electricity from a range of renewable sources and how it is influencing the long-term development of the industry to assist the transition to a low emissions economy at least cost. The Government is conscious that the RET needs to provide investment certainty and predictability for investors long lived assets. It also needs to deliver renewable energy outcomes at least cost to electricity consumers. In this context, I note that some renewable energy industry stakeholders have expressed the view that the statutory requirement for the Authority to review the RET scheme every two years is inappropriate and contributing to uncertainty for investors.

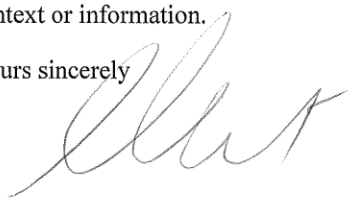
Regarding the Government's broader activities in this area, you will be aware that COAG has prioritised a review of Government climate change programs to look at whether they are complementary to a carbon price and are effective, efficient and do not impose duplicative reporting requirements. The Select Council on Climate Change (SCCC), which I chair, has developed an approach to this review and is due to report to COAG by

8 February 2013. My Department will draw on the findings of the CCA RET Review to assist with completing the COAG Review of complementary measures.

At a meeting on 4 May 2012, the SCCC also agreed that the report of the recently completed *COAG Review of Specific RET issues* be conveyed to the CCA to inform its considerations. COAG commissioned this review in April 2008 in agreeing the design of the RET scheme. As Chair of the SCCC, I attach a copy of the report in accordance with the SCCC agreement.

In closing, I look forward to receiving the Authority's report of the Review and would encourage the Authority to contact the Department of Climate Change and Energy Efficiency and the Clean Energy Regulator as appropriate should you require any further context or information.

Yours sincerely



GREG COMBET

APPENDIX C CONSULTATION

Throughout the Renewable Energy Target (RET) review, the Climate Change Authority (the Authority) consulted with a wide range of interested parties, including energy retailers, energy users, environmental and welfare advocacy groups, the renewable energy industry and individuals.

To assist the consultation process, the Authority released an issues paper and a discussion paper. The issues paper (released 20 August 2012) explained the RET scheme and requested feedback from stakeholders on particular questions. Almost 8 700 submissions were received, including two submission campaigns organised by GetUp (over 7 700 submissions) and Hepburn Wind (over 700 submissions). Submissions, including samples from the submission campaigns, are available at the Authority's website (www.climatechangeauthority.gov.au).

The discussion paper (released 26 October 2012) set out the Authority's preliminary views on key issues. The discussion paper was used as the basis for further consultation, including four stakeholder consultation roundtables held on 2 and 5 November 2012 in Melbourne and Sydney respectively. A summary of these discussions has been published on our website along with a list of the stakeholders that participated. The Authority received 54 written responses to the discussion paper. Table 8 lists the individuals and organisation that provided non-campaign submissions (which are not bound by confidentiality) to the issues paper, discussion paper, or both.

The Authority also held more than 60 one on one meetings with stakeholders over the course of the review.

Table 8 Submissions Received

100% Renewable Community Campaign	ACCIONA
Advanced Energy Consulting	AECOM Australia
AGL Energy	Ai Group
Alinta Energy	Alstom Limited
Alternative Technology Association	Amcor Packaging (Australia)
Andrew Smethurst	Andrew Yarrow
Anthony Yeates	Australian Aluminium Council
Australian Coal Association	Australian Conservation Foundation
Australian Energy Market Commission	Australian Energy Market Operator
Australian Forest Products Association	Australian Geothermal Energy Association
Australian Industry Greenhouse Network	Australian Network of Environmental Defender's Officers
Australian Paper	Australian Petroleum Production and Exploration Association
Australian Power and Gas	Australian PV Association
Australian Solar Council	Australian Solar Thermal Energy Association
Australian Sugar Milling Council	Australian Youth Climate Coalition
Barbara J Fraser	Barry Murphy

Beacons Consulting	Beyond Zero Emissions
BHP Billiton – Illawarra Coal	Business Council of Australia
Cement Industry Federation	Central NSW Renewable Energy Committee
Chamber of Minerals and Energy of Western Australia	Chevron Australia
Chris Hinchcliffe	Chris Mount
Clean Energy Council	CleanSight
Climate Action Hobart	Climate Action Network Association
Climate and Health Alliance	Climate Markets and Investment Association
ClimateWorks Australia	Conservation Council of South Australia
Continental Wind Partners and Wind Prospect	Coronium
CSR	Dandenong Ranges Renewable Energy Association
David Hamilton	David Osmond
Doctors for the Environment Australia	DUT
Energetics	EnergyAustralia
Energy Developments	Energy Networks Association
Energy Retailers Association of Australia	Energy Supply Association of Australia
Energy Users Association of Australia	Enhar
EnviroGen	Enviromate Commercial
Epuron	Eraring Energy
Ergon Energy	Eurobodalla Sustainable Devices
Evans and Peck	EvolveSmart
First Solar (Australia)	Gas Industry Alliance
General Electric	Geodynamics
GetUp	Glen Wright
Goldwind Australia	Government of Tasmania
Grattan Institute	Green Building Council Australia
Greer Taylor	Harry Suehrcke
Hepburn Wind	Hidro+ Technology
Horizon Power	Hydro Tasmania
Infigen Energy	International Power-GDF SUEZ Australia
Investor Group on Climate Change	IPART
James Kwok	James Wight
Joe Hallenstein, Hannah Clare Johnson, Scott MacKinnon, Ngaire McGaw, Fiona McKeague, Ko Oishi and Madeleine Payne	John Poppins
Julie Congdon	Kai Mildner
Keppel Prince Engineering	Lake Macquarie City Council
Landfill Gas and Power	Latrobe Valley Sustainability Group
LMS Energy	M Ballantine Industrial Electrical
Macquarie Generation	Major Energy Users Inc
Marion Cook	Mark Coster
Melanie Mildner	Meridian Energy Australia
Milan Mitic	Minerals Council of Australia

MirusWind	MT Energie
National Farmers' Federation	National Generators' Forum
New South Wales Business Chamber	Origin Energy
Pacific Hydro	Pamela Reeves
Peter Campbell	Peter Doumouras
Power and Water Corporation	Professor Ian Johnston
Qenos	QSG
Queensland Department of Energy and Water Supply	Queensland Minister for Energy and Water Supply
RATCH-Australia	REC Agents Association
REpower Australia	RES Australia
Rio Tinto	Rob Stokes MP
Robin Morgan	Rodney Lowe
Ross Garnaut	RPG Australia
Samsung C&T	Santos
Sienna Mildner	Sinovel Wind Group (Australia)
Snowy Hydro	Solar Business Council
Solar Energy Industries Association	Solar Matrix
Solex	Stanwell Corporation
Steven Boer	Sucrogen Australia
Sustainable Energy Association of Australia	Sustainable Energy Now
Sydney Water	The Children's Investment Fund Management
The Climate Group	The Climate Institute
UNION FENOSA Wind Australia	Uniting Church in Australia
Vestas Australian Wind Technology	Vic McDonald
Visy	WestGen
WestWind Energy	William Adlong
Wind Prospect	Windlab Systems
Wollongong Climate Action Network	WWF Australia
Yarra Ranges Council	

APPENDIX D MODELLING SUMMARY

Appendix D.1 Introduction

The Authority engaged SKM MMA to undertake electricity market modelling to assess the potential impacts of changes to the current Renewable Energy Target (RET) scheme on the electricity generation capacity mix and production, emissions abatement, certificate prices, resource costs, wholesale and retail electricity prices and power bills for the average household and small to medium enterprises (SMEs).

Four RET scenarios were modelled:

- existing Large-scale Renewable Energy Target (LRET) target – *reference case 1*;
- no RET from January 2013 onwards – *no RET*;
- updated 20 per cent target of 26 400 GWh in 2020 for large-scale renewable generation to reflect downward revisions to long term electricity demand forecasts, allowing for around 11 000 GWh for the contribution of Small-scale Renewable Scheme (SRES) technologies – *updated 20% target*; and
- rolling the LRET and SRES back into one target of 45 000 GWh in 2020, to occur from 1 January 2015 – *combined LRET & SRES*.

This appendix summarises *reference case 1* results compared with *no RET* and *updated 20% target* scenarios. Detailed results and assumptions for all scenarios are outlined in the SKM MMA modelling report available at www.climatechangeauthority.gov.au**.**

The results should be interpreted as what might happen given a set of assumptions and scenarios rather than predicting future outcomes. Indeed, the modelling exercise is based on existing regulatory and policy settings, which may change in the future.

The modelling period for the analysis was from 2012-13 to 2040-41 to ensure investments which are forecast to occur following 2020-21 take into account future revenues over the life of the investment. Reporting of results in this appendix focuses on the period 2012-13 to 2030-31.

Modelled impacts of scenarios on retail and SMEs electricity prices reported in this appendix include a suppression of wholesale prices. An analysis of impacts excluding wholesale price suppression can be found at Chapter 4.

All values from the modelling are denominated in June 2012 prices.

Where a net present value is provided, a discount rate of seven per cent has been used, consistent with recommendations from the Office of Best Practice Regulation (2010).

Appendix D.2 Key modelling assumptions

As with any modelling exercise, the modelling results are dependent on the assumptions used. Table 9 outlines the key modelling assumptions.

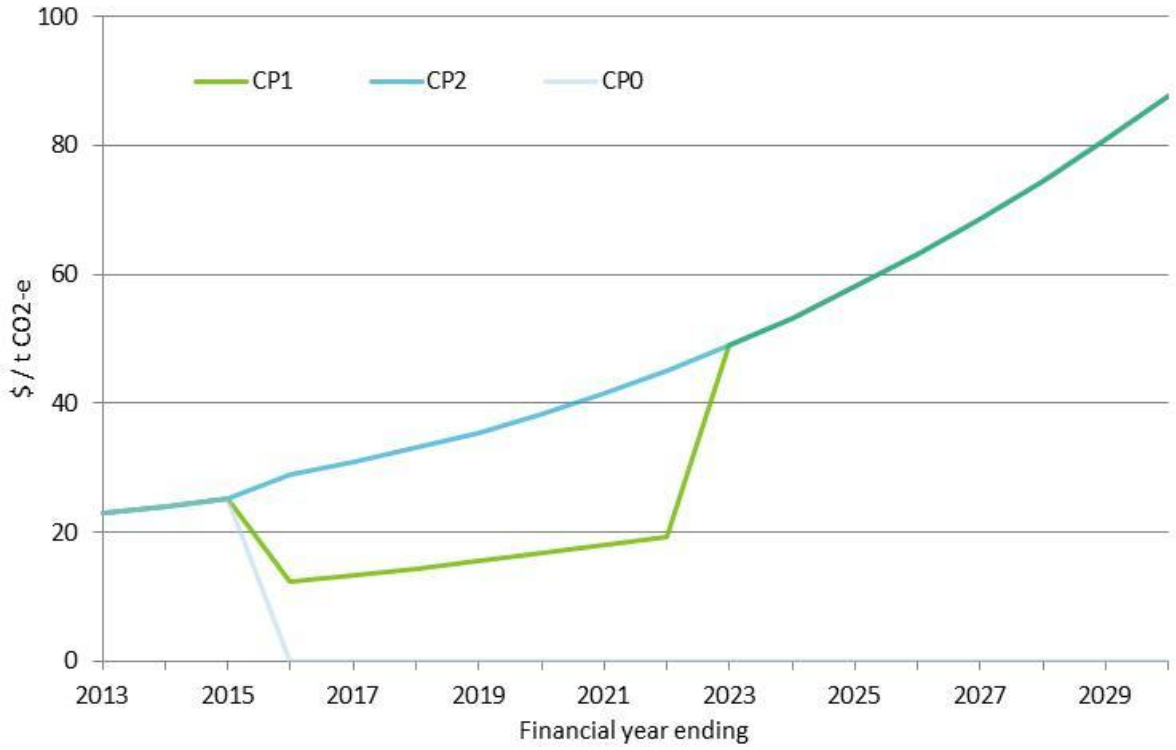
Table 9 Key Modelling assumptions

Assumption	*Reference case 1*	*Updated 20% target*	*No RET* from January 2013
Electricity demand – AEMO medium growth energy forecast	●	●	●
Carbon price – path reflects a fall in prices after the fixed price period (see Appendix D.3)	●	●	●
Regional gas prices – AEMO National Transmission development planning prices developed by ACIL Tasman	●	●	●
Technology costs - SKM MMA data drawing on BREE (AETA) and AEMO publications	●	●	●
Small-scale renewable technology penetration of around 11 000 GWh by 2020	●	●	
Small-scale Technology Certificate price that averages around $27 per megawatt hour over the period 2012 to 2020	●	●	
Updated 20 per cent target of 26 400 GWh in 2020 for large-scale renewable generation (see Chapter 4)		●	
Minimal network constraints (restrictions on power flows) within a state and development of interconnectors between state systems on the basis of market-wide economic assessment of benefits and costs	●	●	●
Baseline renewable generation of around 14 500 GWh	●	●	●

Appendix D.3 Modelled carbon price scenarios

The Authority has drawn on two of the Treasury carbon price scenarios published in *Strong Growth, Low Pollution: modelling a carbon price 2011* (SGLP) and the *SGLP Update* as points of reference for its modelling. A zero carbon price scenario was also modelled. Each of the three scenarios is described in greater detail below and illustrated in Figure 29.

Figure 29 Carbon price scenarios (nominal prices)



Source: Commonwealth Treasury and Climate Change Authority.
Note: The above carbon price scenarios are not a forecast of the expected future carbon price path.

CP1 (Reference case 1) – Combines the Treasury SGLP Update $23 scenario and Treasury SGLP 'low starting price' scenario. This scenario assumes a nominal domestic price of $23 per tonne of carbon dioxide equivalent (CO_2-e) in 2012-13 rising on average 2.5 per cent per year plus inflation over three years. The scenario assumes a transition from this price path to a fixed price of around $12 per tonne of CO_2-e in 2015-16 (this fixed price is consistent with the Treasury SGLP 'low starting price' scenario), which was part of a sensitivity analysis that assumed a domestic fixed price of $10 per tonne of CO_2-e in 2012-13 rising five per cent per year plus inflation over a fixed price period of ten years. This Treasury scenario assumed a transition from a fixed price of around $19 per tonne of CO_2-e in 2021-22 to an internationally linked scheme with a forecast global carbon price of around $49 per tonne of CO_2-e in 2022-23.

CP2 (Reference case 2) – Assumes a world with a 550 ppm stabilisation target and an Australian emissions target of five per cent cut on 2000 levels by 2020 and 80 per cent cut by 2050. This assumes a nominal starting price of $23 per tonne of CO_2-e in 2012-13, rising 2.5 per cent per year, plus inflation, before moving to a flexible international carbon price from 2015-16, projected to be around $29 per tonne of CO_2-e. This scenario was published by the Treasury in the SGLP Update.

CPO (Zero carbon price) – Assumes a nominal domestic starting price of $23 per tonne of CO_2-e in 2012-13 rising on average 2.5 per cent per year plus inflation over three years, falling to zero from July 2015.

Appendix D.4 Key sensitivities

The implications of a change in either carbon price or demand

The modelling results are particularly sensitive to assumptions relating to future carbon prices and electricity demand.

The Authority's modelling explored whether the target under *reference case 1* would be met if the carbon price fell to zero (*zero carbon price* scenario) or if demand were significantly lower than currently forecast (*low demand* scenario). The modelling suggests that if either the carbon price went to zero or electricity demand fell further than is currently forecast by AEMO, then there is a greater likelihood that the LRET target would not be met because overall wholesale prices would be lower, requiring higher certificate prices for renewable energy projects to be viable. Figure 23 in Chapter 4 indicates:

- the shortfall charge is estimated to come into play in the *zero carbon price* scenario, in which case the LRET would not be met as liable parties are likely to pay the shortfall charge rather than meet their LRET obligations – a result that is consistent with the findings of other modelling exercises (for example, AEMC 2011); and
- in the *low demand* scenario the LGC price is estimated to remain below the shortfall charge, although between 2020-21 and 2021-22 the LGC price comes close to hitting the shortfall charge which averages around $74 over this period.

Estimating the cost of abatement

The Authority has used the Department of Climate Change and Efficiency (DCCEE) methodology for estimating the cost of abatement. The DCCEE methodology uses the following formulae and uses discount rates consistent with recommendations from the Office of Best Practice Regulation (2010).

Cumulative additional net resource costs (discounted)	÷	Cumulative additional abatement	=	Resource Cost of Abatement ($/tonne)

Further detail can be found at http://www.climatechange.gov.au/publications/abatement/estimating-cost.aspx.

Key estimated impacts

The following section summarises the key estimated impacts of the different target scenarios on:

- generation of electricity from renewable sources;
- emissions from the electricity sector;
- cost to society, including resource costs; and
- households and businesses, including certificate prices, wholesale and retail electricity prices.

Reference case 1 compared to no RET

Generation of electricity from renewable sources

Comparing *reference case 1* with a *no RET* scenario reveals that over the period 2012-13 to 2030-31 there is a similarity in the level of development in new generation by 2030-31 (see Table 10).

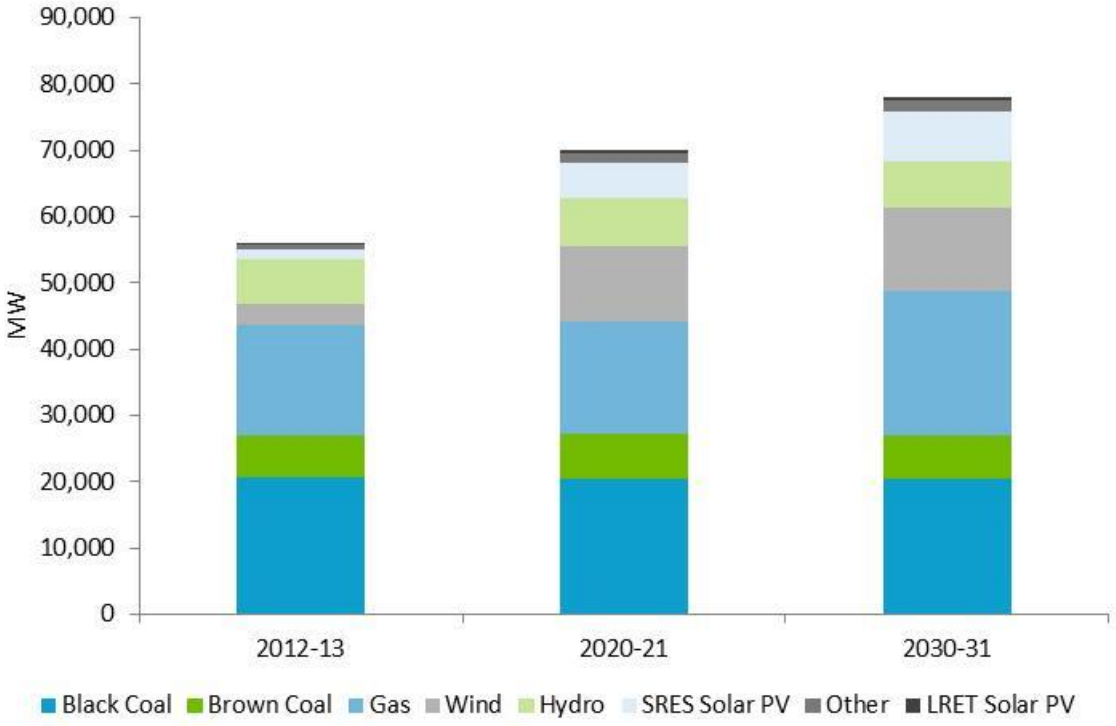
Table 10 New generation build 2012-13 to 2030-31 under *reference case 1* and *no RET* scenario

	reference case 1	*no RET* from January 2013
Renewable generation	17 244 MW (13 875 MW by 2020-21)	17 244 MW (5 043 MW by 2020-21)
Gas-fired generation	5 113 MW	4 854 MW
Coal-fired generation	24 MW	24 MW

Source: SKM MMA and Climate Change Authority, 2012.
Note: Renewable capacity excludes solar water heaters.

The existing target, however, accelerates the build of new renewable energy generation (primarily wind) in the period to 2020-21 during which the carbon price is insufficient to make the development of new renewable energy generation economically viable (see Figure 30). By the end of 2020-21, it is estimated that around 13 875 MW of new renewable energy generation capacity will be installed compared with around 5 043 MW under the *no RET* scenario.

Figure 30 Stationary electricity sector capacity under *reference case 1*

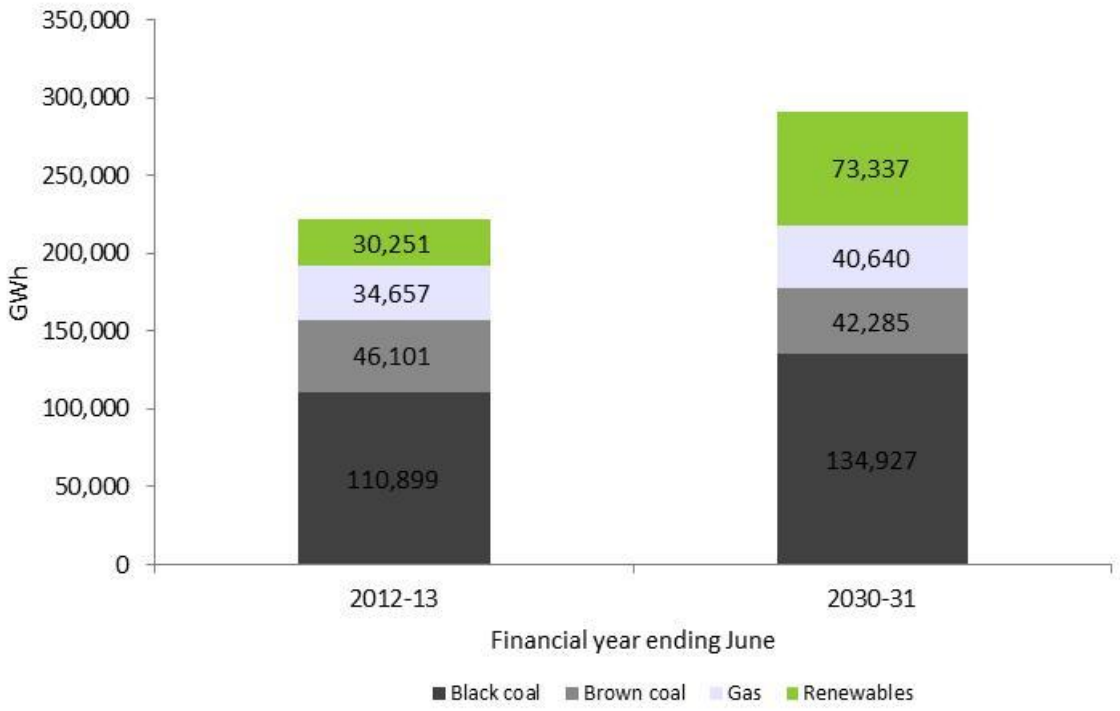


Source: SKM MMA and Climate Change Authority, 2012.
Note: 'Other' includes the following technologies; wet waste, wheat/ethanol plant, agricultural waste, bagasse, black liquor, landfill gas, municipal solid waste, sewage waste, wood/wood waste, geothermal and wave.

Figure 31 presents an overview of total generation in gigawatt hours by broad fuel category and shows the increasing share of renewable energy generation under *reference case 1*. The share of total generation from renewable energy (including an allowance for a reduction in demand due to displacement technologies) is forecast to grow from around 14 per cent in 2012-13 to around 25 per cent in 2020-21 and remain at this level in 2030-31. By comparison, under the *no RET* scenario it is estimated that renewable energy generation contributes around 13 per cent in 2012-13, around 15 per cent in 2020-21 and around 25 per cent in 2030-31.

Additional renewable energy generation displaces some fossil-fuel generation over the period modelled but the overall results for individual fuels are mixed. Over the period 2012-13 to 2030-31, for *reference case 1*, output from black-coal fired generation is estimated to increase by around 24 000 GWh while brown-coal fired generation is expected to decrease by around 3 800 GWh. Coal-fired generation remains relatively competitive with gas-fired generation over this period as real gas prices in the southern and eastern states are assumed to double by 2030-31 as they approach international price-parity levels. Brown coal-fired generation capacity is not estimated to change substantially until after 2030-31, when retirement of some brown coal-fired generation is anticipated.

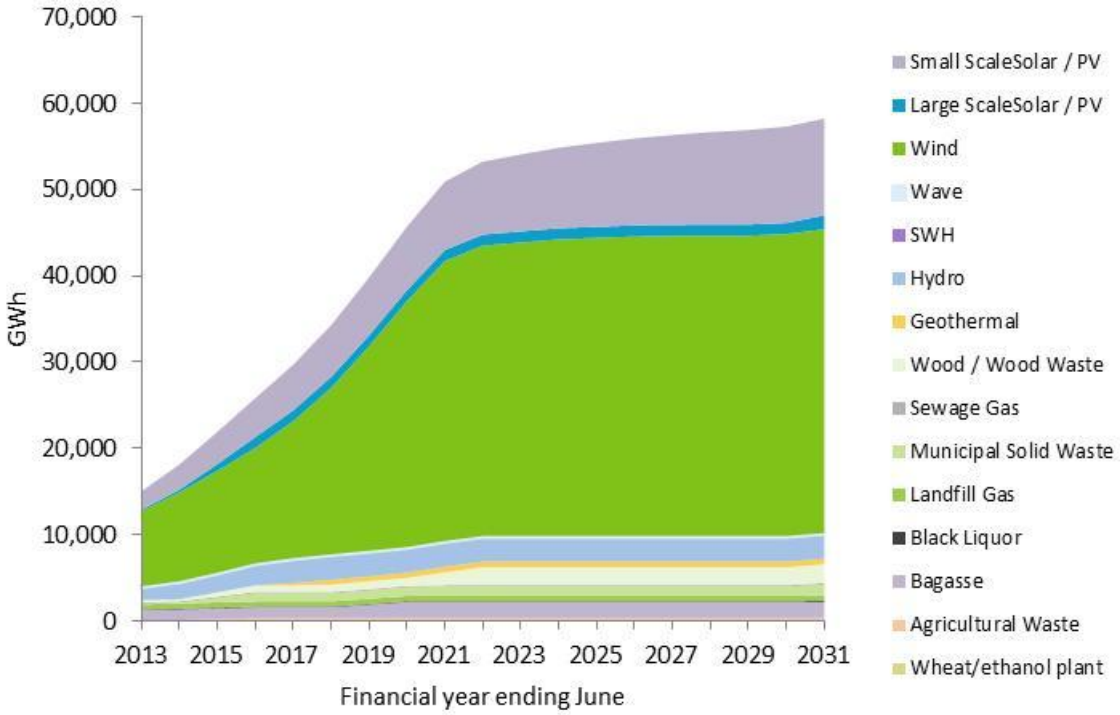
Figure 31 Total generation production mix under *reference case 1*



Source: SKM MMA and Climate Change Authority, 2012.

Figure 32 provides an estimate of the share of generation delivered by eligible renewable energy plant of different technology types. It shows that most of the additional renewable energy generation is likely to come from wind (32 433 GWh in 2020-21), with a smaller contribution from solar PV (large-scale PV generation of 1 288 GWh and small-scale PV generation of 7 933 GWh in 2020-21). Even though the carbon price is assumed to be increasing, a corresponding increase in large-scale renewable generation is not expected because neither the large-scale certificate price nor the carbon price are high enough to encourage new investment. In addition, solar water heating is treated in the modelling as an offset to demand, but its contribution is not assumed to materially change from its existing contribution in the period to 2030-31.

Figure 32 New renewable generation production mix under *reference case 1*



Source: SKM MMA and Climate Change Authority, 2012.

Emissions from the electricity sector

Total emissions from the stationary electricity sector over the period 2012-13 to 2030-31 are estimated to be around 3 570 Mt of carbon dioxide equivalent under the *reference case 1* scenario. It is estimated that emissions will fall over the period 2018-19 to 2020-21, reflecting increased wind generation displacing existing fossil-fuel generation. However, over the period 2012-13 to 2030-31 annual emissions are estimated to increase by nine per cent. The growth in emissions occurs because, with the renewable energy target having been met, renewable generation levels are stable from 2020-21 and fossil-fuelled generation meets any electricity demand growth through the remainder of that decade. By comparison, under the *no RET* scenario, total emissions over the period 2012-13 to 2030-31 are estimated at around 3 787 Mt of CO_2-e.

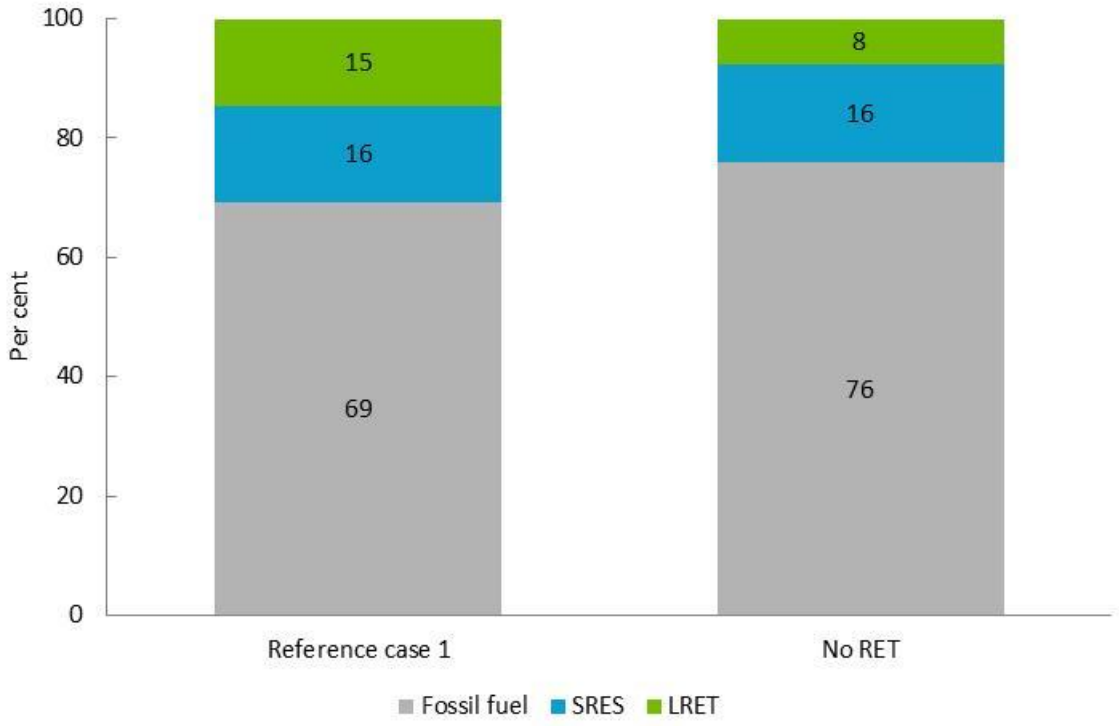
Cost to society

To understand the RET's effect on the overall cost to society, the cost of resources (capital, fuel and labour) deployed in electricity generation with and without the RET have been estimated. This approach has been taken because it is likely that in the absence of a RET that capital and operational expenditure on other generation sources will be required.

New renewable and gas-fired capacity installed over the period 2012-13 to 2030-31 to meet LRET and SRES obligations and electricity demand requirements is estimated to come at a resource cost of around $142 billion in net present value terms – noting that total resource costs represent annualised capital expenditure plus the change in overall system operating costs including reductions in fossil-fuels used. Under the *no RET* scenario, total resource cost over the same period is estimated to be around $134 billion in net present value terms, 76 per cent of which is directed at investment in the fossil-fuel sector (see Figure 33). As such, the modelling indicates that under *reference case 1* the RET will generate an additional $8.6 billion of resource investment (in net present value terms) which represents

around a six per cent increase in resource costs over the period to 2030-31 when compared to the *no RET* scenario.

Figure 33 Contribution to total resource costs over the period 2012-13 to 2030-31



Source: SKM MMA and Climate Change Authority, 2012.

Cost to households and businesses

Certificate prices

The price of a large-scale generation certificate (LGC) is broadly the difference between the wholesale price of electricity and the additional revenue required to make additional renewable energy generation a financially viable prospect. Bloomberg New Energy Finance (2012) has estimated the LGC price currently required to build new capacity is around $40 to $50. A large number of LGCs are, however, traded outside the spot market in (confidential) power purchase agreements and the effective price of the LGCs is unknown.

The LGC price under the *reference case 1* scenario is estimated to remain below the shortfall charge over the period 2012-13 to 2030-31 (see Figure 23, Chapter 4). The shortfall charge is currently not indexed, and its real value falls over time in line with inflation. The LGC price is forecast to approach the tax-effective shortfall charge by 2019-20, reaching around $65 in that year, as higher cost renewable energy projects need to be developed to meet the annual targets.

It is estimated that all of the new renewable generation capacity required to meet the targets until 2030-31 would be built by 2020-21. Although there is no substantive change in large-scale renewable generation from 2020-21 to 2030-31, other market forces (for example, rising carbon prices, falling technology costs and high gas prices) are estimated to help create an environment where renewable energy development is approaching financial viability from 2030-31 onwards.

Electricity prices

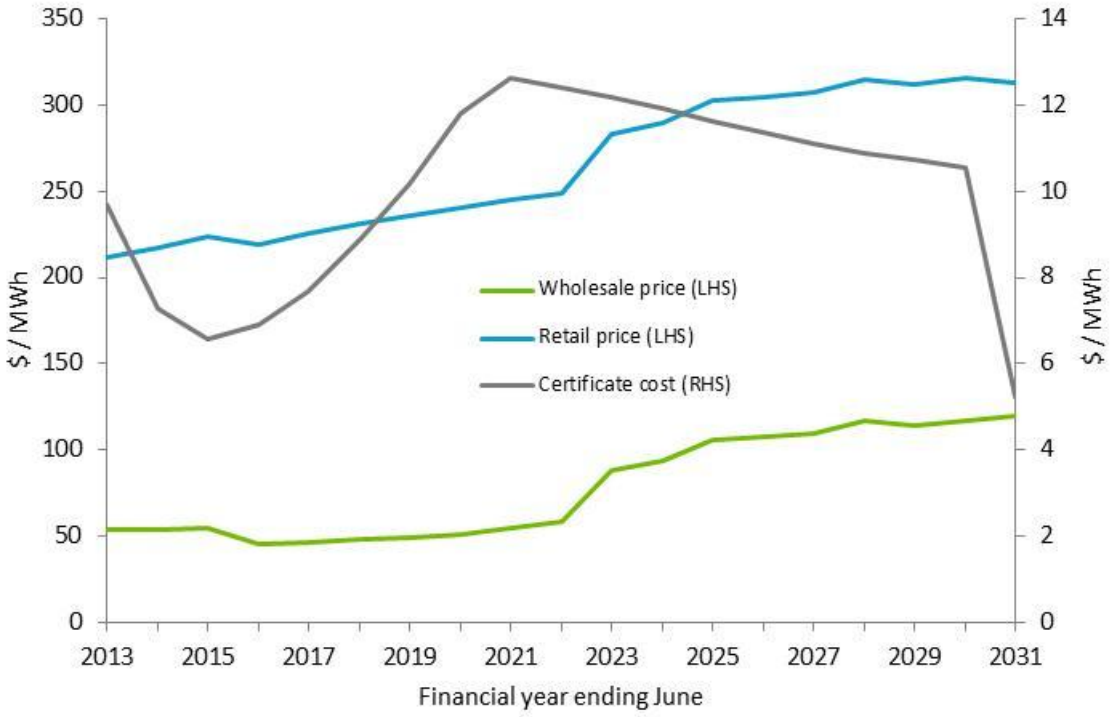
The components of the retail price as modelled include:

- wholesale prices;
- network charges (which are assumed to represent a fixed cost with some escalation in some states based on anticipated increases);
- certificate costs (a proportionate share of LGC and STC costs borne by liable parties); and
- a retail margin.

All other things being equal, the modelling estimates that the higher the large-scale renewable energy target the greater the increase in renewable energy development and the lower the wholesale price. At the same time, however, there will be a greater number of renewable energy certificates created. The net effect on energy consumer bills will therefore reflect the balance of the change in wholesale costs and change in certificate costs.

Over the period 2012-13 to 2030-31, volume weighted average wholesale electricity prices under the *reference case 1* scenario are estimated to rise from $54 per MWh to $120 per MWh (see Figure 34). The substantial upward shift in prices from 2021-22 to 2022-23 ($58 per MWh to $88 per MWh) is, however, the result of the step change in carbon prices that is assumed to occur at that time.

Figure 34 Wholesale and retail prices and RET certificate costs under the *reference case 1*



Source: SKM MMA and Climate Change Authority, 2012.

Overall movements in forecast wholesale and retail prices are quite similar under the *reference case 1* scenario, although the margin between them grows slightly because of:

- increase in RET certificate costs to 2020-21; and
- expectations of slight growth in network charges.

The expected differences in the wholesale and retail prices between the *reference case 1* and *no RET* scenarios indicate that with a RET in place, wholesale prices are lower under the *reference case 1* scenario but retail prices are higher, reflecting the wedge created by the pass-through of certificate costs (see Figure 35).

Figure 35 Change in wholesale and retail prices – *no RET* compared with *reference case 1*

Source: SKM MMA and Climate Change Authority, 2012.
Note: A positive number indicates the value is higher in the *reference case 1* scenario than in the *no RET* scenario.

Energy consumer effects

RET certificate costs are estimated to contribute an average of 3.8 per cent of the total retail costs of electricity over the period to 2030-31, which equates to around $70 per annum for the average household electricity bill, assuming annual consumption of 7 MWh (see Figure 36). Higher RET certificate costs in the *reference case 1* scenario compared to the *no RET* scenario are estimated to be largely offset by lower wholesale prices under *reference case 1*.

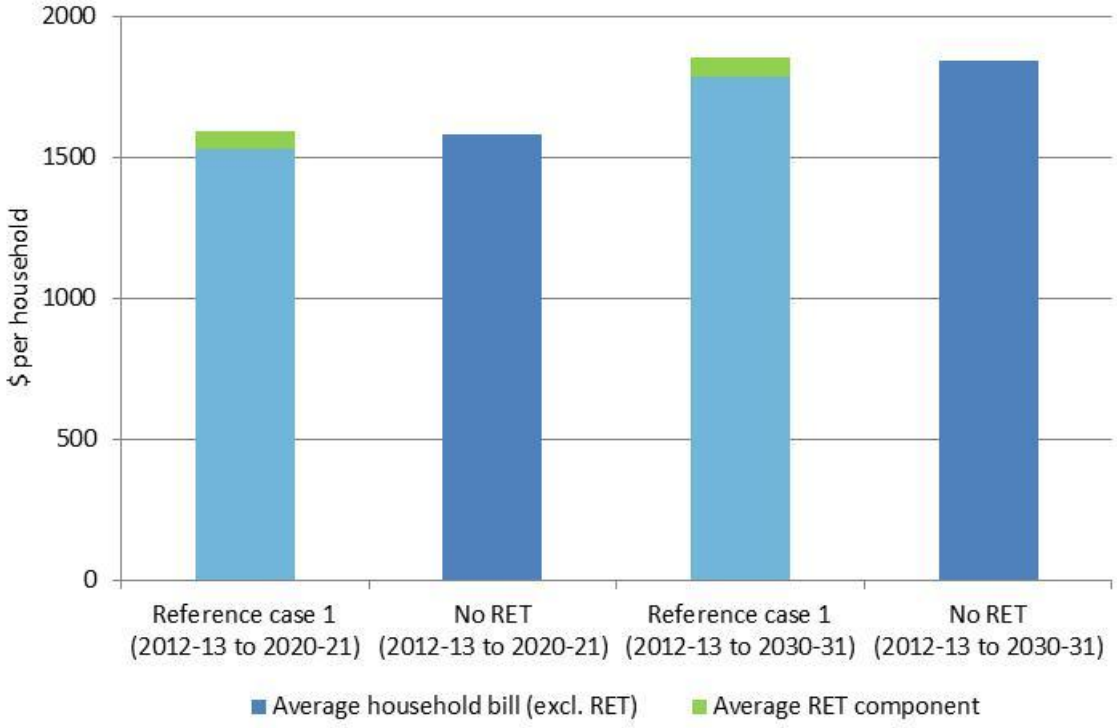
The average household electricity bill is estimated to rise through to 2030-31 at an average annual rate of 2.2 per cent under the *reference case 1* scenario. The sharpest rise coincides with the step change from 2021-22 to 2022-23 driven by the modelled carbon price. Average household bills are expected to plateau from 2024-25 reflecting lower RET certificate costs.

Average household electricity bills are forecast to be around $15 per annum higher, on average, over the period 2012-13 to 2030-31 compared to the *no RET* scenario.

Similarly, the average retail price of electricity for an average small to medium enterprise (SME), consuming 140 MWh per annum, is estimated to be slightly higher on average under the *reference case 1 and no RET* scenarios over the period 2012-13 to 2030-31 (see Source: SKM MMA and Climate Change Authority, 2012.

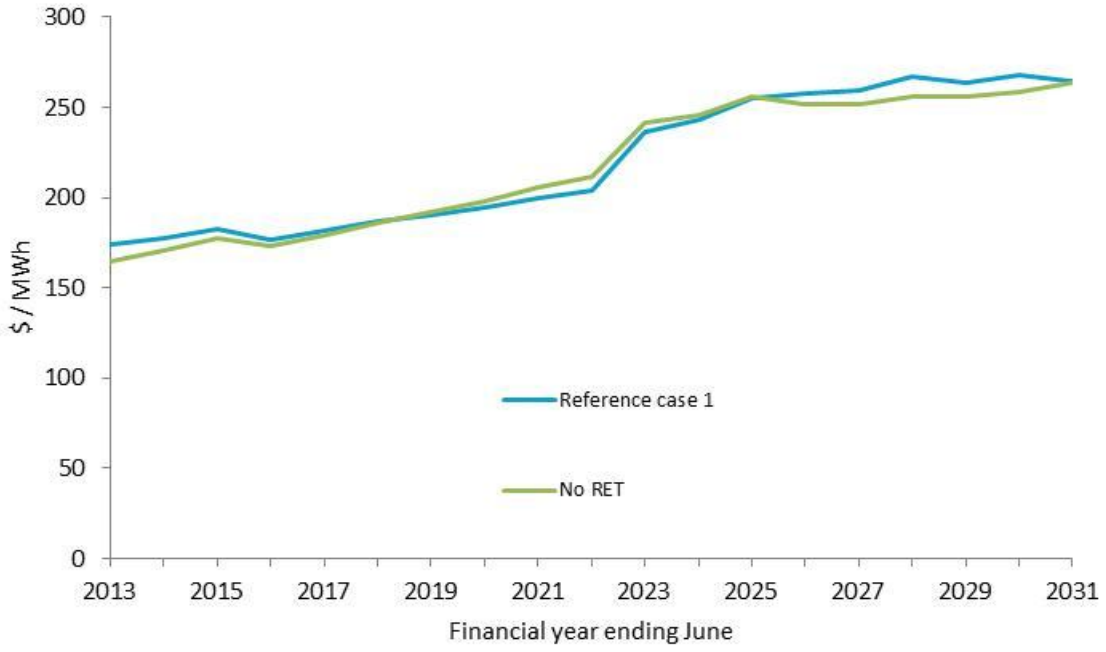
Figure 37). The average SME bill is estimated to increase by around $335 per annum on average over the period 2012-2013 to 2030-31, around $17 (or five per cent) of which is attributable to the RET.
It should be noted that the modelling indicates that SMEs face a proportionally higher RET cost for their electricity bills when compared to the average household due to the fact that SMEs on average face a lower electricity tariff (around $45 per MWh lower than households on average per annum).

Figure 36 Average annual household electricity bill



Source: SKM MMA and Climate Change Authority, 2012.

Figure 37 Commercial electricity prices under *reference case 1* and *no RET* scenarios



Source: SKM MMA and Climate Change Authority, 2012.

Reference case 1 compared to updated 20% target

Generation of electricity from renewable sources

Comparing *reference case 1* with an *updated 20% target* scenario reveals that over the period 2012-13 to 2030-31 there is a similarity in the level of new renewable generation capacity by 2030-31 (see Table 11). However, the existing target accelerates the build of new capacity (primarily wind) in the period to 2020-21, during which the carbon price is insufficient to make renewable energy generation economically viable. By 2020-21, it is estimated that around 13 615 MW of new renewable energy generation capacity will be installed compared with around 9 053 MW under the *updated 20% target* scenario.

Table 11 New capacity *build 2012-13 to 2030-31 under reference case 1 scenario* and *updated* 20% scenario

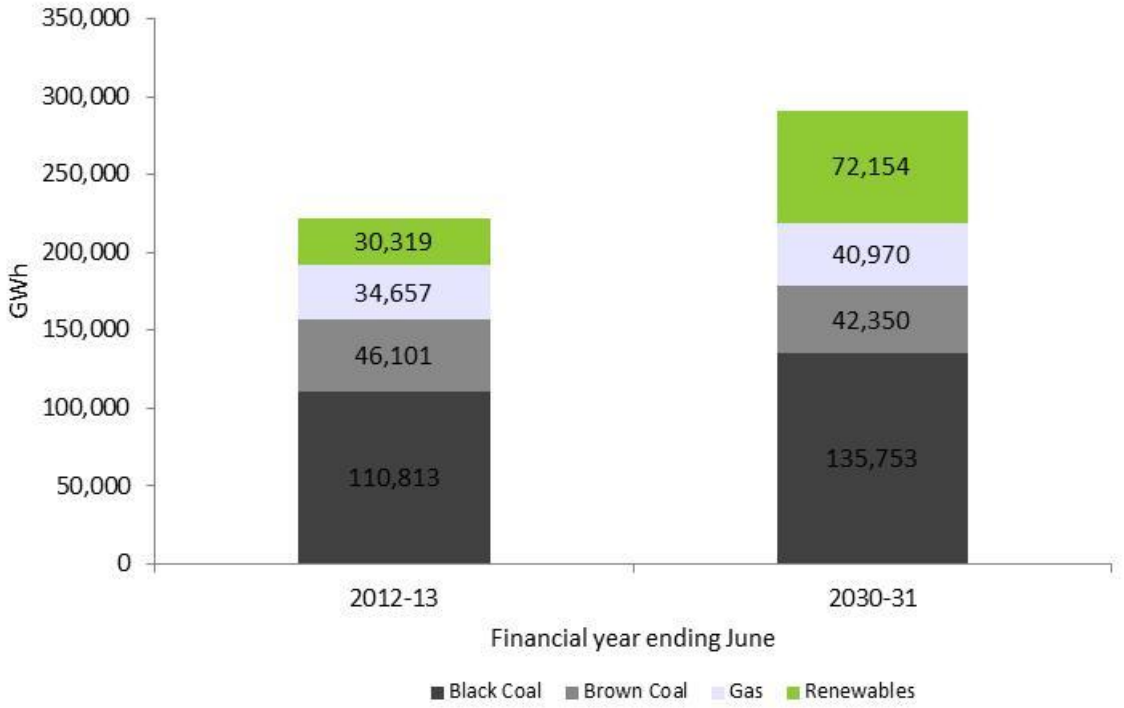
	updated 20% target	*reference case 1*
Renewable capacity	16 986 MW (9 053 MW by 2020-21)	16 986 MW (13 615 MW by 2020-21)
Gas-fired capacity	4 854 MW	5 113 MW
Coal-fired capacity	24 MW	24 MW

Source: SKM MMA and Climate Change Authority, 2012.
Note: Renewable capacity excludes solar water heaters.

Figure 38 presents an overview of total generation in gigawatt hours by broad fuel category and shows the increasing share of renewable energy generation. As a share of total generation, it is estimated that renewable energy generation (including an allowance for displacement technologies) contributes around 14 per cent in 2012-13, growing to around 20 per cent in 2020-21 rising to around 25 per cent in 2030-31 under the *updated 20%* scenario. By comparison, under the *reference case 1* scenario renewable energy generation (including an allowance for displacement technologies) contributes

around 14 per cent in 2012-13, growing to around 25 per cent in 2020-21 and remaining at this level in 2030-31.

Figure 38 Total generation under *updated 20% target*



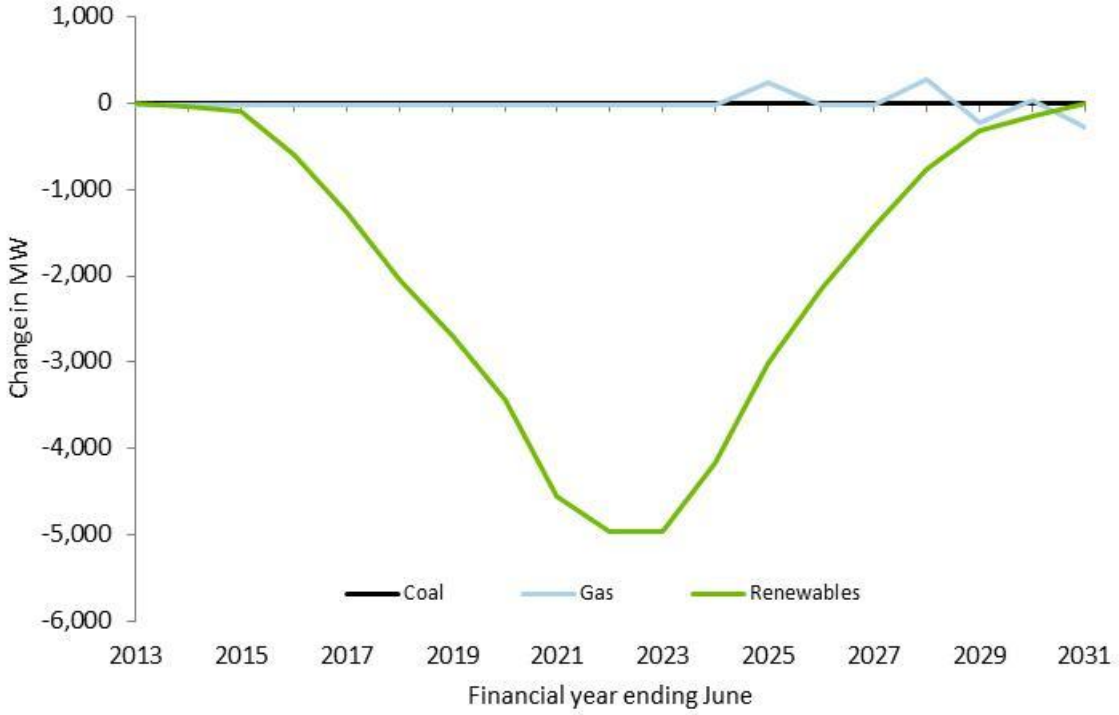
Source: SKM MMA and Climate Change Authority, 2012.

Under the *updated 20%* scenario, in the period from 2012-13 to 2030-31, output from black-coal fired generation is estimated to increase by around 24 940 GWh while brown-coal fired generation is expected to decrease by around 3 750 GWh. Coal-fired generation remains relatively competitive with gas-fired generation over this period as real gas prices in the southern and eastern states are assumed to double by 2030 as they approach international price-parity levels. Brown coal-fired generation capacity is not estimated to change substantially until after 2030, when retirement of some brown coal-fired generation is anticipated.

Generation capacity and production

Under an *updated 20% target* scenario, it is estimated there would be substantially less renewable generation capacity installed through most of the period from 2012-13 to 2030-31. By 2021-22 renewable generation capacity would be around 5 000 MW lower than under *reference case 1* (see Figure 39). By 2030-31, however, the difference is estimated to be largely eliminated, suggesting that a lower 2020 target delays renewable capacity investment to beyond 2020-21.

Figure 39 Change in generation capacity mix – *updated 20% target* compared with *reference case 1*



Source: SKM MMA and Climate Change Authority, 2012.
Note: A positive number indicates the value is higher in the *updated 20% target* scenario than in the *reference case 1* scenario.

With a lower target, generation from renewable sources is estimated to be substantially below the current settings (see Figure 38). At the peak of the differences between the two scenarios in 2021-22, under the *updated 20% target*:

- renewable energy generation is estimated to be around 14 000 GWh less (21 per cent of total renewable energy generation in that year for *reference case 1*);
- black coal-fired generation is estimated to be around 9 500 GWh more (eight per cent of total black coal-fired generation in that year for *reference case 1*);
- brown coal-fired generation is estimated to be around 4 200 GWh more (ten per cent of total brown coal-fired generation in that year for *reference case 1*); and
- gas-fired generation is estimated to be around 1000 GWh more (three per cent of total gas-fired generation in that year for *reference case 1*).

Cost to society

By transitioning to a lower RET target under the *updated 20%* scenario, the savings in resource costs is estimated to be around $4.5 billion in net present value terms over the period 2012-13 to 2030-31 (see Table 12). The modelling does not, however, assume any change to renewable development costs that might flow from increased risk premiums associated with renewable energy policy uncertainty.

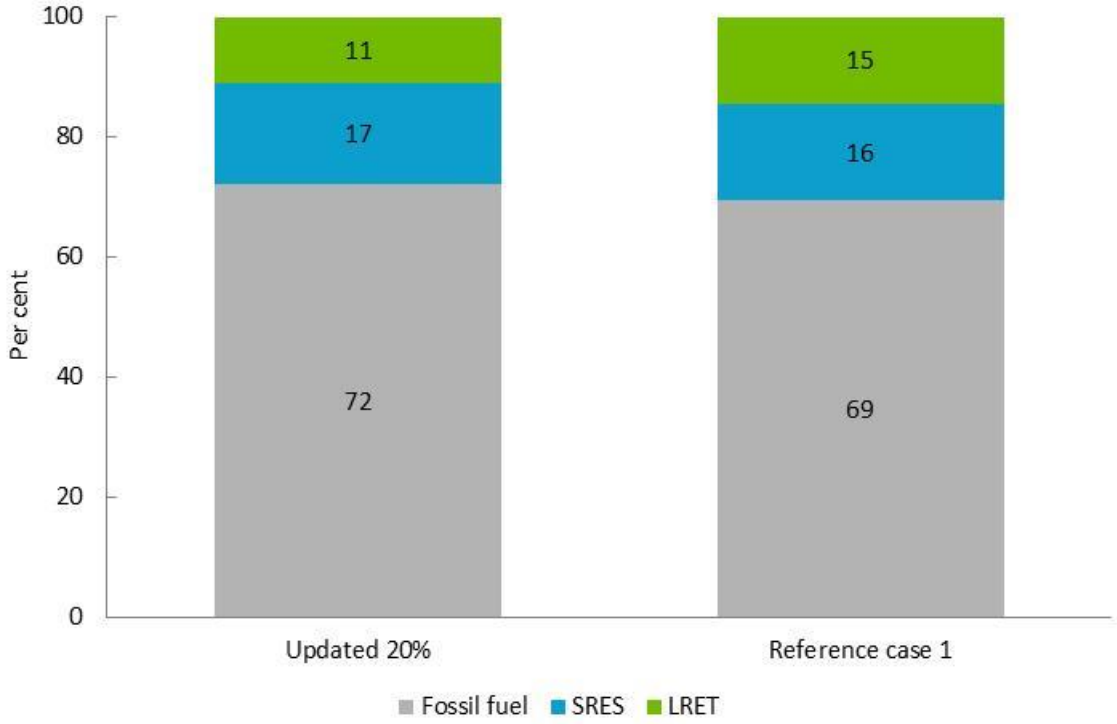
Table 12 NPV of resource cost ($ million)

	2012-13 to 2020-21	2012-13 to 2030-31
Difference between *updated 20% target* and *reference case 1*	-2 484	-4 457

Source: SKM MMA and Climate Change Authority, 2012.
Note: The discount rate used for the NPV is seven per cent.

A change in the target not only has an impact on the total investment in the renewable sector but also has a significant impact on investment in the fossil-fuel sector. As indicated in Figure 40, the proportion of total resource costs in both scenarios is dominated by the fossil-fuel sector, increasing its contribution to the total resource cost by four per cent in the *updated 20%* scenario.

Figure 40 Contribution to resource costs over the period 2012-13 to 2030-31



Source: SKM MMA and Climate Change Authority, 2012.

Emissions

Total greenhouse gas emissions are estimated to be higher in the *updated 20% target* scenario when compared to the *reference case 1* scenario. As shown in

Table 13, an additional 119 Mt CO_2-e of emissions are expected to be generated by moving to a lower, *updated 20% target* due to the higher levels of generation from fossil-fuel generation under that scenario.

On a dollar per tonne basis, the *updated 20% target* represents an abatement cost of around $38 per tonne compared to $40 per tonne under current settings.

Table 13 Emissions (Mt of CO_2-e)

		2021-13 to 2020-21	2012-13 to 2030-31
Absolute value	*reference case 1*	1 668	3 570
	updated 20% target	1 715	3 689
Change between *updated 20% target* and *reference case 1*		47	119

Source: SKM MMA and Climate Change Authority, 2012.

Costs to households and businesses

Wholesale electricity prices are expected to be generally higher under an *updated 20% target* scenario (see Figure 41). However, there is only a marginal change in retail prices for all energy consumers as the estimated fall in LGC prices (see Figure 42) reduces the required certificate cost pass-through to consumers.

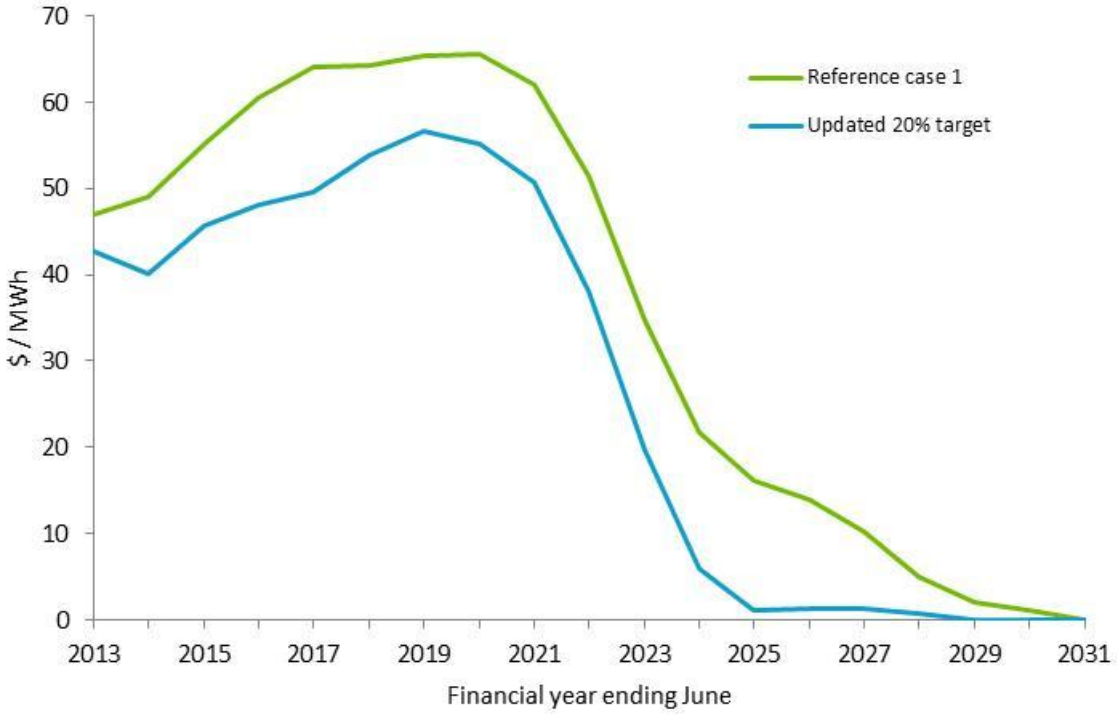
Figure 41 Change in wholesale and change in retail prices – *updated 20% target* compared with *reference case 1*

Source: SKM MMA and Climate Change Authority, 2012.
Note: A positive number indicates the value is higher in the *updated 20% target* scenario than in the *reference case 1* scenario.

As a consequence of the marginal change in retail prices per unit of consumption, the impact of moving to an *updated 20% target* on the average household bill is expected to be small. SKM MMA's modelling indicates that moving from current settings to an *updated 20% target* will deliver an average annual increase in the household bill over the period 2012-13 to 2030-31 of around $0.40 per annum with retail prices averaging around the same level under both scenarios. The modelling indicates that an *updated 20%* target will deliver a decrease in the household bill of around $0.70 per annum on average

over the period 2012-13 to 2020-21 and an increase of around $0.40 per annum on average over the period 2012-13 to 2030-31.

Figure 42 LGC prices – *updated 20% target* and *reference case 1*

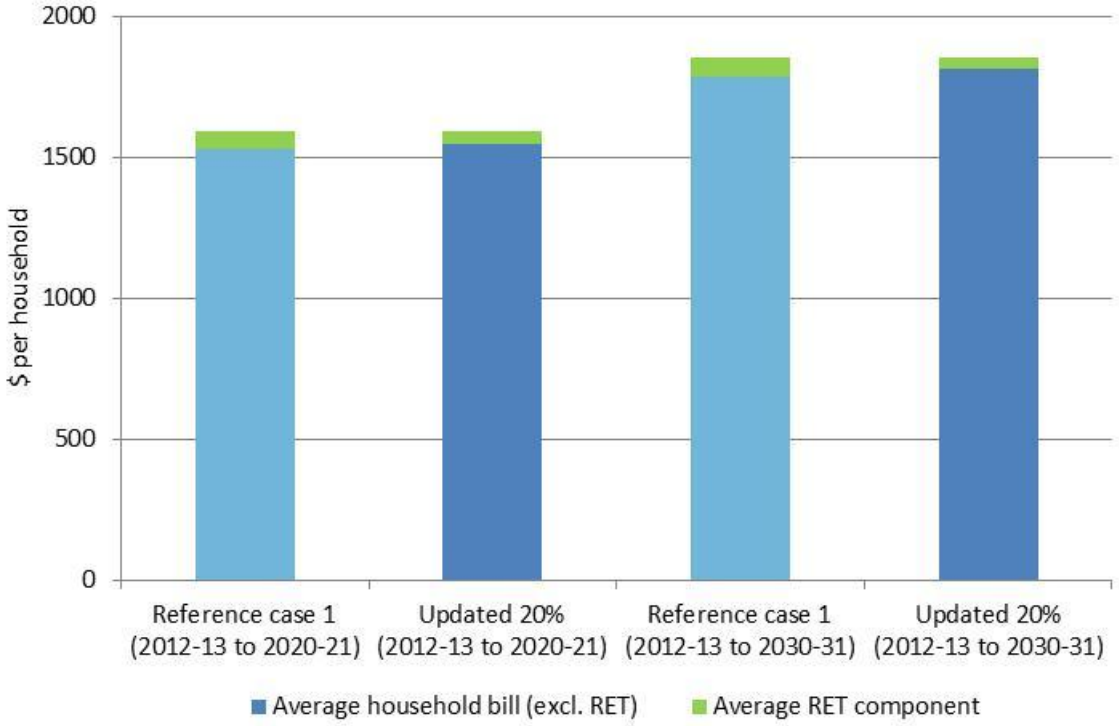


Source: SKM MMA and Climate Change Authority, 2012.

Figure 43 indicates the contribution of the RET to the average household bill over the period to 2030-31 is expected to be lower under the *updated 20% target* scenario at around $43 per household compared to around $70 per household under *reference case 1*. However the difference between the total bill cost by 2030-31 is almost zero.

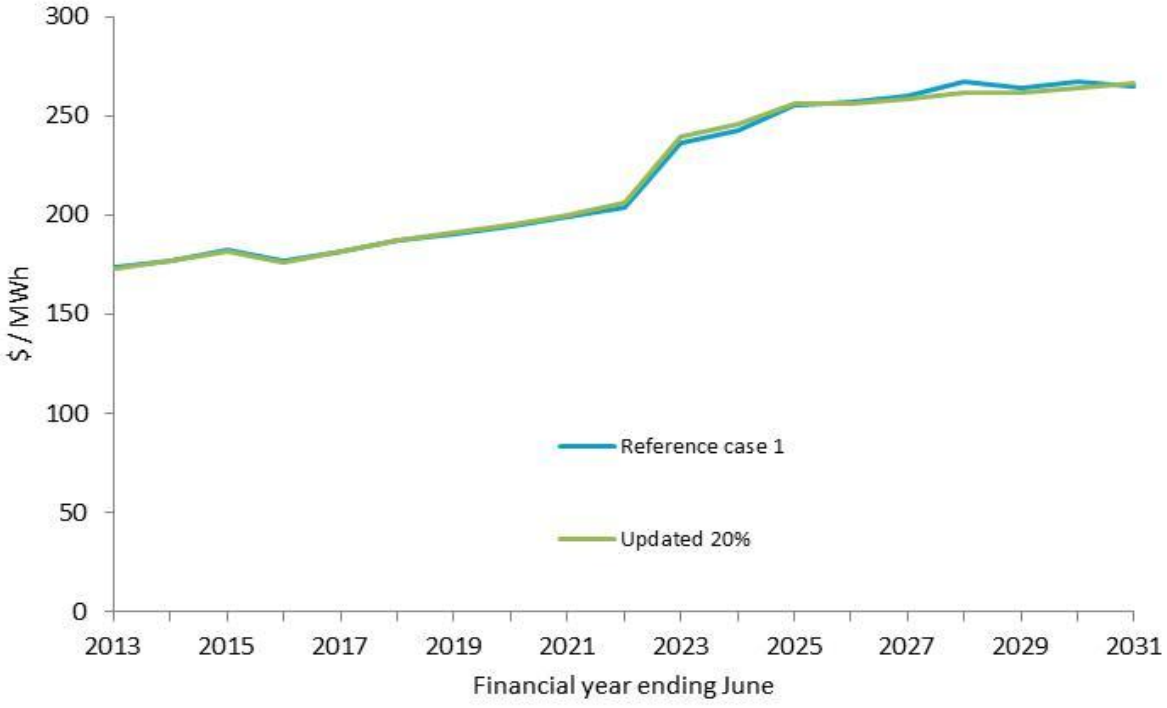
Lowering the target is also not expected to deliver significant savings to the electricity bill of an average SME. The expected retail price under the *updated 20% scenario* is estimated to be around $0.10 per MWh lower on average over the period 2012-13 to 2030-31 (see Figure 44). This represents an estimated decrease in an average SME bill of around $13 per annum on average over the period.

Figure 43 Average annual household electricity bill



Source: SKM MMA and Climate Change Authority, 2012.
Note: Assumes average household consumes 7 MWh per annum.

Figure 44 Small-to-medium average retail electricity prices under *reference case 1* and *updated 20% target* scenarios



Source: SKM MMA and Climate Change Authority, 2012.
Note: Average SME assumed to use 140 MWh per annum.

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GLOSSARY OF TERMS

Term	Acronym/ Abbreviation	Explanation
Australian Energy Market Operator	AEMO	The Australian Energy Market Operator 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	The Australian Renewable Energy Agency 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 Clean Energy Regulator 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.
Bankable certificates		Renewable energy certificates for both the large-scale and small-scale market do not have an expiry date. They may be purchased and held for any length of time before they are surrendered.
Clean Energy Finance Corporation	CEFC	The objective of the Clean Energy Finance Corporation is to overcome capital market barriers that hinder the financing, commercialisation and deployment of renewable energy, energy efficiency and low emissions technologies.
Clean Energy Regulator	CER	The Clean Energy Regulator is an independent statutory authority that administers regulatory schemes relating to clean energy, including the Renewable Energy Target, the Carbon Pricing Mechanism, the National Greenhouse and Energy Reporting scheme and the Carbon Farming Initiative.
Climate Change Authority	'the Authority'	Established on 1 July 2012, the Climate Change Authority provides independent advice on the operation of Australia's carbon price, emissions reduction targets, caps and trajectories, and other Australian Government climate change initiatives.
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	The Council of Australian Governments is the peak intergovernmental forum in Australia. The members of the Council of Australian Governments are the Prime Minister, State and Territory Premiers and Chief Ministers and the President of the Australian Local Government Association.
Department of Climate Change and Energy	DCCEE	The Department of Climate Change and Energy Efficiency leads the development and coordination of Australia's climate change and energy efficiency policy. It is responsible for policy advice, policy

Term	Acronym/ Abbreviation	Explanation
Efficiency		implementation and program delivery in four areas: reducing Australia's greenhouse gas emissions; promoting energy efficiency; adapting to climate change; and helping to shape a global climate change solution.
Deeming		The estimation of the amount of electricity a solar panel 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 through the Jobs and Competitiveness Program under the carbon pricing mechanism and under the Renewable Energy Target scheme.
Energy Savings Initiative	ESI	Under the Clean Energy Future Plan, the Commonwealth Government committed to do further work to investigate the merits of a national Energy Savings Initiative. An Energy Savings Initiative is a market-based tool for driving economy-wide improvements in energy efficiency.
Gigawatt	GW	A measure of power (or demand).
Gigawatt hours	GWh	A measure of electricity generation / use over a period of time (or energy).
Goods and services tax	GST	The goods and services tax is a broad-based tax of ten per cent on most goods, services and other items sold or consumed in Australia.
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	A large-scale generation certificate represents one megawatt hour of renewable energy generation.
Liable entities		Entities that make wholesale acquisitions of electricity and are required by the legislation to surrender a specified number of renewable certificates or pay a renewable energy shortfall charge.
Large-scale Renewable Energy Target	LRET	The Large-scale Renewable Energy Target encourages the deployment of large-scale renewable energy projects such as wind farms.
Mandatory Renewable Energy Target	MRET	The Mandatory Renewable Energy Target began operation in 2001. The Mandatory Renewable Energy Target 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).
Megawatt hour	MWh	A measure of electricity generation / use over a period of time (or energy).
National Electricity	NEM	The National Electricity Market interconnects five regional market

Term	Acronym/ Abbreviation	Explanation
Market		jurisdictions (Queensland, New South Wales, Victoria, South Australia and Tasmania). Western Australia and Northern Territory are not connected to the National Electricity Market.
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 Clean Energy Regulator for a partial exemption certificate.
Renewable energy certificates	REC	The term used for renewable energy certificates generated under the Renewable Energy Target scheme prior to 2011.
Renewable Energy (Electricity) Act 2000 (Cth)	*REE Act*	The legislative framework for the Renewable Energy Target scheme.
Renewable Energy (Electricity) Regulations 2001 (Cth)	*REE Regulation*	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 Energy Target review	RET review	The Climate Change Authority's review of the Renewable Energy Target. The review is defined in Section 162 of *the Renewable Energy (Electricity) Act 2000* (Cth).
Renewable power percentage	RPP	The renewable power percentage establishes the rate of liability for Large-scale Renewable Energy Target and is the mechanism that liable entities use to determine how many large-scale generation certificates need to be surrendered to discharge their liability each year.
Solar Credits		Solar Credits is a mechanism which increases the number of small-scale technology certificates able to be created for eligible installations of small generation units such as solar panels.
Solar photovoltaic panels	PV	Solar photovoltaic panels produce electricity by gathering and transforming the sun's energy.
Small-scale Renewable Energy Scheme	SRES	The Small-scale Renewable Energy Scheme supports the installation of small-scale systems, including solar panels and solar water heaters.
Small-scale technology certificate	STC	Certificate created by small-scale technologies like solar panels and solar water heaters.
Small-scale technology certificate clearing house	STC clearing house	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 (excl. GST).
Small-scale technology	STP	The small-scale technology percentage establishes the rate of liability for the Small-scale Renewable Energy Scheme. The small-scale

Term	Acronym/ Abbreviation	Explanation
percentage		technology percentage is the mechanism that liable entities use to determine the number of small-scale technology certificates needed to be surrendered to discharge their liability quarterly.
South West Interconnected System	SWIS	South West Interconnected System is the electricity network that services the majority of Western Australia's population.

ABBREVIATIONS AND ACRONYMS

ACT	Australian Capital Territory
ABARE	Australian Bureau of Agricultural and Resource Economics
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
ARENA	Australian Renewable Energy Agency
CDM	Clean development mechanism
CEC	Clean Energy Council
CEFC	Clean Energy Finance Corporation
CER	Certified emission reduction
CO_2	Carbon dioxide
CO_2-e	Carbon dioxide equivalent
COAG	Council of Australian Government
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Cth	Commonwealth
EITE	Emissions-intensive trade-exposed
ERU	Emission reduction unit
ESAA	Energy Supply Association of Australia
ETS	Emissions trading scheme
EU	European Union
EU ETS	European Union Emissions Trading Scheme
GDP	Gross domestic product
GNP	Gross national product
GGAS	Greenhouse Gas Abatement Scheme
GST	Goods and services tax
GW	Gigawatt
GWh	Gigawatt hour
IEA	International Energy Agency
IPART	Independent Pricing and Regulatory Tribunal (New South Wales)
kW	Kilowatt

kWh	Kilowatt hour
LGC	Large-scale generation certificates
LNG	Liquefied natural gas
LPG	Liquefied petroleum gas
LRET	Large-scale Renewable Energy Target
MRET	Mandatory Renewable Energy Target
Mt	Million tonnes
MW	Megawatt
MWh	Megawatt hour
NEM	National Electricity Market
NSW	New South Wales
PEC	Partial exemption certificate
PPA	Power Purchase Agreement
ppm	Parts per million
PV	Photovoltaic
REC	Renewable energy certificate
REE Act	*Renewable Energy (Electricity) Act 2000* (Cth)
RET	Renewable Energy Target
RPP	Renewable power percentage
SCER	Standing Council on Energy and Resources
SKM MMA	Sinclair Knight Merz McLennan Magasanik Associates
SRES	Small-scale Renewable Energy Scheme
STP	Small-scale technology percentage
STC	Small-scale technology certificate
SWIS	(Western Australia) South West Interconnected System
t	Tonnes
UN	United Nations
UNFCC	United Nations Framework on Climate Change
USD	United States Dollar
WCMG	Waste coal mine gas
Wh	Watt hour