



**Submission by**

**Alternative Technology Association**

**On the**

**Climate Change Authority's**

**Renewable Energy Target Review – Issues Paper**

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**By Email to: [submissions@climatechangeauthority.gov.au](mailto:submissions@climatechangeauthority.gov.au)**

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## 1.0 Introduction

The Alternative Technology Association (ATA) welcomes the opportunity to provide comment on the Climate Change Authority's *Issues Paper* regarding the 2012 Review of the Renewable Energy Target.

ATA is a national, not-for-profit organisation representing consumers in the renewable energy and energy efficiency marketplace. The organisation currently provides service to 5,500 members nationally who are actively engaged with small, medium and large scale renewable energy projects, energy efficiency and the national electricity market (NEM).

ATA provides an 'independent' consumer advice role, both to our members throughout Australia, and also more broadly to the general public. As we are not funded by, and do not have direct links with industry or government, the ATA is a trusted source of advice for our membership and the general public in regards to the economics and environmental benefits of energy technologies.

### 1.1 Overview

From an international perspective, the world is currently experiencing an industrial revolution in clean energy development.

Last year, \$260 billion was invested in clean energy technologies internationally, with record levels of new investment in clean energy being realised each year over the past decade with the exception of 2004. In 2011, global investment in clean energy outstripped fossil fuel investment for the first time.

In the domestic context, the RET has been the most successful policy mechanism in Australia's history at deploying low emissions electricity generation technology.

Since its inception in 2001, the RET has delivered:

- approximately 71,000 GWh of renewable electricity generation;
- total investments to date of approximately \$18.5 billion;
- small scale installations to more than 1.7 million Australian households;
- thousands of jobs, many of which have been delivered in rural and regional Australia. Under current targets, the RET is anticipated to deliver 35,000 jobs by 2020<sup>1</sup>.

At a cost of only 7% of a typical Australian household's electricity bill, the RET has been the most effective policy tool to deploy clean energy technology ahead of carbon pricing.

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<sup>1</sup> The Climate Institute (2009), *Regional Employment and Income Opportunities Provided by Renewable Energy Generation*, accessed at:  
<http://www.efsllearninghub.net.au/Portals/0/Resources/Publications/Files/663/TCI%20regional%20employment.pdf>

And with continuing reductions in both the level of certificate 'overhang' in the STC market and the level of the STC multiplier aimed at 1.5kW solar systems<sup>2</sup>, the highest cost years of the RET are now behind us, with RET costs as a proportion of electricity bills projected to decline from the beginning of 2013<sup>3</sup>.

Given that Australia now has in place the two policy planks of the RET and carbon pricing to both deploy commercially available clean energy and shift investment away from emissions intensive electricity generation, it is now critical that these schemes work together to provide the highest level of investor certainty possible to unlock the significant opportunities that exist in Australia for the development of clean energy technology.

In this regard, reviewing the RET mechanism every two years, as currently required by the RET legislation, completely detracts from ensuring investment confidence at all scales in the market. In the same vein, reduction or adjustment of the 2020 RET targets will result in the same level of investment uncertainty.

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<sup>2</sup> The STC multiplier is intended to cease on 30<sup>th</sup> June 2013, reducing the deemed incentive for all sizes of solar photovoltaic systems under 100kW back to the original 1 certificate for 1 MWh.

<sup>3</sup> Modelling conducted by ROAM Consulting for the Clean Energy Council, 2012 available at:

<http://www.cleanenergycouncil.org.au/cec/policyadvocacy/Submissions/current>

## 2.0 The RET & Energy Security

ATA understands that a number of energy market participants have been calling for the RET to be wound back in some form – either through amendment to incorporate a percentage-based 2020 target, or through a reduction in the existing GWh target for 2020.

ATA also understands that these arguments are typically being made on the basis of the cost of the scheme and the need to keep electricity prices low.

In this context, ATA believes that the Climate Change Authority needs to give consideration to likely forward trends for different technology costs – and in particular the relationship between gas and large scale on-shore wind, which are likely to be strong competitors for new generation investment over the next ten to 15 years.

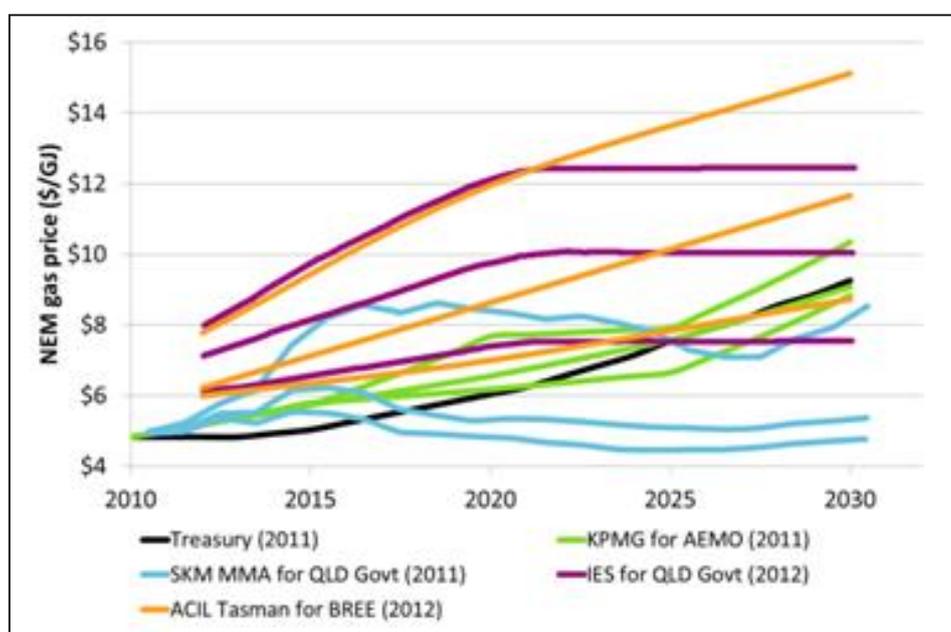
With the introduction of carbon pricing in Australia, the general consensus has been that at around \$20 - \$30 per tonne, the carbon price will ensure that combined cycle gas technology (CCGT) is prioritised over coal as the lowest cost generation option. A more detailed look at technology price forecasts however suggests some doubt in regards to this assumption.

With the development of a large liquefied natural gas (LNG) export industry in Australia, domestic gas markets are likely to become more closely linked with international gas prices in the near future.

Should there be a strong trend towards investment in gas-fired electricity generation in Australia, particularly if that investment is in plant designed for bulk energy production (i.e. CCGT as opposed to peaking plant), then this will likely have implications for increased electricity prices to end consumers.

A brief review of the literature reveals significant variation and uncertainty pertaining to forward gas prices as illustrated in **Figure 1** below. Even in the short term, forecasts vary significantly and by 2030, forecasts range from as low as \$4.50/GJ to as high as \$15/GJ.

**Figure 1: Recent Domestic Gas Price Forecasts in Real 2012 Australian Dollars**

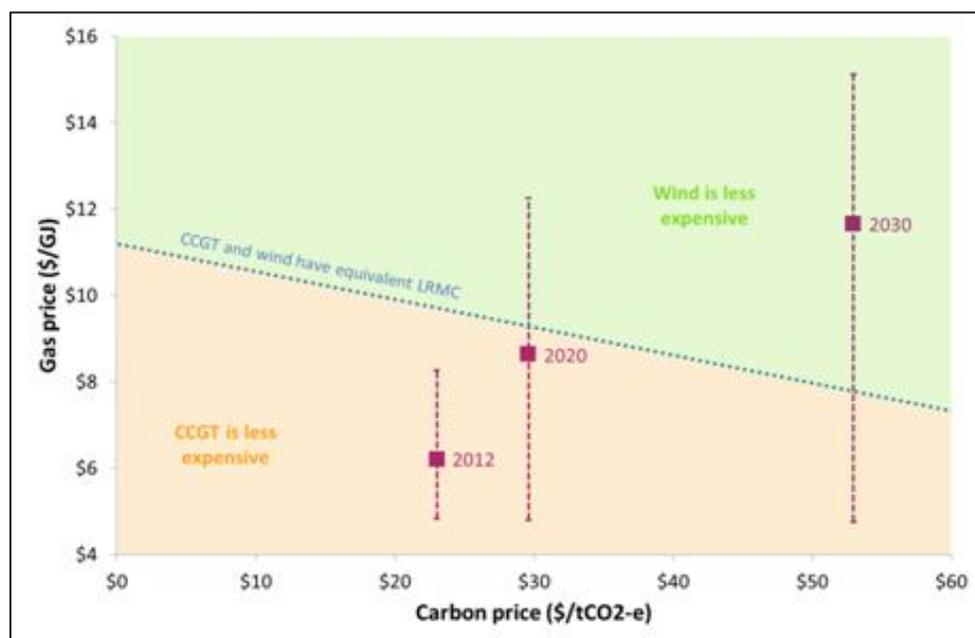


Should there be significant investment in gas for bulk energy production, the threat of Australian electricity prices becoming exposed to the possibility of sudden, unexpected high international prices over which we have little domestic control, or short-term ability to mitigate, becomes very real.

In this context, a comparison of forward prices of large scale onshore wind<sup>4</sup> with forward prices of CCGT should be considered.

The graph in **Figure 2** below highlights the combinations of carbon and gas prices at which the long run marginal cost (LRMC) of CCGT and wind generation are equivalent. Obviously, at higher carbon and gas prices (i.e. above the line), wind is anticipated to be less expensive than CCGT for bulk energy production, and vice versa.

**Figure 2: Comparison of the Long Run Marginal Cost (LRMC) of Wind and CCGT**



The magenta squares are the key data points for consideration in the graph. These indicate:

- forward gas prices as forecast by the Bureau of Resources and Energy Economics (ACIL Tasman, 2012); and
- forward carbon prices forecast by Treasury modelling (Treasury, 2011).

The magenta squares remain below the line until shortly after 2020, which indicates that CCGT will remain cheaper than wind under the forecast scenarios. But it is critical to note that the scenarios forecast by BREE and Treasury are only one possible economic outcome.

<sup>4</sup> Given its current levelised cost of energy (LCoE), large scale onshore wind will be the technology that will either experience the greatest level of deployment under the RET, or will be a strong indicator of the price that all other large scale renewables must meet in order to be deployed, over the next decade.

The magenta dotted lines associated with the square points indicate the range of forward gas price scenarios, taken from the forecasts outlined in **Figure 1**.

It is clear from this data that whilst significant uncertainty exists with respect to forward gas prices, that in line with approximately 40% of the 2020 gas price scenarios<sup>5</sup>, CCGT will be more expensive than wind.

The likely doubling of domestic gas prices in the next decade is something that is emerging as a broadly held industry view<sup>6</sup>. A doubling of domestic gas prices to somewhere in the order of \$9 to \$10/GJ by 2020 would see CCGT on a level playing field with wind with respect to LRMC.

The ATA believes that the above analysis should be considered in the context of energy security.

Whilst typically, energy security is thought of as protection against power outages, it is also relevant in the context of potential, unexpected high prices over which there is little domestic control.

Given the need to move away from coal as an emissions intensive electricity generation source, the RET can serve as a hedge against potential future volatility in domestic gas markets that may lead to even higher electricity prices than anticipated.

Technology costs associated with renewable generation sources are typically either remaining stable or reducing, and given that LRMC of renewable generation assets such as wind are not subject to future fluctuations in fuel prices, the RET can be utilised as a policy mechanism to ensure energy security.

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<sup>5</sup> At a Treasury projected carbon price of \$30 per tonne.

<sup>6</sup> <http://www.canberratimes.com.au/national/gas-prices-to-double-in-20-years-as-demand-explodes-santos-predicts-20111031-1v5qx.html>

### 3.0 Small Wind and the SRES

This section is written in response to the Issues Paper's question:

#### **Are the deeming calculations for different small-scale technology systems reasonable?**

The SRES awards *Small Technology Certificates* (STCs) on the basis of predicted generation performance over time – with small wind turbines under 10.0 kW being able to create deemed STCs for five years at a time, in advance.

These STCs provide an upfront discount to the proponent on the capital expenditure for a wind turbine system.

The incentive for small wind installations is designed on the basis of predicted generation output, with no accompanying requirements that ensure this generation will actually occur.

ATA have considerable in house wind energy expertise and have been working on the development of a number of industry best practice projects relating to site assessment, design and installation for small wind.

Some of our recent wind projects include:

- The development of a Small Wind Site Assessor Training package for NSW TAFE and the Clean Energy Council, funded by the NSW Office of Environment and Heritage
- A host of small and community scale wind workshops throughout rural NSW;
- The publication of wind turbine buyers guides in the ATA's 'Renew' magazine;
- The publication of a consumer guide for buying a small wind system;
- A detailed study assessment of the urban wind energy resource in Melbourne;
- The assessment of small scale wind energy opportunities across council areas for urban, semi-urban and regional/rural councils;
- Wind monitoring and site assessment for potential community scale wind projects in Victoria and NSW;
- Installation of small wind turbines for communities living without electrical networks by ATA's international projects group; and
- Other small wind site assessments for councils and businesses.

As a result of our work across a variety of projects, and based on feedback from our members and other consumers with small wind, ATA has become increasingly aware of sub-optimal design, siting and installation of small wind installations, and in particular grid connected small wind systems installed in NSW in recent years, which form the vast majority of wind energy under the SRES.

Due to the use of a flawed deeming mechanism for STCs and poor or absent site assessment and installation standards, acceptable practice has not been adopted for most of small wind site assessments and installations over the past few years and hence the performance of these turbines is unacceptably low.

Small wind turbines installed under the SRES, almost without exception, fall a long way short of producing the volume of energy that is assumed for the deeming of STCs (equal to 2,500 Net Full Load Hours or 2,500kWh per kW capacity per year).

ATA estimate that the majority of small wind turbines installed under the SRES generate 75-90% less energy than this deemed value. As a result:

- many consumers have invested in small wind technology that has failed to provide the expected generation, while at the same time;
- these consumers are effectively over-compensated by other consumers, who fund the SRES.

ATA see significant need to improve the approvals processes and requirements for small wind systems under the SRES if it is to appropriately incentivise systems that are correctly designed and sited and bring the overall performance of the SRES to an acceptable level.

At the same time ATA believe there to be an opportunity, and a need, to raise the limit for deemed STCs from 10kW to 100kW for wind turbines, with improvements in the site assessment, approval and accreditation techniques.

### 3.1 Key Issues for Small Wind Deeming

#### Tower Height

The absolute minimum hub or tower height for any small wind turbines to work effectively is between 20 metres and 30 metres, depending on the conditions of a site. Below this minimum height, it will be impossible for turbines in most locations to produce 2,500 NFLH.

Often the optimum height (i.e. that which would provide the best return on investment) is higher still: for residential and small business sized wind systems, towers of 30 metres or 36 metres are usually optimal in terms of ROI.

Wind turbines need to be on tall towers because of the friction between the wind and the earth, meaning that wind speed increases rapidly with increasing distance from the ground, especially in the first 20 metres.

Obstructions around the turbine, such as trees or buildings, cause turbulence that not only reduces the efficiency of the turbine, it also shortens its life due to additional wear and tear.

A general rule for tower height is that the bottom of the turbine rotor should be at least 10m above the tallest obstruction within 150 metres or the nearby prevalent tree height ( this means the mature tree height over the 20+ year intended life of the turbine, not the tree height when the assessment was done)

Many turbines installed under the SRES are on towers of between 9 metres and 15 metres and have been installed with little regard for obstacles. Due to the lower wind power intensity and higher turbulence, at these heights:

- turbines that would generate 2,500 NFLH at a given location at a suitable height will only be capable of generating between approximately 250 and 1000 NFLH– 60 to 90% less than the SRES deemed amount;
- turbines will fail many years sooner than their intended design life due to turbulence, in many cases in under the 5 years deemed under the SRES.

## Wind Resource

The site needs to have a good wind resource; otherwise the wind turbine cannot work at its designed efficiency and will not produce the expected amount of energy. A good wind resource includes a sufficiently high wind speed and minimal turbulence. This is why you see wind farms in open denuded land and near water.

To achieve this the surrounding terrain should be relatively free of clutter – wooded areas are considered highly cluttered, and urban areas are never, in any case, appropriate for effective wind energy generation. Valleys are also often poor locations.

The 2,500 NFLH deeming point under the SRES is based on a wind turbine being sited at an optimal location, with a good wind resource. The majority of wind turbines installed under the SRES have been installed at less than optimal locations, where the maximum possible generation is a fraction of the 2,500 NFLH deemed.

## Poor Quality Wind Turbines

There are a number of manufacturers of high quality wind turbines. Due to the installation of many sub-standard turbines under the SRES however, such as those installed by the (now bankrupt) company Rewind, many turbines that have been installed under the SRES that permanently ceased generating altogether early in the deeming period due to breakdown and lack of installer support.

ATA note the standards recently adopted by the Clean Energy Council should go some way to addressing this particular issue.

## System Breakdown and Downtime

Consumers with grid connected wind turbines are not reliant on the energy from the turbines (the turbines are effectively an additional revenue stream), so in some cases turbines remain out of service for a number of weeks or months at a time while awaiting repair.

The standards being adopted by the Clean Energy Council, noted above, may improve the quality of equipment installed and raise the performance of installers and warranty conditions, to some degree alleviating this issue.

## Site Assessments

Fundamental to all of the above issues is a lack of proper site assessment and consumer advice for small wind.

The proper site assessment process for a potential small wind turbine site is vastly more complex than for solar PV, and requires considerable expertise, preferably independently of the installer. Most of the problems noted above can be avoided or foreseen through proper site assessment processes.

Importantly, site assessments are important in identifying the vast majority of sites that are not suitable for wind energy, potentially avoiding costly installations at these locations.

Currently, unlike similar programs in other countries, proper site assessments for small wind sites are not required under the SRES, and most consumers who purchase a wind turbine do so without all the the information necessary to make an informed decision.

ATA would appreciate the opportunity to provide further comment to the CCA regarding appropriate site assessment requirements for small wind.

### Issues for Off-Grid versus Grid Connected Wind Turbines

Generally speaking, small wind turbines in off-grid applications suffer less from the above issues than grid connected turbines. This is due to the following:

- Installers experienced in off-grid wind applications tend to have more experience and a better understanding of good installation practices. Their reputation is more important to their business, and they are less likely to install substandard equipment;
- Off grid areas tend to be rural with a better wind resource and less restriction of tower height; and
- The systems are essential to meet the energy needs of a home and avoid obtaining energy from more expensive sources such as diesel. Therefore when a wind system requires servicing, the owner will usually have it repaired more quickly than a grid connected wind turbine.

ATA have previously raised the above issues with the Clean Energy Regulator (CER) on a number of occasions, however to date the CER have elected not to address them.

## 3.2 Recommendations

- 1 That a performance assessment of small wind turbine installations should be carried out nationally, with a view to understanding the magnitude of the current issues and challenges described above.
- 2 That a more appropriate incentive framework be developed for small wind within the SRES, based on a benchmarking of wind turbine performance and tightening the links between site assessment and generation output.

## 4.0 Responses to Specific Issues Paper Questions

**In the context of other climate and renewable policies, is there a case for the target to continue to rise after 2020?**

In principle, ATA would support the increase of RET annual targets post 2020.

However given that we are only 18 months into operation of the new, amended large and small RET mechanisms, and given the recent overhangs of certificates in both the large and smart RET markets, ATA believes that the newly designed SRES and LRET mechanisms have not yet had sufficient opportunity to demonstrate their optimal investment trajectories, on the basis of the current targets and market design parameters.

Equally, given that the carbon price is in its infancy, ATA believes it will be another 12 to 18 months before realistic market conditions can be assessed, including the interrelationships between the carbon price and the resultant need for investment to be driven by the RET.

As such, ATA believes now is not the appropriate time to consider changes to post 2020 targets, but that this issue should be revisited once the impact of certificate overhang is cleared and liable parties are again at a point where they are seeking to acquire new certificates that will begin to drive new investment, particularly in the large market.

**Should the target be a fixed gigawatt hour target, for the reasons outlined by the Tambling Review, with the percentage being an outcome?**

ATA supports the findings of the original Tambling Review in this regard.

A fixed gigawatt hour target is essential to ensuring that the RET is sufficiently transparent and provides enough certainty to drive investment in projects with high capital costs and long investment and operational lives.

**Should the target be revised to reflect changes in energy forecasts? If so, how can this best be achieved – as a change in the fixed gigawatt hour target, or the creation of a moving target that automatically adjusts to annual energy forecasts? How should changes in pre-existing renewable generation be taken into account? What are the implications in terms of economic efficiency, environmental effectiveness and equity?**

The reduction in demand on the wholesale energy market (and resultant reductions in spot prices) since 2009 is actually due in part to investments driven by the RET.

From a small technology perspective, solar PV in particular generates at times of peak demand in the network. Whether the electricity from that solar PV generator is consumed in that premise or by another customer in the local network, it results in a demand reduction for electricity at the wholesale level.

At the beginning of 2008, the National Electricity Market (NEM) had approximately 30 MW of installed capacity of solar PV. Four years later, there is approximately 1700 MW of solar in the NEM. This 5500% increase in the level of installed capacity in four years has been driven in equal part by the RET and by feed-in tariffs, and has led to significant demand and spot price reductions at the wholesale level.

Against business as usual forecasts of energy demand and spot prices from 2008, this has, and will continue, to result in a price benefit to all electricity consumers as forward hedge contracts adjust downwards compared to the level that they otherwise would have been.

Reducing RET annual targets or moving to a floating percentage based on actual demand will only serve to dampen the potential wholesale price reductions achievable by installing a lesser amount of distributed generation.

Finally, changing the targets, either 2020 or annual, to a percentage-based or adjusted figure on the basis of actual demand will also serve to reduce investor confidence in a market that we need to ensure grows steadily over the next decade in order to make the transition to a cleaner energy future.

**What do you see as being the costs and benefits of an uncapped scheme in terms of economic efficiency, environmental effectiveness and equity?**

The SRES is designed to drive investment into small scale technologies without the constraint of a specific market cap. As designed, the Minister has the power to adjust multiplier levels and the Clearing House certificate price in order to control consumer demand within that market.

Since inception, the SRES has been skewed toward the deployment of solar PV, as a result of the multiplier that has been aimed at 1.5 kW systems. This has in part resulted in a downturn in demand for solar hot water and heat pump systems, as consumers have been attracted to the lower upfront retail price of solar PV systems.

With the phasing out of the multiplier on 30 June 2013, the SRES may return to a more even balance between generation and thermal technologies. In any event, the SRES will settle at a more natural level of demand based on the respective technology costs in the market.

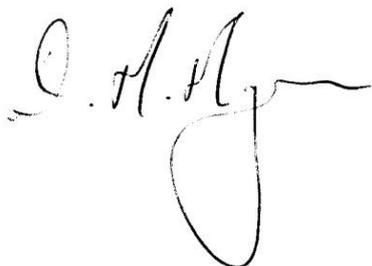
ATA would not support the introduction of a market cap into the SRES. Given the inherent difficulties in predicting consumer uptake in any energy market, a market cap will only serve to bring forward demand as consumers seek to ensure they 'get within' the cap for that year, with the remaining months being subject to drop offs in investment, leaving the industry again with a boom-bust type environment.

After many years of dealing with boom-bust events and now almost reaching a more balanced design across the RET as a whole, the last thing both the industry and consumers in this sector need is for artificial caps to again return wild volatility in consumer demand.

## 5.0 Further Contact

Thank you for the opportunity to provide comment to this review and please do not hesitate to contact us at [Damien.Moyse@ata.org.au](mailto:Damien.Moyse@ata.org.au) or on (03) 9631 5417.

Yours sincerely

A handwritten signature in black ink, appearing to read 'D. Moyse', with a large, stylized flourish at the end.

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