Australian Sugar Milling Council (ASMC) Submission

Renewable Energy Target Review – Issues paper

The Australian Sugar Milling Council (ASMC) is the peak policy body for Australian sugar milling companies, representing over 99% of Australian raw sugar production. Twenty four mills continue to operate in Australia today, and are collectively the largest source of biomass renewable electricity in Australia.

Sugar mills have been generating renewable electricity for approximately 100 years in Australia, meeting their own electricity needs, and frequently the needs of their localized regional communities throughout that time. Since the inception of the Mandatory Renewable Energy Target (MRET) all sugar mills have exported surplus electricity into regional distribution networks during the crushing season (June – November). Increasingly, milling companies throughout the industry are exploring investment opportunities to expand and extend generation capacity.

Since separation of the RET into LRET and SRES, the sugar milling industry has invested an additional $200 million, specifically targeted at increasing the exported amount of electricity from mills to the National Electricity Market (NEM). The RET has been fundamental to capitalizing each of these projects, by creating a market for renewable electricity, and therefore the capacity to enter into power purchase agreements that enable return on investment. While RET as a stand alone policy is insufficient to justify a project, without it these industry projects could not have proceeded in the existing policy environment.

Several more cogeneration expansion opportunities are under development in the sugar milling industry – but critical to ongoing investment under the scheme is policy certainty. Every review, irrespective of the terms of reference, incites an opportunity for mischievous misinformation, that while largely ineffectual on policy, creates community mistrust about the policy benefit and intent.

On balance, the LRET scheme appears to be achieving its objective, with significant investment in expanded renewable energy opportunities in the sugar milling industry. It is the view of ASMC that the fundamental principles of the LRET policy needs to be left as is, to maintain confidence in the program – and investor confidence in the projects enabled underneath it. Projects with 15-20 year payback periods need sufficient confidence that government programs will continue to operate, in a substantially unchanged format, for the life of the project.

ASMC has provided the following responses to questions raised in the review, where deemed to be directly relevant to the sugar milling industry's renewable energy efforts.

Large-scale Renewable Energy Target

Are the existing 41,000 GWh LRET 2020 target and the interim annual targets appropriate? What are the implications of changing the target in terms of economic efficiency, environmental effectiveness and equity?

While all renewable energy generators would ultimately like to see the target raised, most recognise that maintaining broader public acceptability is critical, requiring a balance between environmental outcomes and cost of living. In the current climate of energy conservancy, over supply and rapidly escalating network costs, the broader Renewable Energy Target (RET) is increasingly targeted by retailers and some governments as the underlying cause of distribution network cost increases.

The current investment in increased network sophistication reflects a move towards increased embedded generation **and** the growing sensitivity to quality and reliability of electricity supply in the current demand profile. This is a fundamental change in the service delivery of an aging network infrastructure, necessary for the evolving technological change and dependence of Australia's energy demand. While the broader RET (both LRET and SRES) have heightened the need for increasingly sophisticated distribution networks, it is not the driver. This is a critical distinction to make, given the continual attack on the economic efficiency of the current RET targets. It is also worth noting that sugar mills have generated electricity for approximately 100 years, and supplied into regional networks since the beginning of the RET Scheme (2%), without impact on the existing regional distribution infrastructure

However, current investment in renewable energy isn't as limited by the target as it is by the disparity in renewable energy price between states. While the target is intended to drive the lowest cost renewable energy, for a range of reasons, the current structure results in favouring wind farms in the southern states (attachment 1). This has a subsequent impact on investment in the National Electricity Market (NEM) network, with greater interruptability for regions heavily invested in single renewable energy types - the associated infrastructure required to manage this risk creates some economic inefficiencies. Note that this is different to the argument around current investment in distribution networks.

Arguably the environmental effectiveness (i.e. emissions intensity reduction) and equity of the existing LRET target currently favours southern states, for the reasons outlined above. Although carbon emissions are reducing for the electricity sector across Australia, the disaggregation amongst states is distorted. Northern Australia's proportion of LRET target to renewable energy generated remains disproportionately low, indicating that northern Australian energy consumers are effectively subsidising renewable energy investments in other states. With a carbon price, and an energy generation profile heavily weighted towards fossil fuel, these energy consumers are highly exposed.

Is the target trajectory driving sufficient investment in renewable energy capacity to meet the 2020 target? How much capacity is needed to meet the target? How much is currently committed? Has the LRET driven investment in skills that will assist Australia in the future?

The Australian sugar milling industry has invested over $200 million dollars in expanding renewable electricity generation within mills since the splitting of RET into LRET and SRES, and is projected to spend at least another $100 million over the next 2-3 years. Projects have ranged from expanded cogeneration facilities, to increased energy efficiency, with the outcome expanded renewable electricity generation, eligible for LGCs.

LRET as a stand alone policy would have been insufficient to enable any of these projects. However, without it, these projects would not have gone ahead in this timeframe - and some not proceeded at all. This investment not only enhances the diversification of the sugar industry, but is fundamentally transforming the skill set behind renewable energy generation within the industry, as renewable electricity moves from a sideline windfall into a mainstream revenue opportunity. In addition, as sugar milling construction activities occur in regional Australia, the employment and regional skills opportunities are of significant impact in the townships where investment occurs. Similarly, technological solutions developed within the industry to enhance energy efficiency performance are also expected to have a significant spin off opportunity for the sugar milling industry.

However, LRET does not overcome the policy constraints within the national electricity market, particularly where state energy policy or network infrastructure actively discriminates against embedded generation - particularly exacerbated by the price gap (detailed in the previous question).

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

The RET is the one carbon based policy that has provided some certainty over the last few years, based on bipartisan support. However, at the time of developing the targets for the scheme beyond 2020, all modelling was based on a carbon price transitioning as the key driver for investment. It is difficult to determine at this time whether the existing carbon policy, or rather the state of carbon policy in 2020 will be sufficient to continue to drive renewable energy investment.

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

Yes, a fixed gigawatt hour target is appropriate for LRET. Renewable energy projects require considerable lead time for development. But investment ultimately considers the number of LGCs potentially generated by the project, against the total number available in the pool. A fixed number provides certainty for all stakeholders involved - a fixed percentage does not.

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?

No, the target should not be revised to reflect changes in energy forecasts. Again, this assumes a level of project development responsiveness that generally does not exist for most of the renewable energy sector. There is also an implicit suggestion that exceeding 20% renewable energy generation is an undesirable outcome. The current downturn in energy demand, while certainly impacted by escalating electricity prices, investment in household photovoltaic, much lower than average summers and flow on impact of the global financial crisis, is largely cyclical. Global demand for Australian products will rise again, extreme summers will resume, and demand for electricity will rise again, irrespective of price.

Critically, energy forecasts rise and fall in line with economic growth forecasts – cyclically. ASMC would not support a RET policy which resulted in a target which rose and fell cyclically in line with growth forecasts.

Is it appropriate to set the Renewable Power Percentage by 31 March of the compliance year?

Yes, ASMC supports the current approach to setting the Renewable Power Percentage by 31 March of the compliance year.

Is the shortfall charge set at an appropriate level to ensure the 2020 target is met?

There is an interaction between the RET and the emissions trading price, which ultimately affects the effectiveness of a shortfall price. Given that the emissions trading scheme is relatively new and fixed, there is insufficient information to determine whether the combination of the two is sufficient to measure against the 2020 target at this time. However it would seem that the current penalty is at least sufficient at this time to balance penalty and reward.

Is a list approach to 'eligible renewable sources' appropriate?

Yes.

Are there additional renewable sources which should be eligible under the REE Act?

ASMC does not support the changes made to RET during the negotiation of the Clean Energy Future Strategy (carbon price policy) - i.e. the exclusion of native residues. This particular decision affects two sugar mill cogeneration operations, expanded before the legislative change, which includes the use of native residues as part of their cost recovery model. The phase out of an eligible fuel that would otherwise be incinerated without repurposing seems contrary to the purpose of this Scheme. It continues to be ASMC's view that native residues should be eligible under the Act, or at least continue to be eligible for generators demonstrating existing arrangements for use at the time of the changes made to the legislation.

Should waste coal mine gas be included in the RET? Should new capacity of waste coal mine gas be included in the RET?

No. Waste coal mine gas is not a renewable energy source, and therefore should not be included in the RET, as any inclusion undermines the integrity of the scheme. It is perplexing to understand why this issue continues to be raised in every review, given this was also the broader recommendation of COAG, particularly highlighting the risk of setting a precedent for other low emissions technologies. Mining companies already benefit through reduced emissions under the carbon policy.

What would be the costs and benefits of any recommended changes to eligible renewable sources?

As articulated above, increasing the eligible renewable sources list to include native residues would recognise the value of a previously listed resource that reduces emissions by displacing coal-fired electricity and would otherwise be incinerated. These residues are not created for, or dependant on, cogeneration for viability. However, the loss of these residues in the near future will reduce the viability of the affected projects. Biomass projects need particular certainty around eligible renewable sources. The assumption that projects can readily substitute into alternative and equally suitable resources ignores the constraints of geographic location, resource availability, and critically, investment based on existing resources profile at the time of project commencement.

Small Scale Renewable Energy Scheme (SRES)

What do you consider to be the costs and benefits of having a separate scheme for small-scale technologies?

The Australian Sugar Milling Council contends that separating the RET into LRET and SRES was a highly beneficial and cost effective decision. Large scale generators could not compete in the previous form of RET, as RECs were continually undervalued. Since the separation of the Scheme, over $200 million has been invested in sugar industry cogeneration and energy efficiency infrastructure, with the objective of increased renewable electricity output. A further $100 million is anticipated in the next 2-3 years. While LRET alone doesn't enable projects, it is a critical contributor to revenue, and therefore overcoming the payback hurdle. Without RET, the largest of projects undertaken to date would not have proceeded.

Prior to separation of the scheme into LRET and SRES, large scale projects were forced to compete with household technologies. That is, multimegawatt projects with a 15-20 year payback period, multimillion dollar investment underwritten with substantial capital risk, were competing with kilowatt household technologies, funded by discretionary householder income of a few thousand dollars, and further stimulated by government rebate programs. Household technologies experienced none of the capital financing or reporting and compliance risks of a large scale project (deemed RECs for small scale technologies). Consequently, despite being a less cost effective investment in renewable electricity generation, these projects were easily and readily funded, deflating the REC price through an oversupplied market.

It must also be recognised that retailers were particularly effective at circumventing wider investment in large scale renewable energy by providing terms of finance for average households to make this investment, while tying up the RECs associated with the investment, and therefore continuing to deflate the REC price.

Should there continue to be a separate scheme for small-scale technologies?

Yes - for all of the reasons outlined above. Large scale and small scale technologies are not compatible competing in the same market.

Should additional eligible technologies under the SRES be limited to generation technologies?

While under the one RET scheme, ASMC argued against non-generation technologies (e.g. demand side management such as solar hot water) for all of the reasons outlined above, particularly as hot water systems were overcrowding the REC market. However, in the context of a household technology scheme (SRES), demand side management is as much a component of energy balance and emission reductions as electricity generation. Hence at this scale, and within the SRES, additional technologies that include demand side management should not be discriminated against. Note however, that ASMC also contends (as per the arguments above, and the final reasons for splitting the scheme and treating separately), that SRES should not be included when formulating future LRET targets.

What are the lessons learned from the use of multipliers in the RET? Is there a role for multipliers in the future?

The use of multipliers under the RET scheme provided an opportunity for government to “pick winners” amongst technologies to meet other government objectives. Losing the purity of the scheme intent had disastrous flow on implications for all other renewable energy participants in the scheme. ASMC would argue that the unintended negative consequences flowing from good policy are sufficiently challenging, without reintroducing poor policy.

Diversity of renewable energy access

Should the RET design be changed to promote greater diversity, or do you think that, to the extent that there are barriers to the uptake of other types of renewable energy, these are more cost-effectively addressed through other means?

ASMC supports the current design of the RET. Since separation of the Scheme into LRET and SRES, the sugar milling industry has been able to effectively participate in the scheme, and LRET has significantly influenced the expansion of cogeneration and energy efficiency investment to increase renewable energy output. After 10 years, the renewable energy sector finally has a scheme framework that meets policy intent, and has provided sufficient stability to encourage investment – to change this approach now will undermine the financial viability of existing projects, and harm investor appetite for future projects. Projects invested under the changed framework surely have a right to expect some reasonable certainty of policy implementation, without the spectre of sovereign risk.

Review frequency

What is the appropriate frequency for reviews of the RET?

A two year review frequency destabilises developing projects, particularly where capital investment is sought. Typically, these projects are delayed, waiting for the outcome of the most recent review, to determine if investment conditions have been affected. This highlights the importance of a stable RET policy environment - these projects, while not able to succeed on RET alone, are typically not viable without RET. Even for existing projects, or projects under construction, a review signals anxiety around projected revenue from RET.

However, ASMC recognises the need to fine tune the RET to optimise performance and fairness for all stakeholders involved. And this is the fundamental concern. Under the current scope of legislative requirements, the comprehensive nature of the review creates ongoing opportunity for anti-RET campaigning by well funded sectoral interests. The level of noise, publicity and misinformation creates an unjustified level of policy uncertainty. Hence renewable energy generators are caught in each review cycle, expending resource and effort justifying the status quo support for an emerging industry.

It is the view of ASMC that two year reviews to optimise the existing structure and function of the RET, complemented with a 6 year structural review would provide a compromise for all participating stakeholders. Critically, this approach would need to be communicated ahead of, and during the review, to reduce the antipathy towards the scheme, and misinformation generated by self-interested parties.

What should future reviews focus on?

Future reviews should focus on optimising (fine tuning) the existing structure and function of RET, with a 6 year review of structure.

In addition, future reviews should consider:

- the impact of any review on the legislative risk perceived by project proponents; and
- whether mechanisms outside of LRET will ensure the growth of renewables beyond 2020, or whether the scheme may need to be altered to continue to be effective post 2020, to ensure further growth in renewables.

A six year structural review would mean mechanism review would be considered in 2018, where the impact of a carbon price on the RET would become increasingly apparent, and provide sufficient lead in time to 2020; should a change to the scheme be considered necessary at the time.

Attachment 1

ROAM CONSULTING
ENERGY MODELLING EXPERTISE

ROAM Consulting Pty Ltd

www.roamconsulting.com.au

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Policy options for increasing the uptake of renewable generation in Queensland

A submission to the Queensland Environment and Resources Committee on behalf of Sucrogen Pty Ltd

sucrogen™

30 June 2010

VERSION HISTORY

Version History					
Revision	Date Issued	Prepared By	Approved By	Date Approved	Revision Type
1.0	30-06-2010	Sam Lovick Euan Morton Matt Rose Angela Moody Melinda Buchanan Jenny Riesz			

EXECUTIVE SUMMARY

The Queensland Government has identified a requirement for additional renewable generation in Queensland to meet the policy objectives set out in the Queensland Renewable Energy Plan.

There are substantial resources available through the Enhanced Renewable Energy Target (ERET) that can be used to develop renewable generation in Queensland. The Queensland Government is seeking to secure 20 percent of those funds, estimated to be around $3.5 billion. However, the balance of evidence included in this report suggests that the Queensland Government will not meet this goal in the absence of specific policy action to close the economic gap between Queensland renewable projects and their interstate counterparts.

This economic gap arises for two reasons. Firstly, Queensland's superior fossil fuel resources give rise to wholesale electricity prices and resulting generator revenues that are amongst the lowest in the National Electricity Market (NEM).

Secondly, Queensland's renewable endowments are currently higher cost to develop than those in other jurisdictions, for several reasons. Wind generation is presently the cheapest available form of renewable energy, but Queensland is relatively poorly endowed with wind resources compared with the southern states. On the other hand, Queensland has abundant solar and geothermal resources but the technologies to generate electricity from these sources are currently very expensive or not yet demonstrated.

Queensland does have some scope to further develop its biomass capacity. Biomass is a mature, commercially-proven generation source which has considerable benefits to Queensland and the NEM. Unlike wind resources, biomass capacity availability is predictable (if seasonal). As a result, and unlike wind, it does not necessitate expensive complementary investment in peaking and ancillary services capacity. There is scope, at some additional cost (including some R&D) to further extend biomass duty cycle by longer storage of the biomass fuel, thereby overcoming one of the principle problems of renewable resources (unpredictable operation in combination with limited and costly storage).

In addition, Queensland has potential biomass resources in regions that are currently costly to serve with existing electricity transmission infrastructure. Developing additional biomass generation may strengthen supplies in these regions without the need for continued and expensive transmission investment.

Despite these benefits, the cost of biomass generation is higher than that of developing the high quality wind resources in the southern states. The ERET is a national scheme and liable parties can meet their ERET obligations by purchasing renewable energy from any region of Australia, irrespective of the locations of the customers they service. Consequently, Queensland renewables must compete with lower cost projects earning greater revenues in other jurisdictions.

The structure of the Queensland retail market also creates some hurdles for small-scale renewable investors. Most customers are held by the large retailers AGL, Origin Energy and Ergon Energy. AGL and Origin are vertically integrated into generation and have strong incentives to develop their own renewable projects as they are best placed to manage the market risks and high regulatory and sovereign risks that currently surround renewable resources. Consequently, small independent project proponents may have difficultly securing off-take agreements with liable parties. While this may not hinder the eventual uptake of renewables in Queensland, it may result in lower cost projects being abandoned for lack of a contractual power purchase counterparty.

In our view, there are a number of policy options that can be used to alleviate the economic gap and/or market arrangements. These include:

- through a Queensland Renewable Energy Target and associated Certificates (QRECs) that have specific eligibility criteria, including a requirement that the renewable resource is located in Queensland;
    - tailoring the value of QRECs to reflect the full costs of different renewable technologies to the Queensland power market;
- subsidies to renewable technologies, projects, conversions and R&D located in Queensland;
- a feed-in tariff policy mechanism to provide greater financial support to large scale renewable generation technologies that are generally unsupported by the ERET or currently not financially viable;
- modifying government purchasing policy to favour power purchases with a high local renewables content; and
- seeking to change NEM rules that inefficiently discriminate between different types of renewable resource.

Recognising that each of these policy options has benefits and costs, they could then be assessed on the basis of the following criteria:

- effectiveness, in terms of the likely increase in renewable generation resources in Queensland, whether it addresses retail market structure, and the credibility and transparency of the option to stakeholders;
- efficiency, in terms of minimising total costs and having least detrimental impact (or even a positive impact) on operation of the NEM;
- timeframe, in terms of being able to meet the current ERET with a significant increase in Queensland renewables; and

- impact on industry development in Queensland, particularly in respect of valuable skills, technology and employment.

In order for the Queensland Government to meet its renewable generation objective, we consider that facilitating the closure of the economic gap for renewable energy in Queensland should be the primary issue. Feed-in tariffs, a QRET or purchasing policy appear well-suited to achieve this objective. However, any preferred policy would also need to address Queensland's retail electricity market structure. A feed-in tariff or purchasing policy would appear to achieve this and the economic gap objective best. Other options could, however, also work to address the retail market structure and economic gap issues, depending on the policy design.

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1) Background

The Queensland Parliament's Environment and Resources Committee is currently conducting an Inquiry into Growing Queensland's Renewable Energy Electricity Sector. The Committee has released an Issues Paper identifying those issues seen as key to stimulating renewable energy development in Queensland, and is seeking public submissions to further inform the Inquiry.

Sucrogen is pleased to provide this submission prepared by Synergies Economic Consulting and ROAM Consulting outlining the case for encouraging renewable energy generation in Queensland.

2) Introduction

The Queensland Government has identified that there is an opportunity to substantially advance the deployment of renewable energy in Queensland through measures such as the Enhanced Renewable Energy Target (ERET). However, under a continuation of the present policy environment in Queensland and Australia, much of the investment under the ERET is expected to occur in other Australian jurisdictions.

The result is that there is a substantial 'gap' between the deployment of renewable energy that has been identified as a strategic target by the Queensland Government, and the current and anticipated deployment of renewable energy under existing Commonwealth and State Government policies.

To this end, the purpose of this submission is to identify the size and possible causes of the renewable energy gap in Queensland, describe some potential policy options that may assist to resolve this gap, and to provide some criteria against which policy intervention can be assessed in order to identify the most suitable options for further analysis. The remainder of this submission is structured as follows:

- Section 3 briefly summarises relevant renewable energy policies in Australia;
- Section 4 identifies the Queensland Government's objectives in relation to renewable energy and describes the nature of available renewable energy resources in Queensland;
- Section 5 explains the potential revenue streams available to renewable energy generators;
- Section 6 explains the cost of renewable generation;
- Section 7 identifies the relative disadvantage of Queensland's renewable generation (the 'gap');
- Section 8 identifies existing and announced renewable generation projects across the National Electricity Market (NEM);
- Section 9 describes the NEM rules, particularly as they relate to renewable energy;

- Section 10 describes key characteristics of the Queensland retail electricity market;
- Section 11 describes a range of potential policy options that could address the renewable energy gap in Queensland;
- Section 12 provides criteria against which Government policy intervention can be assessed; and
- Section 13 concludes.

3) RENEWABLE ENERGY IN AUSTRALIA

Over the last ten years, Australian Governments have implemented a range of policies aimed at achieving a reduction in greenhouse gas emissions. The most notable is the Commonwealth Government's Mandatory Renewable Energy Target (MRET), introduced in April 2001. This scheme provided a market-driven subsidy for eligible renewable generation to encourage an additional 9,500 gigawatt hours (GWh) of renewable energy each year by 2010. Prior to the introduction of the MRET, around 15,000 GWh of electricity was generated from renewable resources each year. The MRET successfully brought forward investment in renewable energy generation, and the 9,500 GWh target was exceeded in mid-2009.

In August 2009, legislation was passed to increase the target to 60,000 GWh of renewable generation required annually by 2020[1]. On 23 June 2010, the Enhanced Renewable Energy Target (ERET) amendments were passed, which split the 60,000 GWh target into three components:

The Small-scale Renewable Energy Scheme (SRES): At least 4,000 GWh will be provided from solar water heaters and small solar photovoltaic, wind and hydro systems (collectively small generation units, or SGUs) by 2020.

The Large-Scale Renewable Energy Target (LRET): At least 41,000 GWh will be provided from large-scale renewable energy generators by 2020.

Baseline generation: Roughly 15,000 GWh will be provided from renewable energy generators in existence prior to the introduction of the MRET.

The key features of the ERET (and MRET which preceded it) are the creation of a tradeable certificate, and the placement of a legal liability on wholesale purchasers (e.g. retailers) of electricity to acquire and acquit tradeable certificates proportional to the annual electricity they have sold or used.

Under the LRET, an accredited power station creates a renewable energy certificate (REC) for each megawatt hour of sent-out electricity produced above its baseline level, and can sell these at a negotiated price in addition to selling the electricity they produce through the normal wholesale market. RECs can be sold or surrendered at any date after their creation, allowing generators or liable parties to 'bank' RECs. Thus the annual supply of RECs is affected by the supply and demand

[1] This includes the 15,000 GWh generated annually from renewables in existence prior to the MRET.

for RECs in preceding years of the scheme. Furthermore, RECs produced under the MRET are eligible for surrender under the LRET. The stock of RECs from the MRET at the end of 2009 is estimated to be over 10 million[2].

4) RENEWABLE ENERGY IN QUEENSLAND

The Queensland and Australian economies are resource and energy intensive[3]. Queensland's exposure to policy responses to climate change is substantial; with only 20 percent of Australia's population[4], the State is responsible for approximately 28 percent of Australia's greenhouse gas emissions.

Queensland's energy use is based on the abundance of fossil fuels that can be used to provide energy at low cost. However, to the extent that Queensland's growth has been dependent on high use of low cost fossil energy, full pricing of the cost of carbon emissions, whether under a State, Federal or international carbon pricing regime, can be expected to constrain that growth. Queensland also faces a number of risks to its natural environment as a result of climate change[5]. As a result, one of the State's most important environmental objectives is to maintain economic growth while positioning communities and businesses to reduce fossil fuel energy use in the face of carbon emission-related climate change.

One available policy response is to assist increased deployment of renewable energy in Queensland. The Government, in its publication *Queensland's Energy Future*, notes[6]

> The development of renewable energy is central to the Queensland Government's strategy to manage climate change.

The Government's renewable energy policy is set out in the Queensland Renewable Energy Plan (QREP). The QREP articulates the Government's view on the need for renewable energy in Queensland, and the main ways that it perceives renewable energy can be supported. The main objective identified in the QREP is to maximise Queensland's share of the national ERET while at the same time minimising Queensland's exposure to a carbon price, such as was proposed as part of the Carbon Pollution Reduction Scheme[7].

The QREP identifies three main initiative areas[8]:

- accelerating deployment of renewable generation;

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[2] From ROAM's analysis of REC Registry data: http://www.orer.gov.au/rec-registry/index.html

[3] Queensland's greenhouse gas emissions per capita are approximately 43 tCO_2-e. Queensland Government, The Queensland Renewable Energy Plan A Clean Energy Future for Queensland, June 2009, p6

[4] Australian Bureau of Statistics, Australian Demographic Statistics, Sep 2009 <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0>

[5] Such as higher temperatures, more hot days and fewer cold nights, less rainfall, increased cyclone intensity, increased sea level and increased risk of storm surges. Queensland Government, ClimateSmart 2050. Queensland climate change strategy 2007: a low-carbon future, 2007, p2.

[6] See <http://www.energyfutures.qld.gov.au/zone_files/Energy_general/qld_energy_future_brochure.pdf>

[7] Queensland Government, The Queensland Renewable Energy Plan A Clean Energy Future for Queensland, June 2009, p8.

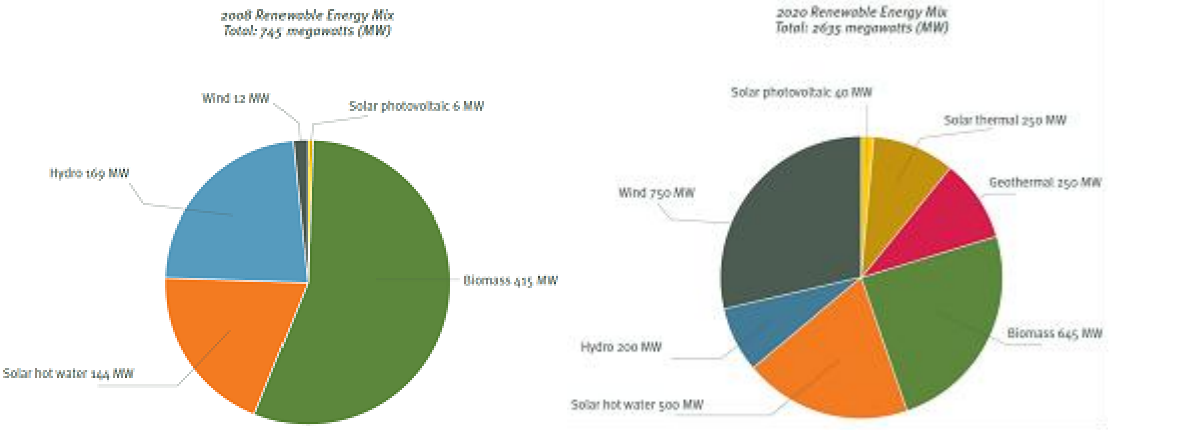
[8] Queensland Government, The Queensland Renewable Energy Plan A Clean Energy Future for Queensland, June 2009, p5.

- efficient and effective regulation; and
- smart industry, jobs and investment.

With respect to the national ERET, the QREP identifies that the Government may be able to leverage up to $3.5 billion for investment in renewables in Queensland, the majority of which would come through the ERET. The QREP aims to capture 20 percent of national ERET investment, estimated to be approximately $12 billion.

The projected industry transformation in the QREP is indicated by the diagram below.

Figure 4.1 – QREP – Queensland's existing and future renewable energy mix[9]



As identified in the QREP, Queensland has unexploited solar, geothermal, biomass, wind and hydro resources. The business case for developing these resources for electricity generation will determine whether Queensland receives the level of investment identified in the QREP.

Hydroelectricity

Most of Queensland's hydro resources are in environmentally sensitive areas and further development will be limited. The only identified site for hydro is the proposed 30 MW development at the Burdekin Falls Dam.

Sugar Cane Bagasse

Queensland's sugar cane industry provides the major source of biomass in the state. Over 30 million tonnes of sugar cane are harvested in Queensland each year. Sucrogen estimates that the Queensland sugar industry could produce a total of approximately 700 MW of renewable electricity generation from the existing sugar cane fibre (bagasse) resource that is currently combusted to supply the industry's energy needs. Some of this capacity could operate only during the crushing season (June to November), while some would be available 9 months of the year, with storage of bagasse over the summer peak electricity demand period. Furthermore, in the Burdekin region there is sufficient fibre in sugar cane leaves and tops, which are currently burnt prior to harvest, to generate an additional ~100 MW of electricity which could operate year round. The sugar industry therefore has the capacity to meet or exceed the QREP targets for

[9] Queensland Government, The Queensland Renewable Energy Plan A Clean Energy Future for Queensland, June 2009, pp16, 17.

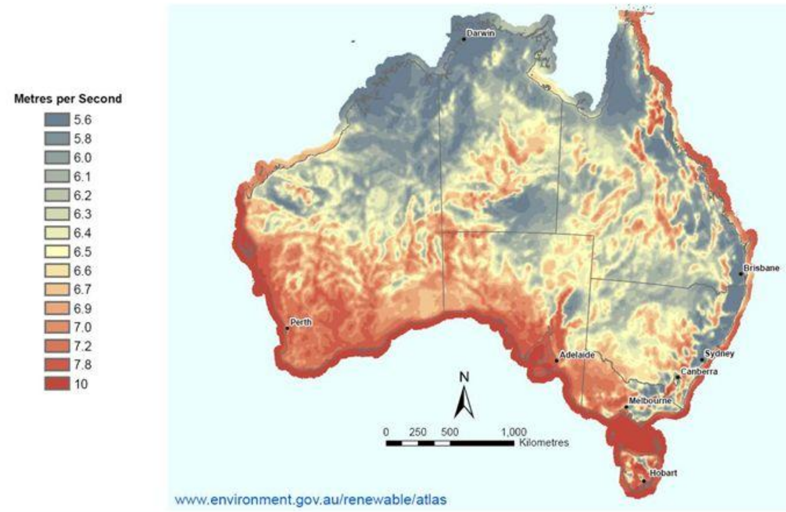
biomass using existing proven technology provided that the economic incentives support the additional investment required.

Increasing biomass generation in Queensland has the potential to advance a number of the objectives that have been identified by the Government. Biomass technology is currently available to contribute to accelerating deployment of renewable generation to increase the proportion of the LRET that is contributed by Queensland. In addition, increasing biomass generation has the potential to benefit the Queensland economy and regional areas by aligning with the QREP's smart industry, jobs and investment initiatives. Consequently, biomass is a form of generation that must be considered as part of the suite of generation that can be used to achieve the Government's renewable energy objectives.

Wind

The wind resources in Australia are shown in Figure 4.2. As the lowest cost renewable technology, wind has made up the majority of large-scale investment under the MRET (refer to Sections 6 and 8), and is likely to continue to contribute the majority of renewable generation in Australia under the LRET.

Figure 4.2 – Australia's wind resource – average speed[10]



Queensland's wind resources are of significantly lower quality than those in South Australia, Victoria, Tasmania and Western Australia (as can be seen in Figure 4.2). The majority of high quality wind resources in Queensland are located offshore, where environmental approval is likely to be very difficult to obtain due to tourism and protection of the Great Barrier Reef. Some limited competitive wind sites are available in Queensland, but there are likely to be many more competitive alternatives in the southern states.

Solar

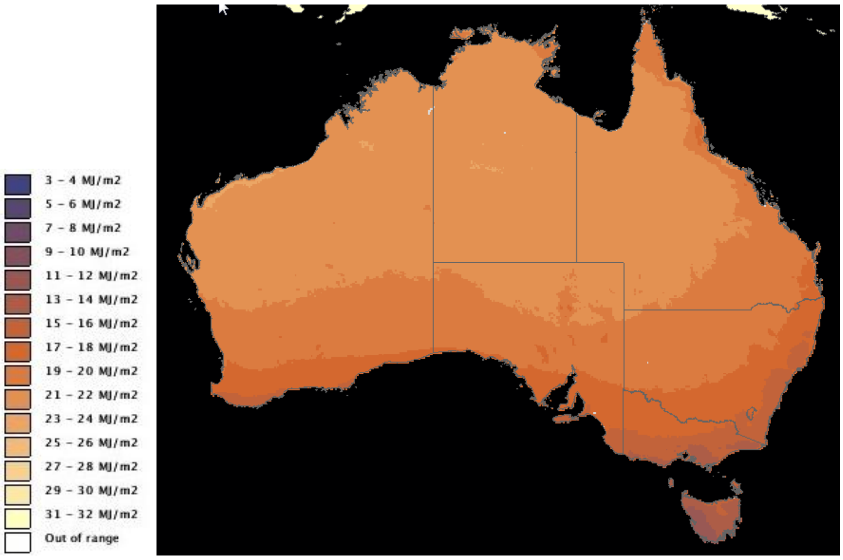
Figure 4.2 shows that Queensland receives the greatest average solar radiation in the north-west, and that this resource is amongst the best in the country. However, the average daily solar

[10] Source: Renewable Energy Atlas of Australia

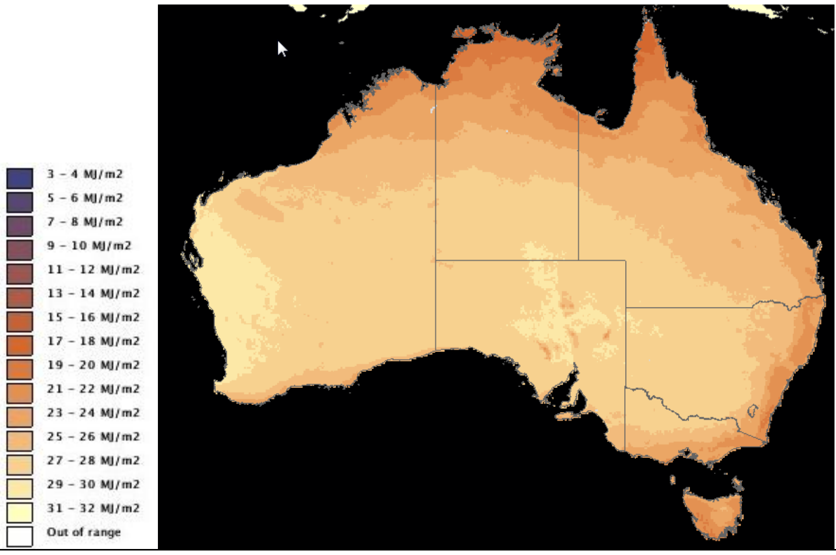
exposure for the month of January (summer) tells a different story. The picture is now inverted – the southern states receive significantly more solar exposure than Queensland due to "wet season" rain and cloud cover. This is also borne out in Bureau of Meteorology data from weather stations across the country.

Figure 4.3 – Australia's solar resource (average daily incident radiation)[11]

Annual:



January:



Generators receive most revenue per megawatt hour in summer, when electricity demand is high and as a result wholesale electricity market prices are high. Operation during high priced summer periods can be critical in determining the competitiveness of a solar generator. Therefore the wet season rain and cloud cover in Queensland puts solar generators located there at a disadvantage, despite annual average radiation values that are higher than those in southern states. While

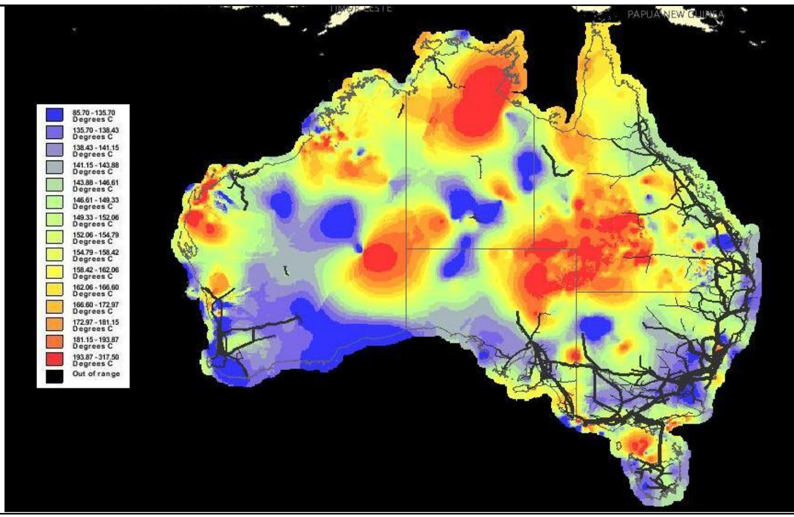
[11] Source: Renewable Energy Atlas of Australia

south-west Queensland appears to provide a good compromise between total annual insolation and summer insolation, the additional transmission costs may prove prohibitive.

Geothermal

Queensland has significant geothermal resources, as shown in Figure 4.4. However, these are in locations very remote from major population centres with the existing transmission system not yet extending to those locations. Moreover, the 'hot fractured rock' technology to extract these deep resources is not proven anywhere in the world. South Australian and Victorian projects are in the early drilling stages. If these attempts are successful, it will still be several years before a pilot plant is running, and significant investment towards meeting the LRET will have already occurred.

Figure 4.4 – Australia's geothermal resources (temperature at 5 km depth)[12]



5) REVENUE FOR QUEENSLAND RENEWABLES

5.1) WHOLESALE ELECTRICITY PRICES

Large-scale generators in Queensland earn revenue for the electricity they generate through the National Electricity Market (NEM). Generators submit offers to the market, and are dispatched in order of bid price until demand is satisfied. The marginal dispatched generator in each five minute trading interval sets the price for that interval, and settlement prices (or pool prices) are the average of the six 5-minute prices over each half hour.

As shown in Figure 5.1, Queensland's average pool price is typically lower than those in other mainland regions of the NEM. Prices are affected by the supply-demand balance, the generation mix (coal, gas, liquid fuels or renewables) and costs of those resources, transmission limits and trading behaviour of the individual market participants. For example, in 2007 Tarong Power Station reduced its output to 30-75% of full output, due to water shortages in Queensland's

[12] Source: Renewable Energy Atlas of Australia

South-East[13]. As Tarong Power Station typically provides up to a quarter of Queensland's power, this reduction had a significant upward impact on Queensland prices in 2006-07 and 2007-08. Since the introduction of the SEQ Water Grid, drought is far less likely to negatively impact on power supplies and the usual situation will be that Queensland prices are consistently lower than those of other states.

Figure 5.1 – Historical average pool prices

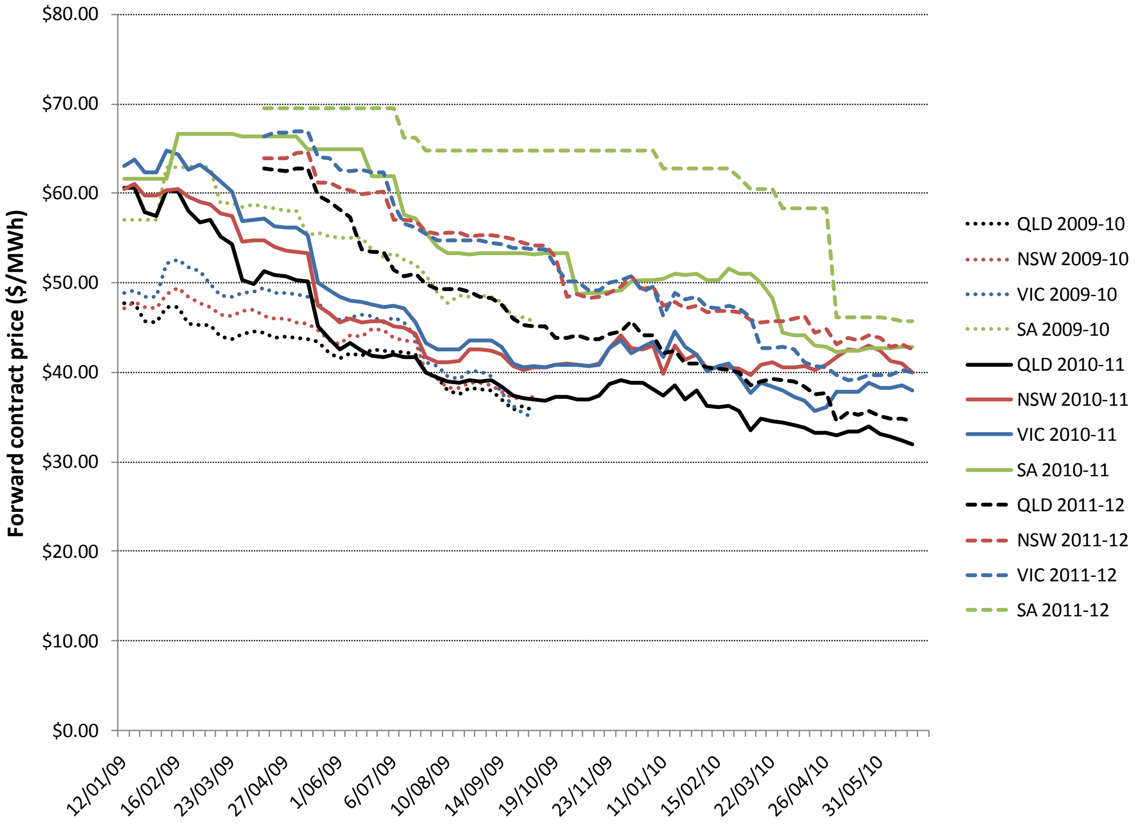
The lower prices for Queensland electricity are also reflected in the forward contracts market. Figure 5.2 shows the price of flat load forward contracts for the mainland NEM regions to 2011-12. These show Queensland forward contracts being typically $10 to $20 per megawatt hour lower than those for other States, and this difference is approximately 10 to 20 percent of the total revenue that renewable generators are seeking for their investment decisions.

If a carbon price is applied in the future, it is anticipated that generators will pass through their respective carbon costs in their bids. Roughly speaking, the average wholesale pool price in each region is expected to rise by the carbon price multiplied by the average emissions factor of generators in that region. Renewable generators will benefit from this uplift in price. However, Queensland presently has a lower average emissions factor than other regions of the NEM and so it is likely that Queensland renewables will receive relatively less uplift in their pool revenue than their interstate counterparts.

[13] Source: http://www.tarongenergy.com.au/Portals/0/docs/mediaRelease/2007/Media%20Release%20-%20Tarong%20Power%20Station%20March%2014.pdf

In summary, Queensland is expected to have lower wholesale prices with or without a carbon price, meaning that Queensland renewable generators are at a disadvantage compared to otherwise identical generators in other regions.

Figure 5.2 – Forward contract electricity prices[14]



5.2) *MARGINAL LOSS FACTORS*

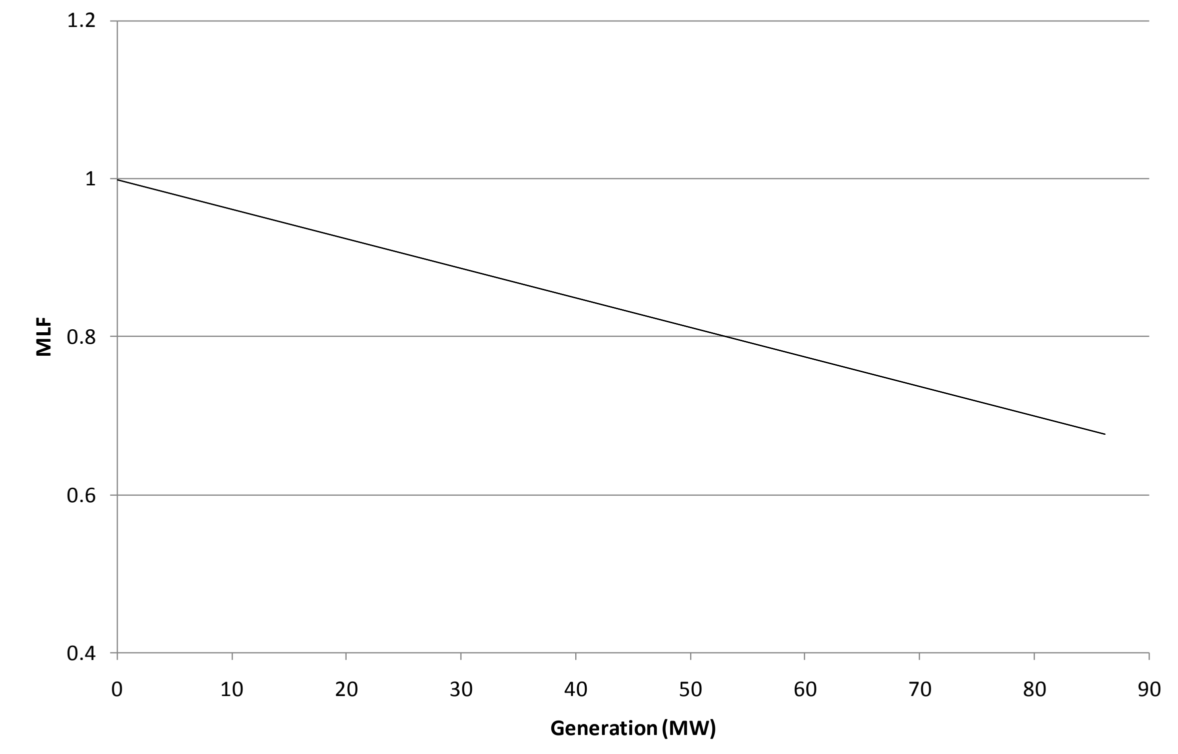
When electricity is transported, resistive heating in the transmission lines causes losses. To incentivize loads and generators to situate in locations with low transmission losses, the Rules of the NEM[15] require that Marginal Loss Factors (MLFs) are applied to the sale and purchase of electricity. A loss factor greater than 1 in a certain location incentivizes generators, since it will increase the price at which they are paid for their electricity by the pool, and equally through their contractual agreements. A loss factor less than 1 means generators will receive proportionally less than the pool price for each megawatt hour of electricity. Furthermore, the marginal loss factor affects the total number of RECs generated by a power station. On the other hand, a loss factor less than 1 incentivizes loads, since they will pay a proportionally lower price for electricity in that location.

[14] d-cypha trade data

[15] http://www.aemc.gov.au/rules.php

The marginal loss factors for locations in weak sections of the transmission grid are strongly affected by new entrant generation. For example, Figure 5.3 shows the decline in marginal loss factor with increasing installed capacity in a location in the NEM with poor transmission. This means that 10 MW wind generator in this location would receive an MLF of 0.9606 and receive 96% of the pool price for each megawatt hour generated, whereas an 80 MW wind generator would receive an MLF of 0.7016 and only 70% of the pool price. MLFs below 0.95 are generally avoided by renewable investors, owing to the penalty to both wholesale electricity and REC revenue streams.

Figure 5.3 – Marginal loss factor affected by generation



Queensland's most prospective renewable resources are located in north and western Queensland, in areas remote from population and load centres. North Queensland historically has had the highest MLFs in the NEM, due to a lack of generation in the area (caused by high fossil fuel prices and the associated lack of generation development) and the relatively poor transmission grid along the northern coast. However, because of this poor transmission, local MLFs are typically very sensitive to new entrant generators, increasing project risks. This factor further narrows the field of economic projects in Queensland.

It should be noted that the impact of renewable projects located in North Queensland reducing marginal loss factors provides a benefit to contestable customers and the Queensland Government, but this benefit is not recognised by the market. Further discussion of the benefits of embedded generators is included in Section **Error! Reference source not found.**.

5.3) *OTHER SOURCES OF REVENUE*

Some renewable generators may be able to earn revenue by providing other services. For example, in the past some Queensland bagasse generators have entered into contracts (Network Support Agreements) with Powerlink to provide capacity through the summer peak demand period. This is valuable to Powerlink, since it allows deferral of transmission augmentation. More recently, these contracts have not been renewed as the grid has just been expanded in capacity, eliminating the revenue available to those bagasse generators.

Market ancillary services, including frequency control and network control are required for the reliable and secure operation of the grid. Some renewable generators may be in a position to provide these and earn supplementary revenue. Schedulable renewable generators (such as biomass, geothermal and hydro) are technically capable of providing frequency control. However, this service is sourced via a competitive market that spans the entire NEM, and small renewable generators are unlikely to be sufficiently competitive for the supply of these services (compared with larger conventional thermal plant).

Unlike frequency control, network control (including voltage control services) must be provided locally. This means that renewable generators located in remote parts of the grid may be able to earn supplementary revenue by entering into contracts to maintain voltage, if it is sub-standard in their local area (and they can provide a competitive bid). This is likely to involve additional capital expenditure, since a sufficient level of voltage control often requires additional infrastructure. The additional capital expenditure required may be prohibitive.

5.4) *RENEWABLE ENERGY CERTIFICATES*

Renewable energy certificates are sold in a national market. Queensland renewable projects must negotiate a price for their RECs in competition with generators in other states and territories.

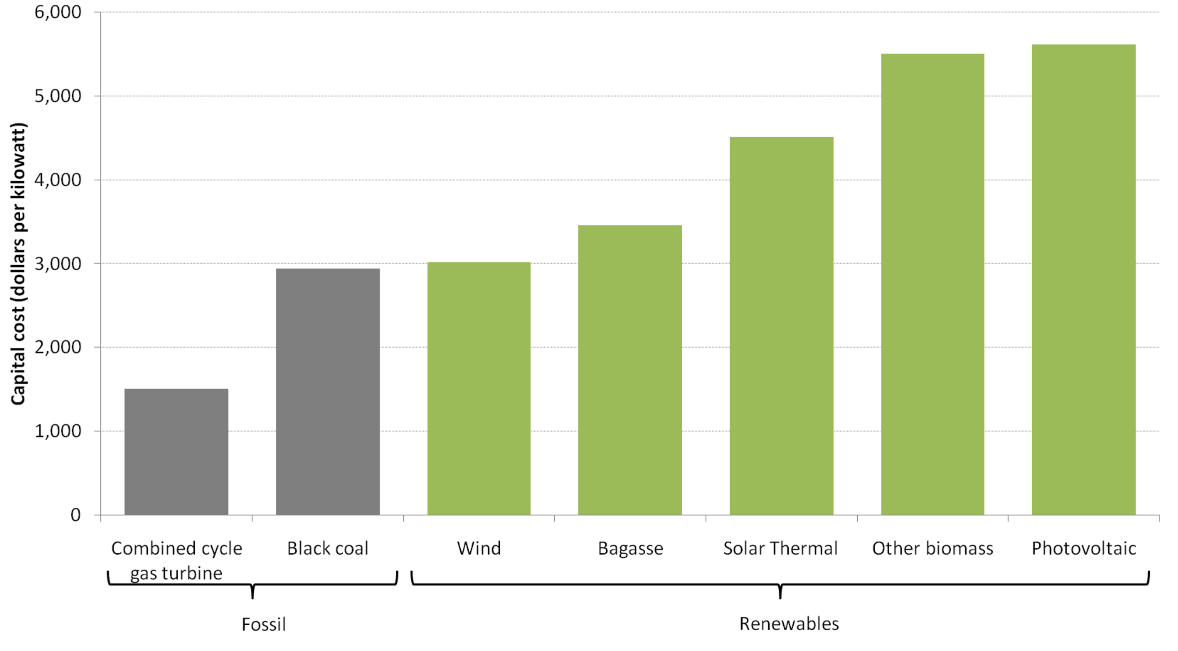
The critical business requirement for a renewable project to be viable is that its pool and REC revenue, adjusted for its marginal loss factor, exceeds its costs and desired rate of return. Essentially, the received REC price must 'close the gap' between marginal costs and pool price.

6) COST OF RENEWABLE ENERGY GENERATION

The most recent Australia-wide review of capital costs for generation technologies was conducted by the Commonwealth Department of Resources, Energy and Tourism and the Australian Energy Market Operator in early 2010[16]. Estimates were compiled by economic consultants EPRI, reviewed by ACIL Tasman and then peer reviewed by a panel of industry and market participants. Individual projects will face different costs based on their location. However, the values give an indication of the relative capital cost of renewable and non-renewable projects. Figure 6.1 shows the capital cost per kilowatt (in today's dollars) for a sample of currently available technologies.

[16] The data are publicly available at http://www.aemo.com.au/planning/ntndp.html. Bagasse boiler costs have been supplied by Sucrogen from AE&E quotes.

Figure 6.1 – Capital costs of renewable and non-renewable technologies



However, the capital cost per kilowatt installed is not a good measure of whether these technologies are economic. If the price is sufficient, fossil-fuel fired generation with a secure fuel supply will run at maximum output in all periods except when maintenance is required, or when limited by transmission. On the other hand, renewable energy generation is limited by the available resource, so renewable generators do not typically produce as much energy per megawatt installed as fossil fuel-fired generators. This is reflected in the *capacity factor* of the plant – the ratio of energy typically produced to the maximum possible energy produced if the plant ran at full output all the time.

The energy that can be produced from intermittent renewable resources (wind and solar) varies by location. Capacity factors for wind farms in Australia can reach 38-43% for the best sites in South Australia and Western Australia. However, wind measurements for typical suitable sites in Queensland result in capacity factors of only 30%. This difference has a very large impact on the economic viability of a wind farm.

Queensland's solar resources yield average capacity factors of around 21% for solar thermal plants without storage. Flat panel photovoltaic plants can achieve around 19%, increasing to 23% with full axis tracking. The additional equipment for tracking or solar thermal storage comes at a cost, which may not be justified by the increase in capacity factor.

Biomass, particularly bagasse resources are limited by the harvesting season. The sugar cane crushing season extends from June to December and bagasse is readily available over this period. To extend operations over the summer peak demand period (when prices are highest) bagasse must be stored from the crushing season. Current storage technologies and bagasse availability means that an annual capacity factor of the order of 75% can be achieved with reasonable confidence.

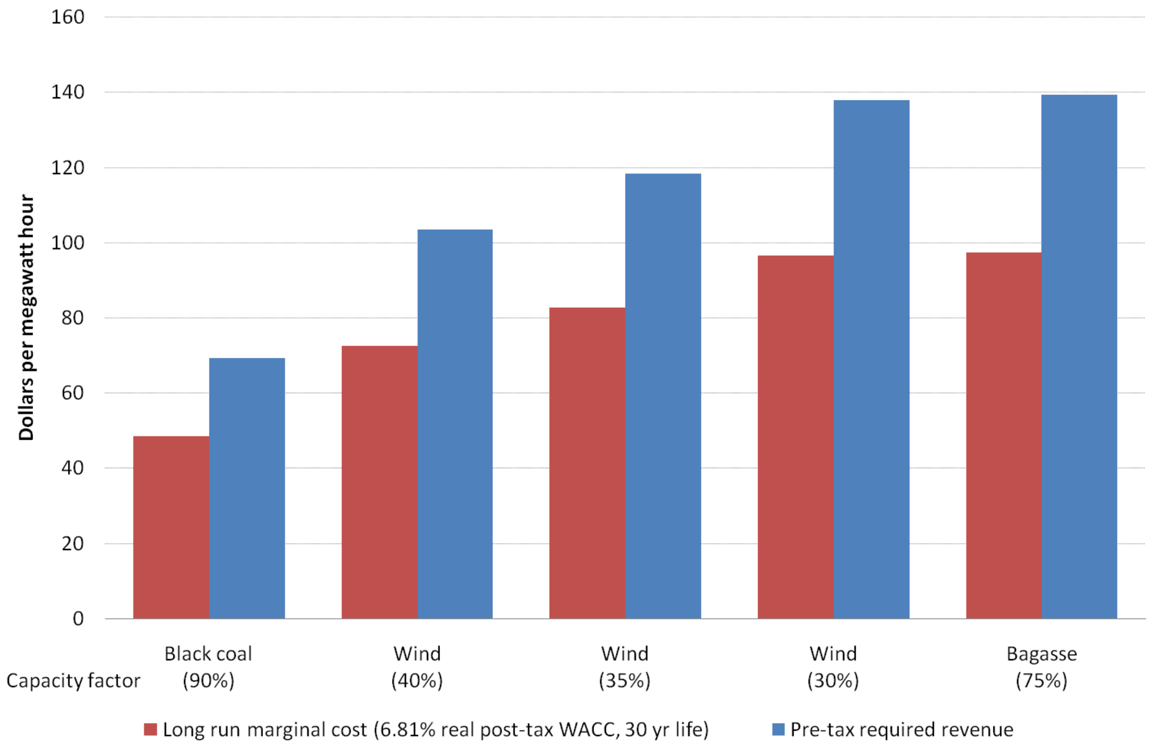
A better measure of the relative cost of each technology type is the long-run cost of producing each megawatt hour of electricity. This cost, the long-run marginal cost, incorporates capital costs, fixed and variable maintenance costs and variable fuel costs. Wind, hydro, geothermal and solar technologies operate on cost-free fuels and are emissions-free. However biomass and bagasse plants must source, transport and store their fuel.

Taking these costs into account, indicative long run marginal costs for the most cost-competitive renewable technologies are shown in Figure 6.2[17]. The cost of Queensland black coal (without a price applied to carbon) is included for comparison with the renewable technologies. The costs of large-scale solar projects are prohibitively high without very significant subsidies (such as the $1.5 billion Commonwealth Government's Solar Flagship Program). The costs of geothermal projects are unknown, as there are no plants built or in operation.

We note that this long run marginal cost must be covered by *post-tax* revenue. The annual *pre-tax* revenue requirement for a project of each technology to go ahead (based on the corporate tax rate of 30%) is shown for comparison.

[17] Bagasse costs have been supplied by Sucrogen from AE&E quotes and fuel cost studies performed by Logicamms. For other technologies, capital, fuel and maintenance costs have been taken from the Energy White Paper assumptions available from http://www.aemo.com.au/planning/ntndp.html. A post-tax weighted average cost of capital (WACC) of 6.81% was applied over a 30 year plant lifetime, based on assumptions in the ACIL Tasman report *Fuel resource, new entry and generation costs in the NEM, April 2009* to NEMMCO.

Figure 6.2 – Indicative pre-tax long run marginal costs by technology



The three data points for wind show the significant impact of capacity factor on the cost per megawatt hour of generation.

The technologies in Figure 6.2 have been compared on the basis of a common, publically available estimate of weighted average cost of capital (WACC). However, different weighted average cost of capital may apply to different technologies due to different levels of risk exposure. For example, bagasse-fired generators are exposed to the risk of lost fuel supply, should Australia lose market share in the raw sugar export industry.

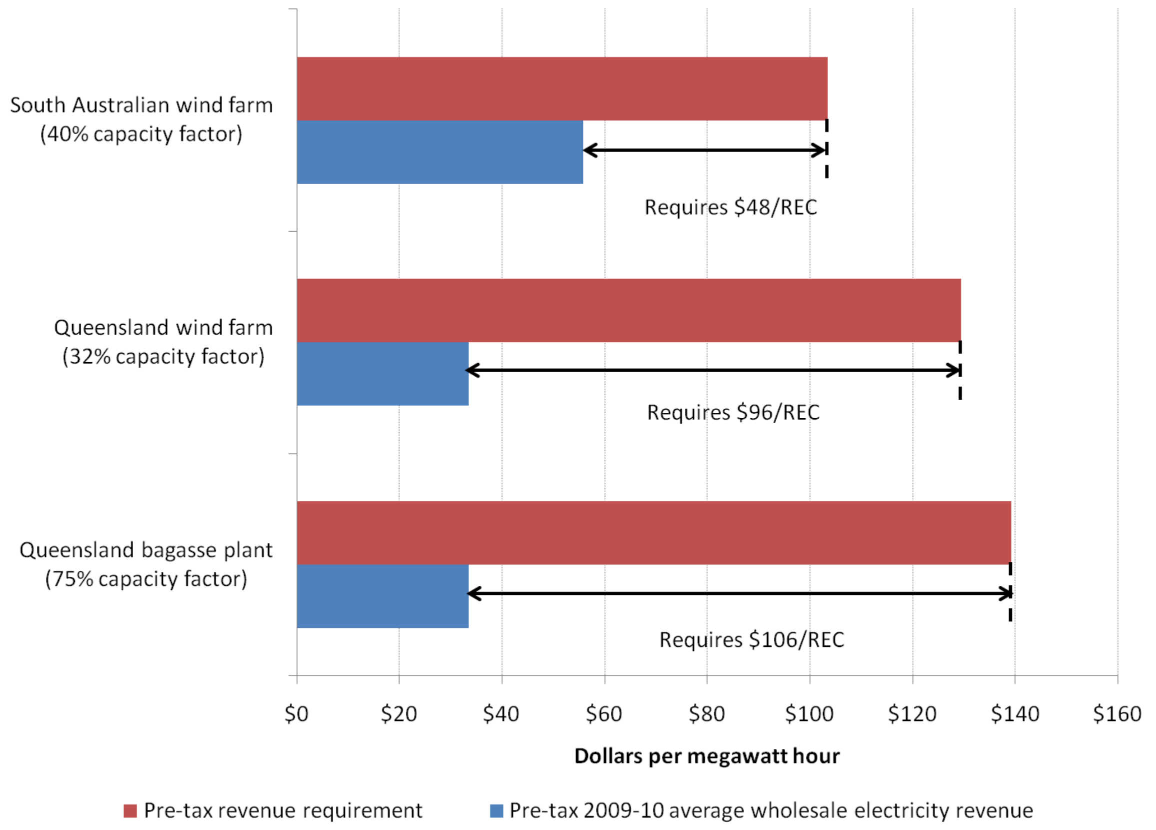
7) QUEENSLAND'S RELATIVE DISADVANTAGE

As discussed in Section 5.1), Queensland renewable projects typically receive lower wholesale electricity revenues than projects in other regions of the NEM. Furthermore, the cost per megawatt hour of generating renewable electricity in Queensland is higher than the costs of projects in southern states (due to either higher technology costs or lower quality renewable resources and resulting capacity factors).

Figure 7.1 shows the gap which must be covered by the sale of RECs for a sample of projects across different states. These are essentially 'generic' projects, with marginal loss factors of 1.0 and the generic capital costs, and do not represent specific developments.

The REC prices required by Queensland projects are not competitive with those required by projects in other states. Indeed, based on the 2009-10 average pool prices and costs in the model, the REC prices required by the Queensland projects exceed the effective scheme cap of $93/REC[18].

Figure 7.1 – Required REC prices

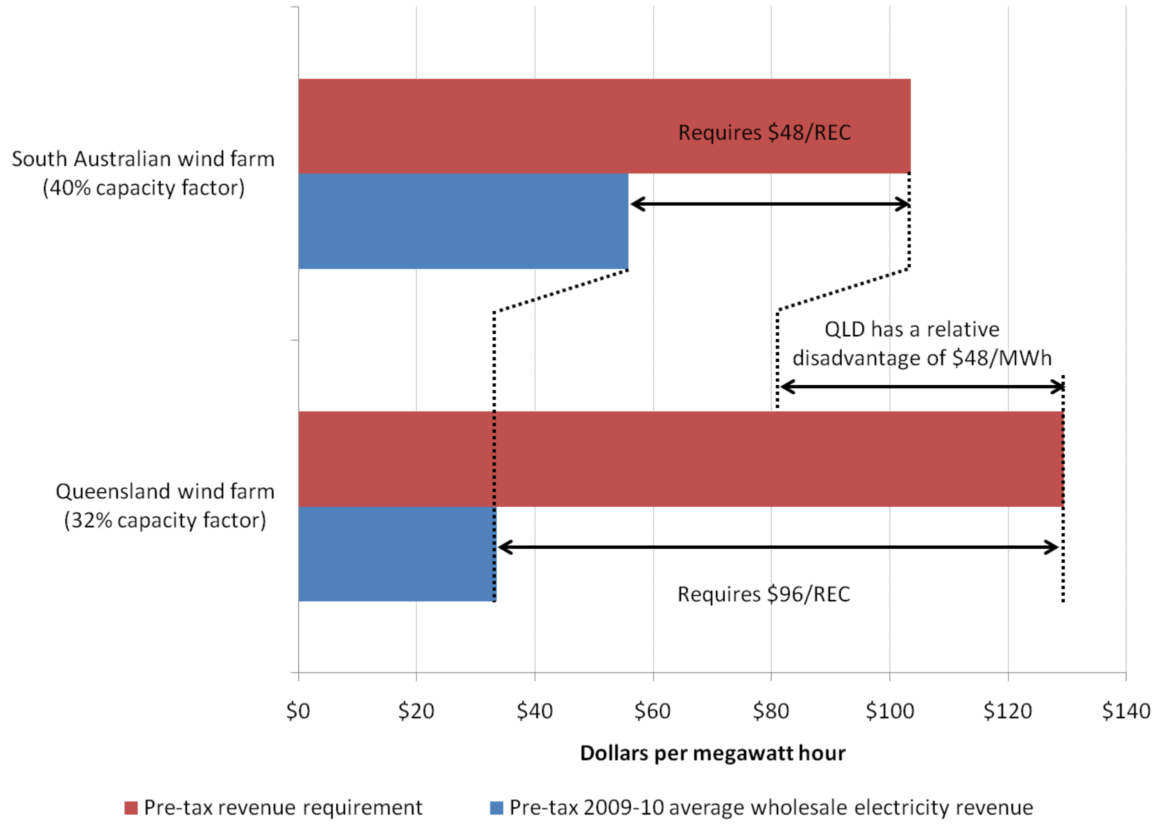


The two wind projects in Figure 7.1 have identical total cost. However, the Queensland project utilises a lower quality wind resource and has a correspondingly lower capacity factor. This means the Queensland project has a higher cost per megawatt hour generated (accounting for the difference in pre-tax long run marginal cost). The lower Queensland pool price adds to the 'gap' between pool revenue and costs.

The difference in required REC price of $48 per megawatt hour ($48/REC) for the two wind projects is essentially Queensland's relative renewables disadvantage, illustrated in Figure 7.2.

[18] The ERET has a shortfall charge of $65/REC for liable parties. This is equivalent to a pre-tax REC price $93/REC.

Figure 7.2 – Relative costs and revenue of wind projects



8) EXISTING AND ANNOUNCED PROJECTS

8.1) EXISTING RENEWABLE GENERATION

In considering the likely proportion of renewable generation that will be installed in Queensland as a result of the LRET, it is useful to consider what has transpired as a result of the previous MRET. This scheme was very similar in nature to the new LRET.

Figure 8.1 illustrates the proportion of renewable energy installed in each state compared with the energy used in each state (showing the relative size of the customer base that is liable for renewable energy certificates). Despite the fact that Queensland currently uses 24% of the energy in Australia, it has only 12% of the renewable energy installed. By contrast, South Australia has only 7% of the customer base in Australia, but has 32% of the renewable generation. This is indicative of the lack of renewable generation sites in Queensland that are competitive with those available in other states.

Figure 8.1 – Existing renewable generation built under the MRET compared with energy usage

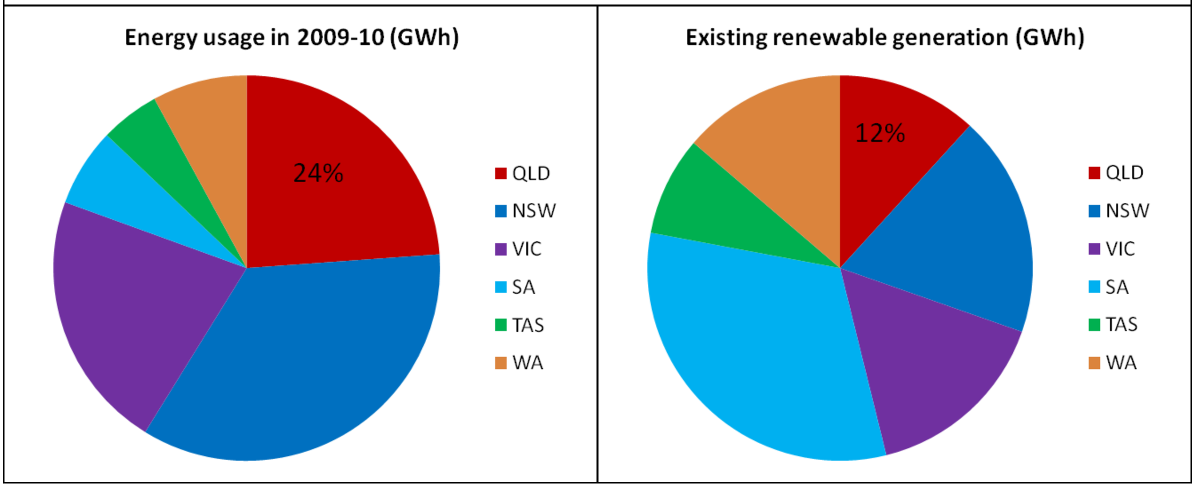
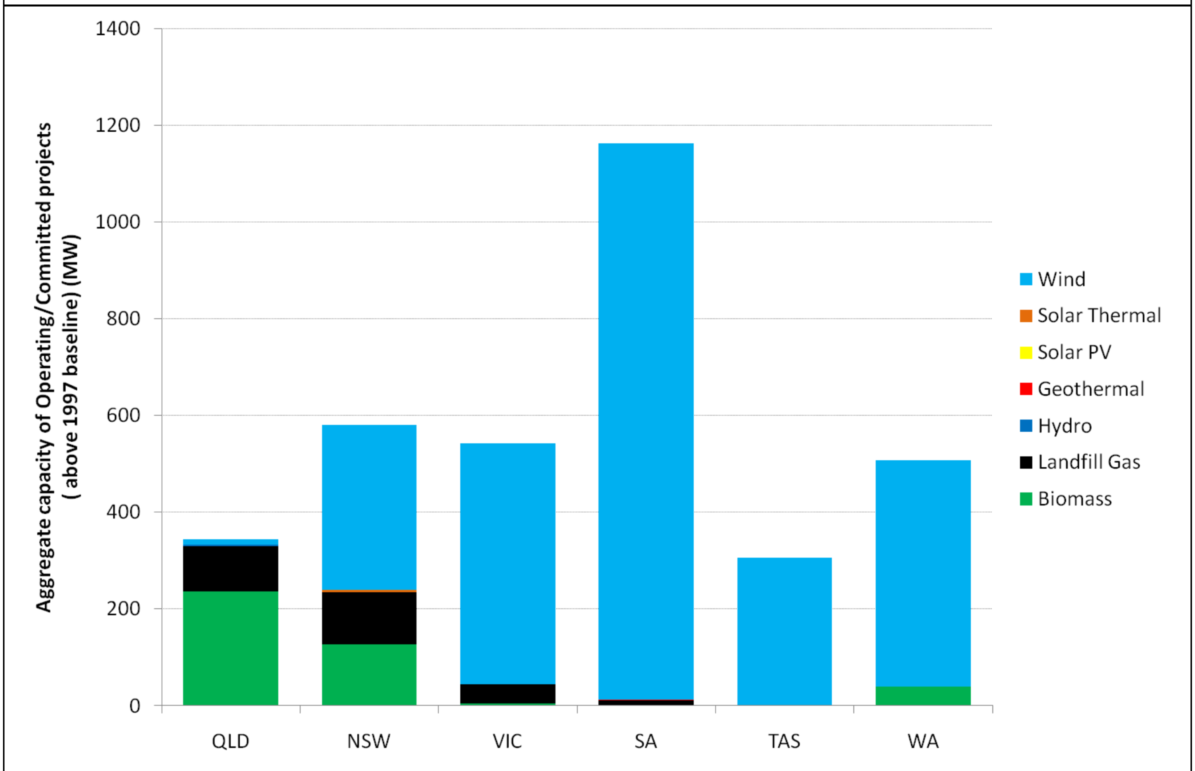


Figure 8.2 illustrates the types of existing capacity of renewable generation in each state of Australia. Queensland renewable generation is primarily biomass and landfill gas, whereas all other states have significant contributions from wind energy. This has likely developed due to the lack of attractive wind generation sites in Queensland.

Figure 8.2 – Existing renewable generation built under the MRET



8.2) FUTURE RENEWABLE GENERATION

We have collated a list of all announced renewable projects. This includes any projects that may be undergoing feasibility studies, or in various stages of development. The total quantity of projects far exceeds the LRET target (announced projects total to more than double the renewable energy required). Therefore it is expected that many of these projects will not eventuate under the LRET; only the most competitive are likely to be installed.

Figure 8.2 illustrates the types of projects proposed by state. Some wind projects have been announced for Queensland, but these are dwarfed by the quantity proposed in New South Wales, Victoria and South Australia. Tasmania and Western Australia are both limited by their relatively small loads and transmission to the NEM, and are therefore special cases.

Figure 8.3 – Proposed new renewable generation

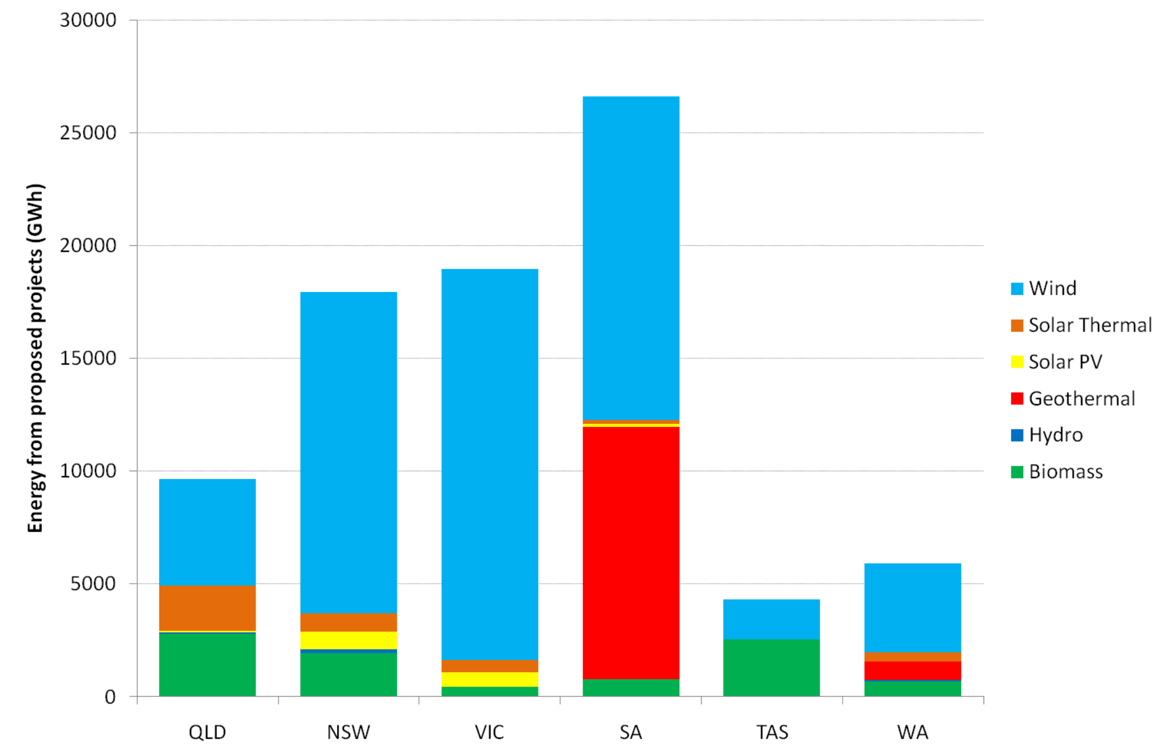
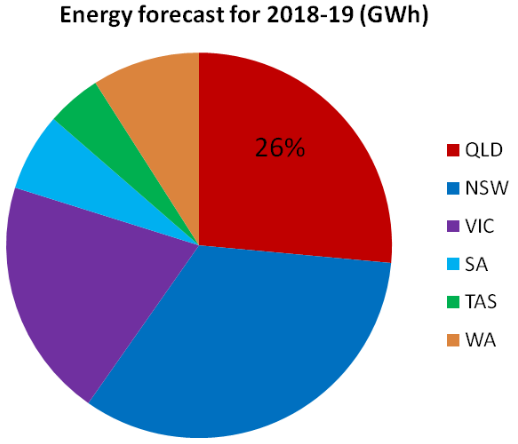
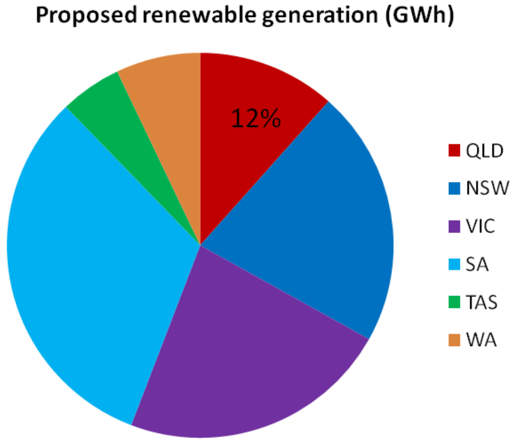


Figure 8.4 illustrates the proportion of energy likely to be used by Queensland in 2018-19 compared with the aggregate energy that could be sourced from proposed projects by state. Despite Queensland's growth to 26% of Australia's energy consumption, only 12% of the renewable generation proposed is located in Queensland. This strongly suggests that under existing market conditions renewable developers do not believe Queensland is as competitive as other states. Therefore without intervention Queensland is likely to develop a much lower proportion of renewable generation compared with other states under the LRET.

Figure 8.4 – Renewable generation compared with forecast energy[19]





The structure of the ERET has changed since the publication of the Queensland Renewable Energy Plan. The targets outlined in the QREP as they pertain to the ERET legislation are subject to some interpretation. Nevertheless, to obtain the large-scale generation benefits outlined in the QREP, Queensland will need to aim to secure 20% of the LRET. It is very unlikely that this will occur in the current market given the Queensland renewables disadvantages discussed in Section 7).

9) NATIONAL ELECTRICITY MARKET RULES

9.1) SYSTEM-WIDE COST OF RENEWABLES

As discussed in Section 6), wind power is presently the cheapest available source of renewable generation. However, this does not tell the whole story. Wind generation is unreliable in so far as there can be no guarantee that wind will be available for generation at times when power is needed. Indeed, South Australia assumes that the reliable capacity that is available at peak times from wind generation should be calculated on the basis of the lowest 5% of wind speeds. In consequence, each 100 MW of nameplate wind capacity is deemed to contribute only 3 MW to available generation capacity at peak.

As a result, for each 100 MW of wind generation added to the NEM there needs to be complementary investment in 97 MW of conventional high reliability peaking capacity (such as gas open cycle generation). There will also need to be 97 MW of complementary investment in transmission capacity. Furthermore, a retailer that meets its LRET obligations by purchasing wind generator effectively imposes a cost on all other NEM participants (in the form of higher peaking and ancillary services costs), including on retailers that meet their LRET obligations through renewable resources that do not have the same characteristics as wind.

All of these extra costs are, in essence, externalities. In order to inform policy decisions about the optimal sourcing of renewables, it is crucial that the additional capital and operating costs that wind generation (and, indeed, every form of renewable energy) impose on the market (and in

[19] Energy forecasts from Australian Energy Market Operator (AEMO), Statement of Opportunities 2009.

turn electricity consumers) are properly quantified. Similarly, these external costs should be incorporated into any comparative analysis and ranking of the efficiency of alternative renewable generation options. Failure to do so will distort the optimal mix of renewable energy sources and result in electricity consumers paying higher electricity costs than would otherwise be the case (ie if the external impacts were incorporated into any analysis for policy purposes) to meet a particular renewable target.In particular, the capacity factor of controllable biomass energy, such as sugar cogeneration (bagasse), is much higher due to its seasonal predictability and can be more efficiently managed from a generation supply perspective. In addition, the value of sugar cogeneration's predictability has been reflected in its use for reliability-related network support purposes.

9.2) AVOIDED TRANSMISSION-USE-OF-SYSTEM (TUOS) PAYMENTS

Under the National Electricity Rules, avoided TUOS payments made to embedded generators provide some recognition of the benefits they provide by connecting to electricity networks. The principal benefit is the value of deferred augmentation of the transmission network. The payment is generally calculated on the basis of the difference at the transmission connection point in any financial year, between the charges that would have been payable if the embedded generator were not connected and those actually payable.

However, not all benefits are recognised. For example, the reduction in transmission loss factors caused by embedded generators connecting to the network in Far North Queensland provides a benefit to contestable consumers and the Queensland Government (via Ergon Energy Queensland's non-contestable customers) is not recognised in the Rules. In considering policy options to close the renewables economic gap, these benefits should be taken into account.

Moreover, we understand that the Australian Energy Market Operator has proposed changes to TUOS pricing (placing greater weight on peak demand rather than energy charging), which will result in embedded generators reliant on the energy they distribute into the NEM losing their TUOS rebates. As a result, this proposed change is likely to further disadvantage renewable generation opportunities in Queensland, including bagasse.

10) QUEENSLAND RETAIL ELECTRICITY MARKET

10.1) RETAIL MARKET STRUCTURE

Full Retail Competition (FRC) commenced in Queensland energy markets on 1 July 2007, allowing all electricity and natural gas customers the option to choose their energy retailer.

Since the introduction of FRC, the supply of retail electricity services to small customers in Queensland by Sun Retail Pty Ltd and Ergon Energy Pty Ltd has been replaced with competition between eleven electricity retailers. Currently nine retailers are licensed to provide electricity to large customers.

While characterised by a relatively large number of licensed retailers, the Queensland retail electricity market is reasonably concentrated with two national retailers, AGL and Origin Energy, by far the largest participants in the market in terms of customer numbers, with Ergon Energy Queensland retaining a significant proportion of customers[20].

Large retailers are well suited to procuring electricity supplies from renewable generation as their size and broad customer base enables them to most effectively manage the risks associated with renewable generation not capable of delivering 100 per cent reliable capacity. In contrast, smaller retailers are likely to be reluctant to contact with renewable generators because, unlike larger retailers with a broad customer base, small retailers are not well placed to manage the pool price implications of additional supply risk associated with biomass (compared to fossil fuel or gas). Consequently, large retailers are the natural 'partner' for renewable energy projects. However, the relatively high concentration of the retail market in Queensland and the fact that teh largest participants are vertically integrated with generation activities, makes them less likely to contract with independent biomass generators for supply.

In this regard, it is relevant to note that both AGL and Origin Energy hold significant generation (both renewable and non-renewable) portfolios that are geographically dispersed throughout the NEM. TRUenergy, another vertically integrated national retailer operating in Queensland, also holds a significant generation portfolio (outside the State).The Energy Reform Implementation Group (ERIG) identified the following commercial incentives for vertical integration[21]:

- a physical hedging mechanism against wholesale pool market price risk;
- providing collateral (generation assets) for financing purposes and to meet prudential requirements of the NEM;
- the creation of some economies of scale and scope; and
- a competitive response to vertical integration by competitors.

ERIG noted that integrated players have a lower cost of capital because they can more readily manage risks. In addition, trading risks and trading strategies allow more scope for profitability when generation and retail assets are held[22].

The national vertically integrated retailers would be able to, and can be expected to make, direct investment into their own renewable generation projects to meet their compliance obligations under renewable energy supplemented by some reliance on external parties. This issue is discussed further in the next section.

10.2) RETAILER BEHAVIOUR AND REC MARKETS

As discussed in Section 3), the key features of the ERET are the creation of a tradeable certificate (RECs), and the placement of a legal liability on wholesale purchasers (e.g. retailers) of electricity to acquire and acquit tradeable certificates proportional to the annual electricity they have sold or used. While there are allocative efficiency benefits associated with the use of market mechanisms, there are significant risks for electricity retailers. For example most tradeable

[20] AGL and Origin Energy acquired large customer number shares through the purchase of Powerdirect (417,000) and Sun Retail (800,000) respectively from the Queensland Government in February 2007 and November 2006. Ergon Energy Queensland has 600,000 'unprofitable' customers in rural and regional areas. Source: ACCC, State of the Energy Market.

[21] Energy Reform Implementation Group, Energy Reform the Way Forward, pp 126-127.

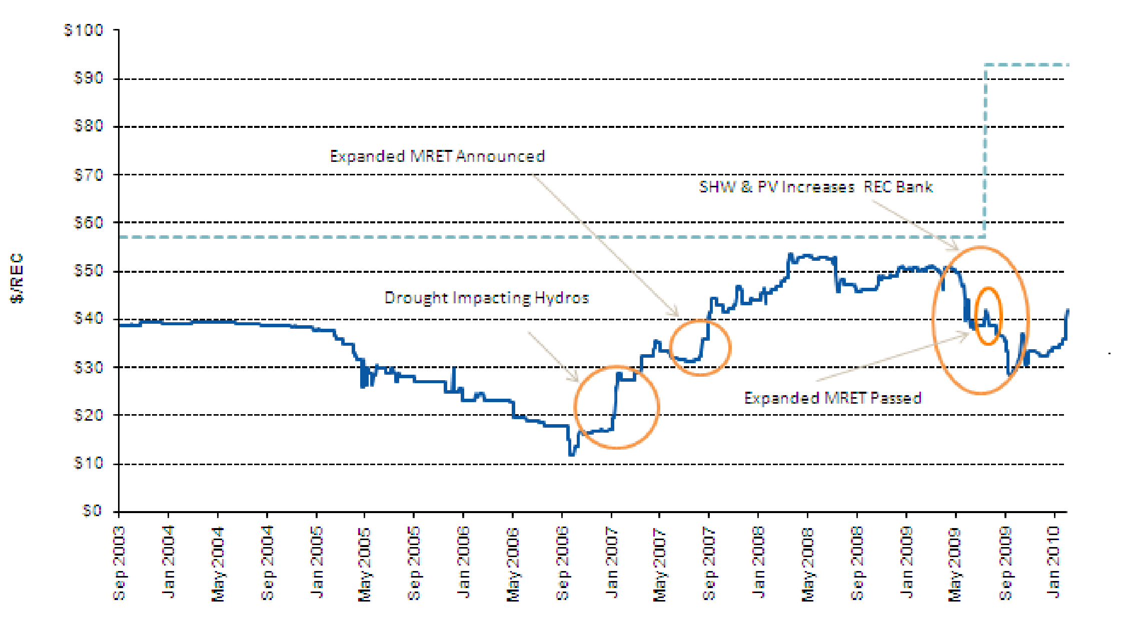
[22] ERIG, p 221.

renewable energy schemes have suffered from market illiquidity, especially in the initial years of the scheme. This is a common feature of new markets (including power markets when they arise) and may not be a concern in the long term. However, market illiquidity has had a significant effect on a retailer's ability to achieve compliance at a reasonable cost. The financial impact of this trend has also been compounded by the lack of fungibility between the various jurisdictional schemes.

Retailers are also subject to changes in Government policy, which can have a significant impact on certificate prices, as shown in Figure 10.1. The following policy changes have had a material impact on the price of RECs:

- in response to the Labor Party announcement in October 2007 of an expanded Renewable Energy Target, the market price increased by almost 20 percent;
- the introduction of a multiplier for solar photovoltaic (PV) installations and expanded capital rebates for solar hot water heaters resulted in a significant drop in the market price; and
- the passing of the expanded RET legislation in August 2009 led to an increase in market prices.

Figure 10.1 – Spot and forward prices of RECs[23]



Regulatory and policy changes can act as a barrier to independent investment into renewable generation alternatives due to sovereign and regulatory risk. Price variability, including that caused by policy changes, can also have a significant impact on the commercial viability of renewable energy technologies. For example, the availability of subsidies to the deemed end of

[23] Source: AGL, Expanded Renewable Energy Target, AGL's application to the Essential Services Commission of South Australia, March 2010. The forward price (dashed line) represents the average contract price today to provide a REC at some future date.

the market[24] (solar PV and solar hot water) has distorted the supply of RECs and has pushed prices down to levels where large-scale renewable projects are no longer viable. This was clearly demonstrated with the introduction of the multiplier for solar PVs in 2009[25]. It is clear that policy stability and longevity, along with a commitment to transparency, can assist to facilitate increased investment in large-scale renewable generation.

To address the risks of market price variability and policy changes a number of retailers have entered into long term Power Purchase Agreements (PPAs) or invested directly in renewable plant so that they can secure the volume of certificates they require at a known price. For example, AGL and Origin Energy, who are the largest electricity retailers in Queensland, have significant interests in large-scale renewable generation assets[26]. The willingness of retailers to enter into long term PPAs also has a significant impact on the commercial viability of renewable energy technologies.

Market prices are a key determinant of whether a retailer sources certificates in the market or via PPA's compared to their direct renewable energy investments. When certificate prices are low, a retailer could be expected to source certificates via the market. However when prices are high the retailer would be expected to utilise banked certificates (if permitted under the scheme), contracted certificates (e.g. via a PPA) or those created from their own generation plant to satisfy their compliance requirement.

Furthermore due to the oversupply of RECs and the uncertain policy environment, the ability of retailers and renewable generation operators to reach long-term commercial agreements that are mutually agreeable have proved to be increasingly difficult.

As previously noted, Queensland renewable generation suffers from a comparative disadvantage to its interstate counterparts. While this is largely due to the factors outlined in Section 7), it appears to be compounded by the fact that the largest retailers in Queensland are vertically integrated with renewable generation interests. Hence, if these national retailers have a strategic interest in vertical integration, then it may further disadvantage independent renewable generators in Queensland, and there is some evidence that retailers have been active in this regard.

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[24] The number of RECs a solar water heater or small generation unit) is entitled to is calculated by determining the amount of electricity the solar water heater displaces or the amount of electricity a solar photovoltaic system produces over a determined period (called a deeming period) given that the installation and ongoing use of the system will reduce demand on the electricity grid. Systems are usually deemed for the maximum period of 15 years for solar photovoltaic panels and 10 years for solar water heaters to receive the maximum amount of RECs upfront. (ORER. 2010. *Solar owners guide snapshot*. June. p 2.)

[25] It is noted the impact of these market distortions will be mitigated through the separation of the ERET into the Small-scalee Renewable Energy Scheme (SRES) and Large-scale Renewable Energy Target (LRET). The Renewable Energy (Electricity) Amendment Bill 2010 is intended to encourage additional generation of renewable electricity from large-scale installations while continuing to support generation from small-scale installations.

[26] AGL and Origin Energy also have interests in small-scale renewable generation such as the installation of solar hot water systems and solar PVs.

11) POTENTIAL POLICY OPTIONS

Given the Queensland Government's objective of increasing the proportion of electricity generated from renewable sources in Queensland (as opposed to increasing renewable across the whole of the NEM), there are many available policy options that could be directed to closing the renewables economic gap. To facilitate the process, we propose a non-exhaustive list of policy options that could be considered by the Queensland Government. Given these options have a wide range of potential benefits and costs, the relative merits of these options should be determined according to their performance against the evaluation criteria outlined in Section 12).

11.1) FEED-IN TARIFFS

A feed-in tariff (FiT) policy mechanism could be used to provide greater financial support to large-scale renewable generation technologies that are generally unsupported by the ERET or are currently not financially viable.

The objective of a feed-in tariff would be to support the economic viability of electricity generation from a range of prospective renewable energy technologies where Queensland holds a comparative advantage. This would circumvent the Queensland retail market structure concerns discussed in Section 10). In addition, it would serve to provide financial surety to renewable energy manufacturers and investors.

To achieve the policy objectives, the Queensland Government would determine the FiT rate that would apply to each applicable renewable energy technology. The FiT may be varied by the Government on an annual basis according to the type and location of the qualifying generator. The applicable FiT would take into account the relative cost effectiveness of the technology

Alternatively, an auction mechanism could also be incorporated into the feed-in tariff design in order to maintain competitive pressure on the value of the feed-in tariff. This would ensure that there was pressure on renewable energy generators to reduce their reliance on assistance over time. Feed-in tariff payments would be made to renewable generators following an auction of the bids to supply the renewable energy required. The first generator chosen to receive a feed-in tariff would be the lowest bidder (in that they submit the lowest required feed-in tariff for their project). Subsequent generators would be selected on the same least cost basis until the required volume of renewable generation is reached. By having the contract period operating over a number of years (e.g. up to 5) the renewable generator would have greater certainty over their revenue than may result from a more volatile, short term market measure.

The owner of a qualifying generator would receive a constant FiT for a prescribed period set at the time that they register with the scheme on the energy they produce. This could be measured on a net or gross basis. Annual or more frequent payments would be made to qualifying generators on the basis of their periodic generation reports submitted to Government.

The scheme would be funded through a FiT levy applicable to wholesale electricity purchases (per MW). The FiT levy would be sufficient to cover the estimated cost of payments under the feed-in tariff scheme.

An alternative approach to a FiT levy would be to establish feed-in tariffs for different renewable technologies having regard to the size of the respective economic gaps. The Government would subsidise the tariff levels but the RECs created by the renewable generator would be assigned to the Government either on the full amount of the energy generated or just export sales. This approach would assist to close the economic gap related to investment in renewable energy, but the cost to Government is moderated by it being able to sell RECs according to their market value. Hence, the Government's contribution to the generator would simply be the value of the economic gap. This approach would also be of substantial benefit to renewable generators, as their income stream is dependent on the value of the feed-in tariff, not the more volatile, market-based price of RECs.

11.2) PURCHASING POLICY

To encourage the use of local renewable sources, Queensland Government agencies could be required to purchase a nominated percentage of their energy from accredited renewable energy generators. Accredited renewable energy generators would be permitted to create certificates, which would be purchased directly by the Government agency from the generator. This approach would circumvent the Queensland retail market structure concerns discussed in Section 10).

Alternatively, a model similar to GreenPower could be adopted where renewable energy purchases would be underwritten solely by Queensland based renewable generation[27]. Electricity retailers licensed in Queensland could administer this program. That is electricity retailers could develop a product that complies with the Queensland Government's energy purchasing policy and purchase the applicable number of scheme certificates from accredited renewable generators.

11.3) QUEENSLAND RENEWABLE ENERGY TARGET

The Queensland Government could promote the development of large-scale renewable energy generation projects through the establishment of a market based scheme that promotes the creation, acquisition of and surrender of Queensland Renewable Energy Certificates (QRECs). Such a scheme would mandate the percentage of total energy Queensland consumers must consume from renewable sources by a prescribed date.

On the supply side, QRECs could only be created from renewable energy generation projects that meet the eligibility criteria. At a minimum, the eligibility criteria would include:

- the generation project must be located within Queensland;
- only new or additional generation capacity installed after a nominated date may create QRECs;
- the generator utilises an eligible renewable energy source
    - the number of certificates a generator may create could be based on the technology used (having regard to NEM externalities discussed in Section 9.1); and

[27] Under GreenPower, all sales to new customers require one REC to be surrendered for each MWh sold.

- new or increased renewable energy generation capacity is treated as a 'top up' (operating alongside the RET) sufficient to meet the quantified economic gap;
  - generation facilities registered to create QRECs would be entitled to create certificates under another jurisdictional renewable energy scheme for the same generation capacity.

On the demand side, wholesale energy purchasers (e.g. retailers) would be 'liable persons' required to support the generation of electricity from Queensland renewable energy sources through the acquisition and surrender of QRECs. A retailer would be required to surrender their acquired QRECs on an annual basis to demonstrate compliance with the scheme. The QRECs surrendered must equate to the prescribed percentage of the liable persons amount of electricity sold or used in Queensland.

The QRET scheme would operate in parallel with the Commonwealth's ERET.

11.4) Subsidies

The Queensland Government could invest directly in or provide subsidies to preferred renewable energy technologies or renewable energy projects located in targeted regions to reduce the cost of renewables. These initiatives could include:

- contributing towards network connection costs for certain renewable energy technologies in key regional areas;
- co-funding renewable generation projects; or
- provide funding to research projects aimed at closing the economic gap for proven renewable energy technologies (eg. to reduce the storage costs associated with use of bagasse to improve its capacity factor).

11.5) National Electricity Rule changes

Investment in new renewable generation capacity is likely to be clustered in specific geographic areas (e.g. wind, biomass projects) or located in remote areas away from the grid. The result for network service providers is likely to be an increase in connection applications for remote renewables and requirements for investment in the shared network.

Adjustments to the National Electricity Rules could be sought by the Queensland Government to facilitate the negotiation process between the generator (connection applicant) and network service provider and/or improve an embedded generator's ability to input energy to the grid. This could be achieved by requiring network service providers to implement transparent documented processes for the application and assessment of connection. Furthermore an obligation on the network service provider to negotiate access in good faith and on fair and reasonable terms (with access to dispute resolution) could facilitate increased penetration of embedded generation alternatives.

12) Criteria for assessment of policy options

All available options for Government policy intervention should be assessed against common criteria to determine their suitability in achieving the Government's objectives. In simple terms, those policy options that maximise the benefits and minimise the costs of meeting the Government's objectives should be pursued.

We suggest four criteria that should underpin assessment of any policy options considered by the Government, discussed in more detail below:

- effectiveness;
- efficiency;
- timeframe; and
- industry development potential.

It is possible that the Government will identify further policy options that have not been identified in this paper. The criteria identified in this section have been developed to provide a basis for comparison of all available options. However, further analysis of policy options that meet the criteria may be required, particularly where a number of suitable options are identified. Cost benefit analysis would provide a suitable framework for further analysis of options.

12.1) EFFECTIVENESS

Closing the economic gap

As noted in section 7), above, there is an economic gap faced by renewable generation in Queensland. Effective policies will be those that can effectively close this economic gap.

In terms of effectiveness, policy options should be judged in terms of their ability to increase the percentage of total power generated in Queensland from renewable sources. This should be assessed against a credible robust baseline of expected renewable generation under current arrangements, compared to when the policy option is in place. This method could be used to derive a simple measure of policy effectiveness, namely, how much higher is the proportion of generation that comes from renewable energy under the alternative case (with the Queensland Government intervention) compared to the base case (without any additional Government intervention). Moreover, failure to recognise structural market characteristics (such as the impact of retailers seeking vertical integration) could undermine the scope for the any policy target to be achieved using the most socially desirable sources of renewables.

A baseline against which to assess the investment in renewables in Queensland to 2020 has not been developed. Part of the policy development process should include developing an understanding of the baseline penetration of renewables on a Queensland-specific basis.

Retail market

As noted in section 10) above, Queensland's retail market for electricity is concentrated and the main retailers in the market are vertically integrated into the generation sector. This has led to a situation in which the retailers most suited to purchasing renewable generation in Queensland are not necessarily willing to do so, due to their other interests in renewable generation. An effective policy should address the issue of vertical integration in the retail market.

Credibility and transparency

Credibility and transparency are both important aspects of an effective policy. An effective policy design will be transparent as this allows participants to inform themselves as to the content and application of the policy and reach their own conclusions about the impact that policy options will have on energy market outcomes. Transparent, clearly articulated policies, with observable methods to identify outcomes will be preferable to policies that are not implemented on a transparent basis, or are not well explained to all affected stakeholders, or do not have outcomes that can be monitored.

Credibility can be maintained by setting industry targets and timeframes that can be realistically achieved. Over-ambitious targets, associated with unrealistic requirements for achievement, will reduce the credibility of the policy, to its detriment. Frequent changes to policy design will harm credibility of Government policies for renewable energy. Frequent changes also have the potential to hinder investment by creating additional market uncertainty (see for example the REC price volatility demonstrated in Figure 10.1, which was partly driven by changes in government policy).

12.2) EFFICIENCY

Market Efficiency

Any form of Government intervention in an efficiently operating market has the potential to compromise market efficiency[28], however appropriate policy design can assist environmental objectives to be achieved at minimum cost to consumers. For the renewable energy industry in Queensland, this is particularly important, as most renewable generation in Queensland will be supplied into the NEM, a market that relies for its effective operation on maximising the efficient revelation of preferences by market participants. On balance, the fundamental design of the NEM is effective in fostering efficient revelation of preferences, notwithstanding that improvements, such as fostering demand side participation, could be achieved. NEM design is capable of accommodating the impact of well designed policy options that are external to the NEM rules (to avoid distorting the ability of the NEM to clear efficiently).

Government intervention should aim to maximise efficiency to ensure that the greatest possible benefits and smallest possible costs result from the intervention. Efficient policy intervention will minimise the risk for harmful disruption of NEM operation.

Generally, the most efficient outcomes arise when the policy instrument places as few constraints as possible on market participants as to how best to meet the policy goal, thereby encouraging the widest and most innovative responses (noting that the desire for retailers to pursue vertical integration in renewable generation could itself seriously limit the development of the most efficient renewals opportunities). In addition, restricting the coverage of a policy option to particular sectors or industries removes the opportunity to access innovative responses from those sectors or industries excluded.

Prices for electricity supply to consumers will rise in response to Government intervention as externalities from electricity supply are internalised, representing the cost of carbon emissions. To

[28] In economics, the broader concept of efficiency comprises three main types of efficiency: productive, allocative and dynamic efficiency. Productive efficiency refers to whether output is produced at minimum cost, allocative efficiency requires that resources are put to their highest value use, so that overall community welfare is maximised, while dynamic efficiency is associated with the allocation of resources (or improvement in efficiency) over time. For the policy making process, each of these types of efficiency is relevant to supporting renewable energy in Queensland.

maximise efficiency, price rises should accurately reflect the price placed on the externality. Whether Government intervention is efficient can be assessed by reference to prices paid by consumers. This is because the price to consumers will rise as the costs of policy intervention are passed through the supply chain. Minimising this price rise through appropriate policy design indicates that the efficiency of intervention is maximised (that is, the most efficient solution will allow the price rise to be minimised, subject to achieving the policy objectives). It is therefore crucial that the policy design operates so as to inform the least cost solution, having regard to externalities in different generation technologies and to other structural issues in the market (such as the impact of the desire for vertical integration by retailers).

Transaction costs

In assessing effectiveness, it is also necessary to consider the transaction costs associated with implementing the policy option.

Any policy option will have impacts on stakeholders due to the processes associated with implementation. Effective policies are those that minimise the transaction costs to stakeholders, for example by minimising any unnecessary regulation to implement the option, and by minimising upstream and downstream costs to stakeholders that are a direct effect of the policy. Transaction costs could arise during the initial implementation of the policy, or the policy design could lead to ongoing costs (for example transaction costs associated with the ongoing administration of the policy).

Analysis of this form could also be incorporated into cost benefit analysis of policy options. Cost benefit analysis of feasible options could be used to identify, at a later stage of the process, the net welfare impacts of a renewables policy option, as well as identifying the impacts for affected stakeholders.

Energy efficiency

Another useful method to compare the efficiency of alternative forms of intervention is to compare the cost of intervention to other policies that are associated with reducing carbon emissions and increasing the deployment of renewable energy in Queensland. Energy efficiency measures (such as solar hot water systems, building insulation and small scale solar PV systems) come at a cost to the energy user and tax payers (through Government subsidies). The cost of a range of energy efficiency measures could be compared to the costs of identified policy intervention to identify whether some Government objectives could be more efficiently achieved through alternative policies.

12.3) TIMEFRAME

The LRET will apply from 2011 to 2030, however the target will plateau from 2020 onwards, at 41,000 GWh per year. The target for 2011 is 10,400 GWh per year, with the most substantial increases in renewable energy volume required from 2015 to 2020. This, combined with the QREP targets for a Queensland proportion of the RET implies that policies for renewable energy that are targeted to attracting investment during the period in which RECs are available must be available to commence within relatively short timeframes. This will ensure not only that project investment will receive support under the RET scheme, but also that the duration of time that the project can receive this funding is maximised.

There is also a risk that the price of RECs will fall during later years of LRET operation, favouring earlier investment. This could occur due to a number of factors. The most significant is that because the LRET target plateaus from 2020 onwards, new investment in renewables is unlikely to be required to provide further sources of RECs for surrender by liable parties. However, new investments in renewables will continue to be developed, particularly if a domestic carbon price is established[29]. This will lead to a situation in which supply of RECs will far outstrip demand. Other reasons that REC prices may fall over time include that the capital costs of renewable generation may fall, leading to more investment in projects eligible to receive RECs, and that other Government assistance measures for renewable energy generation could lead to investment that exceeds that required by the LRET, with the result that REC supply far exceeds demand.

Various types of technology could be supported by the policy options previously identified. However, not all of these types of technology are available for commercial deployment. Some, such as wind and biomass, are proven technology options, while others, such as solar thermal and particularly geothermal, are at a substantially less advanced stage of technology development. This implies that those projects targeted to attract Queensland's proportion of the LRET should be proven technology options, notwithstanding that support to other forms of renewable technology may still be justified, as the RECs will continue to be traded until 2030.

12.4) *INDUSTRY DEVELOPMENT*

Policy intervention to increase renewable generation in Queensland has the potential to facilitate industry development. Consequently, the industry development potential of identified options should be considered as one of the criteria for determining the suitability of each policy option. The industry development potential should be considered in the context of other Government industry development initiatives. A policy that complements existing Government initiatives for industry development will be preferable to one that duplicates or impedes an existing policy.

The QREP identified that there is a significant potential increase in Queensland's renewable energy capability, including through initiatives like creating jobs in the renewable energy industry, identifying Queensland's renewable energy resources, providing funding and fostering technology and innovation.

It has been identified that the ERET will drive the deployment of more capital and labour intensive technologies for electricity generation than would otherwise have been used. This is correlated with increased employment, indicating that if Queensland attracts additional renewable energy investment, increased employment in the electricity supply industry will result.

12.5) *PRELIMINARY ASSESSMENT*

The table below provides a preliminary assessment of the possible policy options identified in this report, noting what we consider to be the key issues for each option by reference to the policy criteria.

[29] By 2030 it is possible that the price of carbon under a carbon pricing policy will be a more significant driver of renewable generation investment than the RET, as the REC price is capped at $65/MWh pre-tax.

Table 1 Assessment against criteria

Option	Effectiveness			Efficiency	Timeframe	Industry Development
	Closing the Gap	Retail market structure	Credibility and Transparency			
Queensland Renewable Energy Target	✓ The QRET will provide no guarantee of diverse or new sources of renewable generation unless the scheme explicitly requires certificates to be sourced from different renewable technologies. Effectiveness therefore depends on whether the Government prefers to close the economic gap via a number of renewable technologies or is indifferent which technology or technologies achieve it. If it is indifferent, wind generation is likely to dominate investment decisions given the externality issues.	✗ No impact on retail market structure.	✓ The Queensland Government has previously successfully delivered a similar scheme, the Queensland Gas Scheme, which has been successful in meeting its objective. As a result, a similarly credible and transparent QRET scheme targeted at renewable generation could be developed.	✓ The cost of government intervention will be minimised by the market mechanism inherent in the QRET scheme, but failure to address externality issues associated with wind generation will reduce efficiency.	✓ The initial MRET scheme demonstrated that the market can respond within the required timeframe to a renewable energy target.	✓ A QRET scheme will promote industry development in relation to renewable generation. However, wind generation development will dominate over other technologies if the QRET scheme is technology-neutral in its design.
Subsidies	✓ Subsidies could be targeted at closing the 'economic gap by increasing uptake of proven Queensland renewable energy (such as biomass).	✗ No impact on retail market structure.	✗ Based on history, there is the potential for government subsidies to attempt to 'pick winners' that ultimately fail, with no economic benefits delivered. This will undermine the credibility of the policy.	✓ Subsidies would promote efficient outcomes only if they assist to close the economic gap through addressing externalities in the NEM which disadvantage renewable generation.	✓ Subsidies targeted at mature technologies and 'ready to go' projects could result in renewable energy generation being promoted within the required timeframe.	✓ Well targeted subsidies to renewable generation projects with mature technologies are most likely to promote industry development.

			Subsidies are unlikely to be transparent to energy users.			
Feed-In Tariffs	✓ The level of the feed-in tariff can be directly targeted at specific renewable generation technologies. If the feed-in tariff is initially unsuccessful in procuring sufficient investment, the assistance to renewable energy can be raised to ensure scheme effectiveness.	✓ This option will mitigate the retail market structure issue by establishing a gazetted tariff open to all generators of the specific technologies.	✓ Publicly notified feed-in tariffs are transparent to the market and consumers. Feed-in tariffs are familiar to energy consumers.	✓ The efficiency of feed-in tariffs can be further enhanced by introducing market discipline, such as auctioning rights to access the tariff (auctioning for renewable energy is used in Brazil to maintain competitive discipline).	✓ Experience in other jurisdictions (FiTs are used widely both around Australia and internationally) indicates that feed-in tariffs can be effective in rapidly increasing the deployment of renewable energy (e.g. deployment of solar energy in Germany).	✓ Industry development can be achieved by targeting feed-in tariff to support those renewable generation options with industry development potential.
Purchasing Policy	✓ The targeted nature of this option will enable the economic gap to be closed, measured by the volume of energy that Government agencies procure from local renewable generation.	✓ This option will directly address the retail market issue provided there is a direct relationship between the generator and government purchasing agency (ie no retailer involvement).	✓ This policy option would be relatively straightforward to implement and transparent.	✓ This option would be more likely to deliver efficient outcomes if government purchasing agencies could exercise choice in their renewable generation source.	✓ It would likely be possible to implement this option within a short timeframe, provided government agencies do not purchase their energy under long term contractual arrangements.	✓ This option will directly facilitate investment in Queensland renewable generation through creation of a new market for renewable energy supplies.
National Electricity Rule Changes	× The impact on closing the gap is highly uncertain and the externality issues are not addressed.	× No impact on retail market structure.	✓ Any Rule change must go through a public consultation process.	✓ Our proposed Rule changes, which focus on facilitating commercial negotiations, would not hinder efficiency of the NEM.	× The Queensland Government cannot unilaterally change the NEM Rules. A Rule change process must be undertaken by AEMC.	× The proposed Rule changes are not targeted to benefit Queensland renewable generation and would apply equally across NEM jurisdictions.

In our view, the primary issue for the Queensland Government to meet its renewable generation objective is to close the economic gap for renewable energy in Queensland. Feed-in tariffs, a QRET or purchasing policy appear well-suited to achieve this objective. However, any preferred policy would also need to address Queensland's retail electricity market structure. A feed-in tariff would appear to achieve this and the economic gap objective best. Other options could, however, also work to address the retail market structure and economic gap issues, depending on policy design.

13) Conclusion

The Renewable Energy Target is a national scheme. This means that all consumers are equally liable for the costs of the scheme regardless of location. However, the balance of evidence included in this report suggests that Queensland is likely to have less renewable development as a result of the scheme, with the majority of renewable development occurring in other states. The existing NEM rules and Queensland retail market structure also limit potential commercial opportunities for renewable energy generation in the State. This means that Queenslanders are paying for renewable development in other states, but are not receiving the benefits of that development in their own state.

Renewable energy development can be beneficial for the jurisdiction in which it occurs in many ways, including increased investment and employment. In addition, over the longer term it is anticipated that a carbon price will be applied. This will increase the cost of electricity in proportion to the average emissions intensity of electricity generation in each state. If renewable energy development has occurred primarily in states other than Queensland, their average emissions factors will be decreased, and the uplift in cost due to the emissions trading scheme will be lower. Queenslanders, on the other hand, will experience the full uplift in their wholesale electricity prices, despite having paid an equivalent amount for the renewable energy development that is lowering costs in other states.

A more subtle impact of Queensland not developing renewable technologies could be an increasing perception both internally and externally that Queensland is "less clean" than other states where renewable energy development has been high. A perceived lack of commitment to sustainability and environmental security could have long lasting detrimental effects for Queensland.

The key issue for the Queensland Government then is to determine what role it should play in facilitating the development of renewable generation technologies. However, the conjunction of the characteristics of Queensland's natural resource endowments, NEM rules and retail market structure pose unique challenges, which must be recognised in any policy option(s) taken up by Government.

Furthermore, the unintended consequences of well meaning but poor policy design and implementation can be substantial, in particular, creating risks to NEM outcomes and Queensland investment. As result, a sound analytical framework will be necessary to assess the respective merits of a potentially wide range of policy options, including the extension of feed-in tariffs and application of government agency energy purchasing policies.

In our view, creative but robust policy development will be essential to increasing the penetration of renewable energy in Queensland while maximising the benefits to electricity consumers. It clearly makes sense for Queensland to build on the existing strengths of its economy and renewable endowments, with well-targeted Government policy capable of assisting in this regard.