Report to

South Australian Department of the Premier and Cabinet

Potential for Renewable Energy in South Australia

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McLennan Magasanik Associates

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Project Team

Ross Gawler

Walter Gerardi

Antoine Nsair

Melbourne Office
242 Ferrars Street
South Melbourne Vic 3205
Tel: +61 3 9699 3977
Fax: +61 3 9690 9881

Brisbane Office
GPO Box 2421
Brisbane Qld 4001
Tel: +61 7 3100 8064
Fax: +61 7 3100 8067

Email: mma@mmassociates.com.au
Website: www.mmassociates.com.au

ACN: 004 765 235
ABN: 33 579 847 254

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1 INTRODUCTION

South Australia has a large renewable energy resource built around its world class wind, solar and geothermal resources. However, exploitation of this resource will be limited by the small size of the energy market in South Australia and the current structure of the transmission system within South Australia, which limits the ability to transmit electricity from favourable sites to remote electricity markets. Already, a number of wind farms on the Eyre Peninsula have been put on hold as the existing transmission system cannot cope with additional capacity.

In this paper, the potential for renewable energy generation is explored. Issues affecting the uptake and development of the renewable energy resource are discussed. The scope for developing this resource is examined under the following scenarios:

- Assuming the incentives provided by the proposed CPRS and expanded Renewable Energy Target (ERET) will be the prime motivator for the development of this resource. No changes to existing infrastructure are assumed.
- Unconstrained development of the resource to meet requirements under the ERET and CPRS.

The purpose of this analysis is to provide guidance for determining a plausible range for a renewable energy target for 2020 in South Australia. South Australia presently has a legislated target of having 20% of its electricity generation coming from renewable sources by 2014. The Department of Premier and Cabinet (DPC) is considering a proposed state-based renewable energy target for 2020. The analysis also provides an initial assessment of the factors that could hinder the achievement of the target.

The general conclusion from the study is that a renewable energy target of up to 40% of total generation in 2020 in South Australia is possible under some plausible and favourable circumstances but that the expected rate of technological development and the Commonwealth commitment to a 20% renewable energy target for Australia will likely see a lower level achieved. Achievement of this potential rests on the further development of the transmission system within South Australia and between South Australia and adjoining States. South Australia could also take the lead in some facilitating technologies such as energy storage to maximise the potential for its renewable energy resources.

2 RENEWABLE ENERGY RESOURCE

The level of the target that can be achieved in South Australia will depend on three factors. Firstly, level of the renewable resources available in the state, which sets an upper limit of the total amount of renewable generation possible. Secondly, the policies supporting renewable generation will determine how much of this potential is realised. Thirdly, the presence of technical or physical constraints could prevent the development of economic renewable resources if they are not actively addressed.

2.1 Measures supporting renewable energy generation

Renewable energy generation has typically a higher cost of generation than conventional forms of generation. Uptake of renewable energy generation has largely been through support measures implemented by State and Federal Governments.

The major measures supporting renewable generation in South Australia have been or will be implemented by the Federal Government. First, the Federal Government is likely to implement the Carbon Pollution Reduction Scheme. Under this scheme, generating plants that emit emissions need to purchase permits to cover their emissions. Purchasing permits increases the cost of fossil fuel based generation but not renewable generation. Based on the analysis of the CPRS undertaken by the Federal Treasury, additional renewable generation is encouraged even without additional support measures. Specifically:

- Under the CPRS -5 Scenario (leading to a 5% cut in emissions by 2020) with no extended renewable energy target, there was an additional 8,600 GWh of renewable generation by 2020 (from 2010 levels). About one-quarter of this additional generation (around 2,300 GWh) occurred in South Australia.
- Under the Garnaut -25 Scenario (leading to a 25% cut in emissions by 2020 and with no other support measure), renewable energy generation increases by 33,000 GWh by 2020 (to be 54,000 GWh in 2020), with around one-quarter of this growth occurring in South Australia.

In addition to the CPRS, the Federal Government is implementing the Expanded Renewable Energy Target, which requires an additional 45,000 GWh of new renewable generation by 2020, leading to a total level of renewable generation of around 60,000 GWh or around 20% of predicted electricity demand. This scheme expands on and replaces the Mandatory Renewable Energy Target.

The South Australian Government has legislated for a 20% target of renewable generation in 2014. So far it has not had to implement any specific measures to support the achievement of this target.

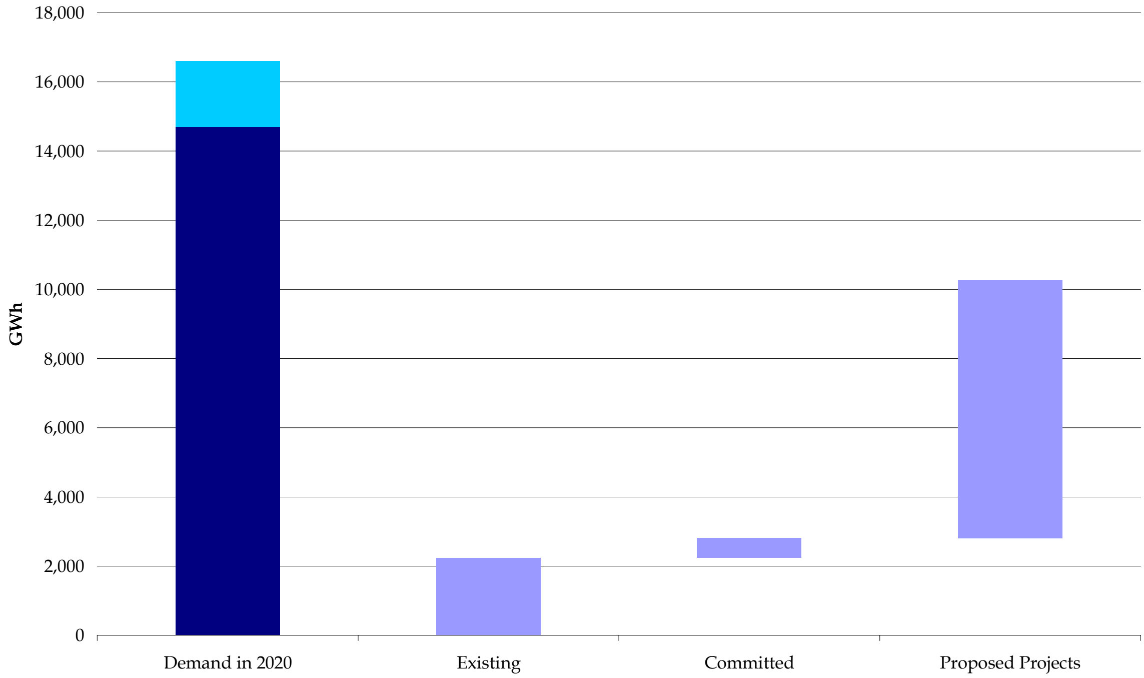
A range of support measures have been implemented to encourage the uptake of mainly small scale renewable generation, including:

- Rebates for the installation of solar water heaters.
- A feed-in-tariff for roof top photovoltaic systems.
- A program to support the installation of photovoltaic systems at schools.
- Rebates and grants to support renewable generation for remote area power systems.

2.2 The renewable resource base

Renewable energy generation has increased markedly in South Australia. Currently, around 2,250 GWh of generation exists and another 560 GWh of capacity is under construction. This comprises between 17% and 19% of predicted electricity demand in 2020[1]. Another 7,450 GWh of projects have been proposed, mainly wind generation, mainly a total of 10,270 GWh of renewable generation either operating or under consideration. If all the proposed projects proceed, this would enable 60% to 70% of total demand to be sourced from renewable energy sources.

Figure 2-1: Existing, committed and proposed renewable energy capacity in South Australia[2]



The actual resource base is larger still. The known project base only includes a small number of demonstration projects for geothermal. If this technology can be demonstrated successfully, the potential resource base is large. Over the long term there is also a large potential for solar thermal.

1 According to modelling by Treasury of the CPRS, electricity consumption grows at a slower rate as aresult of higher electricity prices to reach around 14,700 GWh. Based on the median growth forecast by NEMMCO, electricity consumption without a CPRS is projected to be around 16,600 GWh in 2020.

2 Demand and generation estimates are on a regional reference node basis.

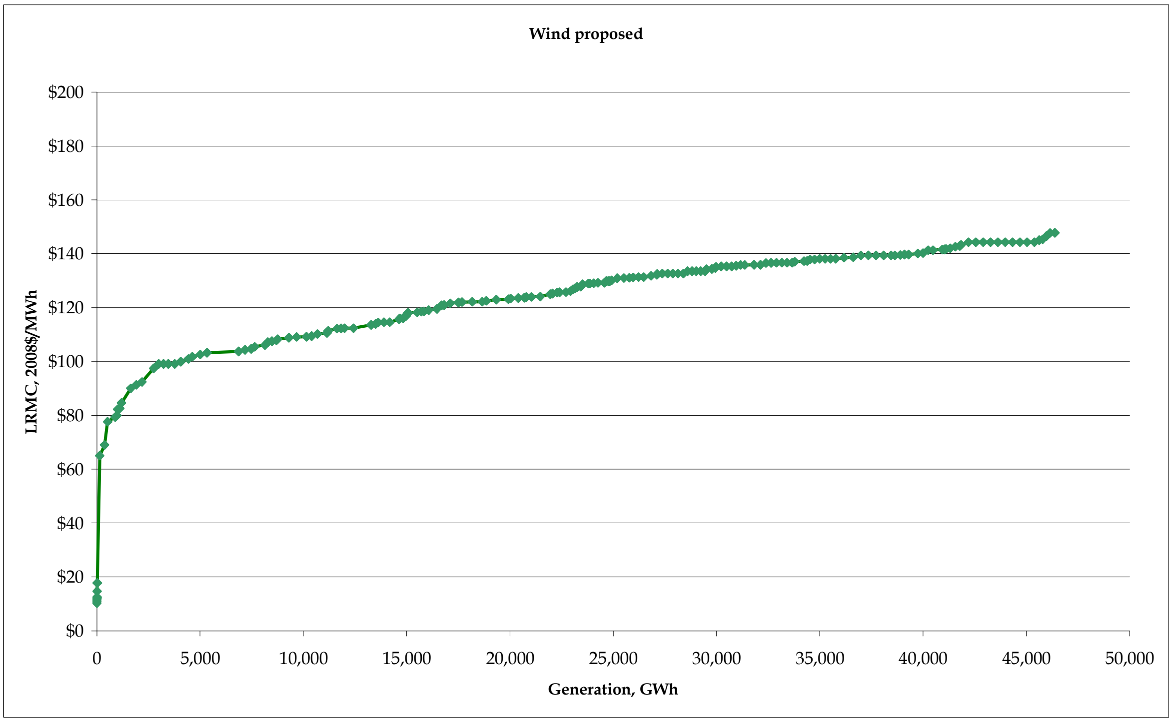
Wind generation dominates the renewable energy developments to date. Over 90% of existing capacity is in the form of wind generation. Around 6,500 GWh of projects in wind generation are in the development pipeline. The only other technology showing promise is geothermal generation, although this technology is still in the demonstration and development phase and may take at least 5 years to be commercially proven and more than 10 years to achieve its full potential.

Figure 2-2: Project development by technology type.

2.3 Comparative costs

Currently it is expected that the more competitive wind powers will be available in the cost range of $100-$140/MWh and geothermal power will be in the range of $80 - $105/MWh delivered to regional nodes if the expected technological and commercially developments are realised. Much of the favourable lower cost resources are in South Australia and this is why South Australia has been a major participant in the renewable energy market to date. Figure 2-3 shows the wind power supply curve to 2040 based on data available to MMA. Much of the lower cost resources in the $100 - $120/MWh are available in South Australia due to the favourable wind regime.

Figure 2-3 Wind Cost Curve to 2040



Source: MMA May 2009 (June 2008 dollars)

3 ALTERNATIVE TARGET SCENARIOS

3.1 Views for Review

The following sub-sections outline alternative views concerning the economic and technical potential for a renewable energy target.

3.1.1 Variable Energy Target - 40% Target

A target of 40% is considered attainable [and relatively conservative] for generation of renewable electricity in SA by 2020 as a proportion of the state's total electricity use. It would be regarded as conservative as long as there is a supporting planning and approval environment that will ensure that transmission infrastructure is developed in a timely manner so that the available energy can be delivered to customers without constraints that depress price received for the energy at site.

In arriving at the target the following constraints on large scale renewable energy development should be noted.

Wind power is expected to remain the cheapest form of energy and grid stability will be the constraining factor to uptake. Wind resources are not a constraining factor and identified development sites in SA already exceed the projected uptake by 2020. A level of 20% wind capacity is proposed as a level that can be achieved without compromising grid stability. International R&D, especially in Denmark, is focussed on increasing this limit to 50%. Stronger interconnection with other states and increased base load from developments such as Olympic Dam are also likely to increase the grid stability limit.

Geothermal expansion from 2015 to 2020 is expected to rely on the support of federal policies. The R&D funding is targeted at commercial success by 2015. Successful projects will then rely on sufficient renewable energy certificates remaining within the expanded MRET to fund developments through the latter years of the MRET commitment. Once again, the resource and potential developments will not be constraining factors in the capacity of geothermal to be achieved by 2020.

Solar thermal is expected to be a more expensive form of renewable energy in the period to 2020 and the modelling suggests this technology will be crowded out by geothermal energy which promises to be cheaper. Solar thermal is not relied upon to assist in meeting the proposed target; however it is likely to become a key energy source if its development in the lead up to 2020 is more successful than that of geothermal energy. South Australia is well endowed to benefit from any solar technology which becomes cheap enough by 2020.

MMA modelling suggests that SA could achieve the following by 2020:

a) 6,600 GWh of geothermal power from 0 GWh currently

b) 5,700 GWh of wind power (up from 1,140 GWh currently. 3,200 GWh would meet the current 2014 target of 20%)

c) 350 GWh from other sources (up from 90 GWh currently)

Based on South Australian electricity demand of 24,500 GWh (i.e. taking into account the resources boom) the MMA modelling (total 12,650 GWh) would result in over 50% renewable electricity with all of the growth in demand being accounted for by new renewable power. Such a scenario may result in some sunk costs within the fossil fuel industries as plant providing capacity in the early part of the decade is rapidly retired as geothermal capacity takes over.

In order to ensure the assumptions remain conservative the growth in wind power and geothermal power has been modified as follows:

a) 4,600 GWh of geothermal power reducing installed capacity by 30% from 900MW to 620MW. This is estimated to be the impact of a 2 year delay in geothermal entering the market.

b) 4,850 GWh of wind power which is consistent with a 20% limit on wind capacity to ensure grid stability.

Based on the same demand as above, a more conservative total of 9,800 GWh achieves 40% of the state's electricity from renewable sources. In this case 80% of growth is met by renewables.

It is clear that such a target could be significantly exceeded if the barriers to wind can be reduced and/or if geothermal and solar energy are more successful than anticipated within the MRET scheme.

On the flip side, a target of 40% is primarily at risk if renewable energy certificates are not available to fund South Australian projects in the latter years of the MRET scheme.

Table 3-1 provides an indicative analysis of the export capacity required based on average weekly minimum load conditions commencing at 950 MW sent-out. The analysis is based on an estimate of minimum stable and economic generation at Northern, Osborne, Torrens Island and Pelican Point Power Stations of about 686 MW sent-out. A minimum level of 580 MW is needed for system stability but energy prices would be depressed for thermal generation below 686 MW.

The analysis shows that this 40% target would require between 240 MW and 400 MW of export capacity to ensure that the available renewable resources are not constrained overnight. This of course may not be the economic level of extra export capacity. It rather sets an upper bound on what may be required. Thus this target of 40% would require some investment in the inter-regional transmission system according to how much of the renewable generation can be economically absorbed within the South Australian region.

Table 3-1 Analysis of Export Requirement for 40% of Demand Target

40%	Target		Now	2020 (Med)	2020 (High)
Load South Australia					
	Energy	GWhso	14000	16000	24500
Typical	Min Load	MWso	950	1086	2164
Typical	Max Load	MWso	3000	3529	4741
Normal Minimum Generation					
Northern		MWso	260		
Osborne		MWso	120		
Torrens Island		MWso	76		
Pelican Point		MWso	230		
	Total		686		
Wind Generation					
	Energy	GWhso	1140	2050	4850
	Max (38% CF)	MWso	388	616	1457
Geothermal Generation					
	Energy	GWhso	0	4000	4600
	Max (85% CF)	MWso	0	537	618
Other Renewable		GWhso	90	350	350
	MAX (70% CF)	MWso	0	42	42
Totla Renewable		GWhso	1230	6400	9800
		%	8.8%	40.0%	40.0%
Export Capacity					
	Required	MWso	124	796	639
	Available	MWso	400	400	400
Extra Export Capacity Needed		MWso	0	396	239

3.1.2 Less than 40% Target

Geothermal

The amount of drilling and number of Rigs that may be available over the period may be constrained. The Lightning Rig Geodynamics now uses seems to be the one favoured by the Geothermal Market at the moment (This is a larger and heaver duty drill designed for greater depths and is the one selected by Geodynamics after they had problems with a smaller drill). Geodynamics is apparently in negotiations to obtain a second rig, and Petratherm is also trying to obtain one.

Assuming:

a) There will be three rigs in the State within the next year,

b) Each can drill up to 3 holes per year (this is optimistic, and assumes nothing goes wrong)

c) Each 50MW plant consists of 9 holes

d) Assuming plant construction occurs in parallel with the drilling program (i.e. not allowing additional time for plant construction)

An optimistic level of geothermal generation would be around 500MW or approx 3720GWh in 2020 (assuming 85% capacity factor)

Biomass

The development of biomass projects is under some doubt. The Auspine project in the South East has been sold and feedback is that they are no longer focusing on the project.

Olympic Dam Extension

The Olympic Dam Extension (ODX) could remain in the calculations - but it is worth noting that with the global financial crisis, financing and contracting the mine output will be more difficult for BHP and there may be project delays. If we assume that no more than 200 MW load increase is achieved by 2020, then there may be less opportunity to add renewable generation to the SA region without resulting in network constraints.

Wind

For the purposes of wind power, let us assume that no additional export capacity can be economically realised before 2020 and that local network constraints case a further 10% reduction in wind farm output. Assuming that no more than another 200 MW of load eventuates at ODX by 2020 (at 90% load factor), which would limit the growth in minimum demand, we can back calculate how much wind power could be absorbed without additional output constraints

Target Calculation

Based on these figures above a starting point for setting the target would be based on Wind Farm Capacity:

= (Minimum Load – Minimum Thermal Generation Capacity - Geothermal Generation Capacity + Export Capacity) =

= 1286 - 686 - 500 + 400 = 500 MW

The wind energy allowing for 10% local constraints would then be:

= 500* 0.38 * 0.9 *8.76 = 1498 GWh

The target ratio would then be

= (3720 + 1498 + 90)/(16000 + 200*8.76*.9) = 30.5%

This calculation is shown in Table 3-2 including a case without ODX which meets the lower target but with no further wind development.

Table 3-2 Analysis of Export Requirement for 30% of Demand Target

30%	Target		Now	2020 (Med)	2020 (High)
Load South Australia					
	Energy	GWhso	14000	16000	17577
Typical	Min Load	MWso	950	1086	1286
Typical	Max Load	MWso	3000	3529	3754
Normal Minimum Generation					
Northern		MWso	260		
Osborne		MWso	120		
Torrens Island		MWso	76		
Pelican Point		MWso	230		
	Total		686		
Wind Generation					
	Energy	GWhso	1140	1140	1498
	Max (38% CF)	MWso	388	388	500
Geothermal Generation					
	Energy	GWhso	0	3720	3720
	Max (85% CF)	MWso	0	500	500
Other Renewable		GWhso	90	90	90
	MAX (70% CF)	MWso	0	0	0
Totla Renewable		GWhso	1230	4950	5308
		%	8.8%	30.9%	30.2%
Export Capacity					
	Required	MWso	124	488	400
	Available	MWso	400	400	400
Extra Export Capacity Needed		MWso	0	88	0

The following caveats are considered:

Delivery to Market

These calculations are based on the assumption that the energy will be delivered to market without impediments.

The practical reality is:

a) HFR Geothermal technology is still in the development stage and has not yet been proven.

b) Almost $1billion dollars of infrastructure will be required to connect geothermal to market

c) Over $1 billion will be needed to upgrade and construct transmission infrastructure to export the power to Victoria and the higher target could not be achieved without interconnection augmentation.

d) MMA predicts a significant increase in renewables in Victoria. So we could be trying to export to a network that is also constrained for export from Victoria to NSW even if the export to Victoria is unconstrained.

Reliability

In order to provide voltage support/spinning reserve and other ancillary service, there is around 580MW of conventional generation in the State that must operate at all times. This is around 60% of the current minimum load. This means alternative sources of generation may need to be constrained off at times of low demand.

4 MARKET PROSPECTS FOR RENEWABLE ENERGY

4.1 Market factors and technology scenarios

In relation to the information stated in the alternative scenarios set forth above MMA makes the following observations based on information available and its professional interpretation and expectations of market and technological developments:

a) Wind power in South Australia may be limited by ability of the interconnected transmission system to absorb the variable power without violating requirements for system reliability and service quality standards for voltage and frequency of supply. This constraint will be relaxed progressively as the South Australian market expands and interconnections are augmented. Such augmentation will depend on other market developments that would define the value of augmentation as defined by the regulatory process for transmission development.

b) The capability to absorb wind power into the South Australian system may be increased by a number of measures that are technically feasible but may not be economic in comparison to other ways of reducing carbon emissions and meeting national renewable energy targets. These prospective available measures include:

   i. Augmenting the Victoria – South Australia interconnection to increase power export capability and thereby accommodate more dynamic power flows between South Australia and the other NEM regions;

   ii. Increasing the transmission capacity between South Australia and Southern NSW to provide for increased power interchange with NSW and the Snowy generation;

   iii. Providing additional voltage control equipment in the form of static var compensators to manage voltage variations caused by changing power flows on long transmission lines;

   iv. Providing battery and flywheel energy storage to assist frequency regulation against short-term variations in generation, typically within the half-hour period when peaking plant may be committed, changing its output or shutting-down;

   v. Providing compressed air energy storage facilities for increased capacity for day to day changes in renewable energy power production;

   vi. Providing more liquid and gas fuelled peaking plants to manage day to day variations in wind power output;

   vii. Proving power control capability on new wind farms to curtail output during low load conditions when frequency control might otherwise be threatened by excessive wind power output.

c) In addition, other expected market developments will slowly increase the ability to absorb wind power such as:

   i. Demand growth which increases the size of the system and results in increase thermal power development, albeit with a lower carbon emission profile than the market average;

   ii. Increased diversity of wind power sites across the NEM will reduce the average impact of any particular wind farm on the system relative to other resources;

   iii. Smart metering that will enable thermal storage devices such as refrigerators and cool room compressors to be operated to control demand and regulate frequency within half-hour trading intervals and thereby permit more variable generation on the system;

   iv. Increased use of electric vehicles will provide the market with the opportunity to create and utilise distributed energy storage to provide frequency control;

   v. Solar energy resources will eventually provide another diversified energy source to the system to help manage low wind days.

d) In view of the substantial potential to increase the Victoria – South Australia and NSW – South Australia interconnections, any limit on wind power output in South Australia ultimately depends on economic and market factors beyond South Australia's jurisdiction. It would be unwise to set long-term targets based solely on current technical and economic constraints. Energy management technology development will be greatly transformed as the world moves to carbon trading and responds to much higher energy costs.

e) Given that South Australia has excellent wind potential, a large minerals base including Olympic Dam resources, the potential for coal to liquids at Arckaringa with carbon capture and storage and no longer has large scale low cost indigenous gas resources, it is likely that a large scale augmentation of the Victorian interconnection will become feasible around 2020 or thereafter. There are a number of scenarios that could drive large scale interconnection development at 500 kV voltage levels to provide an increase of 500 to 1000 MW in transfer capacity including:

   i. The increasing incentive for development of geothermal and wind potential together with electricity market prices driven by increasing pressure on reducing national carbon emissions post 2020

   ii. The development of Arckaringa and similar type projects at economic scale with large amounts of base load generation together with carbon capture and storage in conjunction with geothermal power development so as to require increased export capacity

iii. The development of cogeneration at mining sites to process the ore into materials with a higher value and lower cost of transport where feasible. This is understood to be a viable option at Olympic Dam for example. This means that the extra mining load may not absorb all the renewable energy that could be produced in South Australia and power export capacity will need to be increased.

iv. The development of nuclear power at economic scale in NSW, Victoria or South Australia would require a major increase in inter-state transfer capacity between regions because an economic power station would be of the order of 4,000 MW in size. The adoption of nuclear power as a solution seems a low probability scenario that is only likely if geothermal power does not live up to its promise, wind power reaches its limits and solar thermal power is constrained by relatively remote locations and high transmission costs, and loss of synergies with geothermal power.

f) Once a larger scale interconnection capacity is established with South Australia, the ability to further develop wind power in South Australia would be enhanced, particularly as it would increase the value of energy storage options in Victoria and Tasmania where compressed air energy and hydro storage options are prospective under high wind power penetration.

g) Even with large export capacity to Victoria and NSW, there may remain limitations on wind power absorption due to potential wind power projects in Victoria and NSW. Retirement of high mechanical inertia generators in the Latrobe Valley and loss of smelting load at Portland could result in regional limits of wind power to some 20% of the combined regional demand of say 20,000 MW or 60% of minimum demand at 7000 MW, both around 4000 MW or 13,000 GWh

h) At least South Australia has the better wind regime and would have the opportunity to be first to meet the target with the more profitable options.

4.2 Estimating a target

In order to estimate a possible target range in the period to 2020, we have collected data from a number of scenarios from recent work to see what ranges have been implied by those scenarios. These values in Table 4-1 are taken from recent cases which have not included expansion to the minerals processing load other than what is already included in the NEMMCO forecasts provided in the Statement of Opportunities. Some cases were related to the recent work on the Carbon Pollution Reduction Scheme (CPRS) and expanded ERET. Two scenarios were modelled:

- Low uptake scenario: CPRS starts in 2011 and the RET target proceeds with the designed approved by COAG in April 2009. Wind capacity in South Australia is limited to never exceeding 25% of peak demand (as a proxy for transmission and intermittency issues) whilst geothermal uptake is limited to one demonstration plant before 2015, and only up to 500 MW to 2020.

- High uptake scenario. Same as with the low uptake scenario except that all limits removed (with the exception of geothermal uptake not commencing before 2015) and additional transmission capacity into Victoria built to allow access to eastern seaboard markets.

Under the low uptake scenario, renewable energy generation grows modestly from around 2,900 GWh in 2010 to 3,900 GWh in 2015. The low uptake in this period is due to three factors. First, the penetration of wind is constrained by the capacity limit (25% of peak demand), which is exacerbated by the fact that electricity demand growth is subdued as a result of the CPRS. Second, adding additional wind capacity in this period would result in low overnight prices in the wholesale market, so that it would be uneconomic to install this capacity. Third, the nature of the target ramp up under the RET is for a slow ramp up in the period to 2015. As there are already 9,000 GWh worth of RECs banked this low ramp up discourages early investment in renewable generation.

Figure 4-1: Predicted generation by state, CPRS with ERET, low uptake scenario

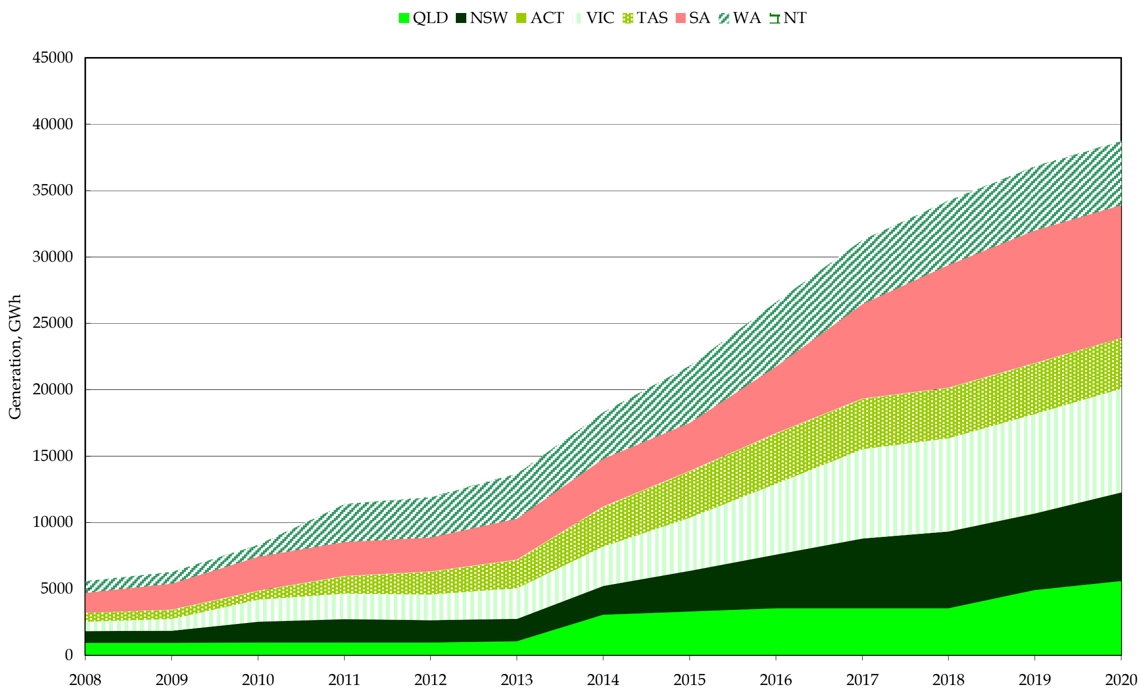


Table 4-1 Analysis of some recent scenarios for 2019/20 financial year, low uptake scenario (GWh)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Wet waste	0	0	0	15	15	15	15	15	15	15
Wheat/ethanol plant	0	0	0	0	0	0	0	0	0	0
Agricultural Waste	0	0	0	0	0	0	0	0	0	0
Bagasse	0	0	0	0	0	0	0	0	0	0
Black Liquor	0	0	0	0	0	0	0	0	0	0
Landfill Gas	28	28	28	28	28	28	28	28	28	28
Municipal Solid Waste	0	0	0	105	105	105	105	105	105	105
Sewage Gas	4	4	4	4	4	4	4	4	4	4
Wood / Wood Waste	0	0	169	193	193	193	193	193	193	193
Geothermal	0	8	380	752	752	2167	4244	5868	6597	6597
Hydro	5	5	5	5	5	5	5	5	5	5
SHW	0	0	0	0	0	0	0	0	0	0
Solar / PV	6	6	6	6	6	6	6	6	6	6
Wave	0	0	0	0	0	0	0	0	0	0
Wind	2521	2521	2521	2521	2521	2521	2521	3051	3051	3051
Total	2564	2571	3112	3629	3629	5044	7121	9274	10004	10004
Proportion of Demand - no demand response	16%	16%	19%	22%	21%	29%	40%	51%	54%	53%
Proportion of Demand - demand response to CPRS	16%	17%	21%	25%	25%	35%	49%	64%	68%	67%

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The studies showed potential renewable energy generation in the range of 37% to 62% of total South Australian generation. Clearly if higher loads are expected at Olympic Dam and if new thermal generation is developed at Arckaringa, the same amount of renewable energy would constitute a lower proportion of South Australia's total generation. MMA's assessment of more than 50% potential market share is based on the more conservative growth perspectives.

4.3 Components of the target

The more conservative view in the Background chapter suggests that MMA has included the Auspine project (now owned by Gunns Limited) in its renewable energy yield by 2020. This is true in the cases presented in Table 4-1 and has been true of our recent work. A REC production of 168 GWh for Auspine was included.

The estimates of geothermal power in these scenarios range from 2,688 GWh to 7,749 GWh which exceeds the range considered by the South Australian Government officials. However our CPRS cases had geothermal energy within the range of the Government Official's estimates. Our wind energy of up to 2,941 GWh is less than the potential estimated by both Officials.

Constraints on geothermal development based on the existing number of drilling rigs available would be unlikely in the long-term. If the market is attractive, engineers will build new rigs and the rate of new drilling would be increased.

MMA considers that access to the grid is a more significant barrier to entry, particularly for the more remote sites due to economies of scale in long-distance electricity transmission. Limited transmission access for large scale wind development relates to both local conditions (such as Eyre Peninsula) and interconnection with Victoria and NSW for lower demand scenarios. The lower the rate of demand growth, the more dependent large scale renewable energy development is exposed to the South Australian export capacity.

On this basis, MMA's analysis would suggest that achieving 40% renewable generation as a ratio of demand for the high growth would be a stretching target for a high growth scenario, for both the wind and geothermal sectors as in Table 3-1. Such a target to be realised would require an early commitment to interconnection augmentation to provide investors with the necessary confidence to proceed at this pace.

5 CONCLUSION

A renewable energy target of 40% of total South Australian generation by 2020 for a high demand scenario in South Australia is a reasonable but stretching proposition given the expected rate of technological development and the Commonwealth commitment to a 20% renewable energy target for Australia by that time. There are no significant technological constraints to achieving such a target. It is more a question of whether such a target would correspond to the most economic solution for meeting the national renewable energy target. That is, whether it would be economic to deploy the necessary infrastructure resources to remove barriers to entry for renewable energy in South Australia.

The main threat to achievement would be that energy efficiency growth could be strong and economic growth weaker in the face of high carbon prices. If that occurred, the generation base upon which that 40% were to be calculated would be some 30% to 35% lower than projected in the high case and the 40% renewable energy might find it difficult to reach commercial operation in the presence of lower market prices and infrastructure constraints.

Even if the high growth scenario were to be achieved, a 40% target would require an early commitment to interconnection development to provide investors with the necessary confidence to proceed.

It therefore depends on how the South Australian Government wishes to apply such a target. If it is to guide the market place on what is achievable within the State and not relying on interconnection development, then 30% would be appropriate as it could be achieved by a number of feasible and foreseeable pathways. A more stretching target of 40% relies on fulfilling the expectations in geothermal development and applying resources to network development so as to provide investor confidence to proceed with project development.