



A Renewable Energy Plan for South Australia



**Government of
South Australia**
RenewablesSA

Strategy Paper

Achieving 33% of electricity generated
by renewable energy by 2020.

Photo

AGL Wattle Point Wind Farm,
South Australia.

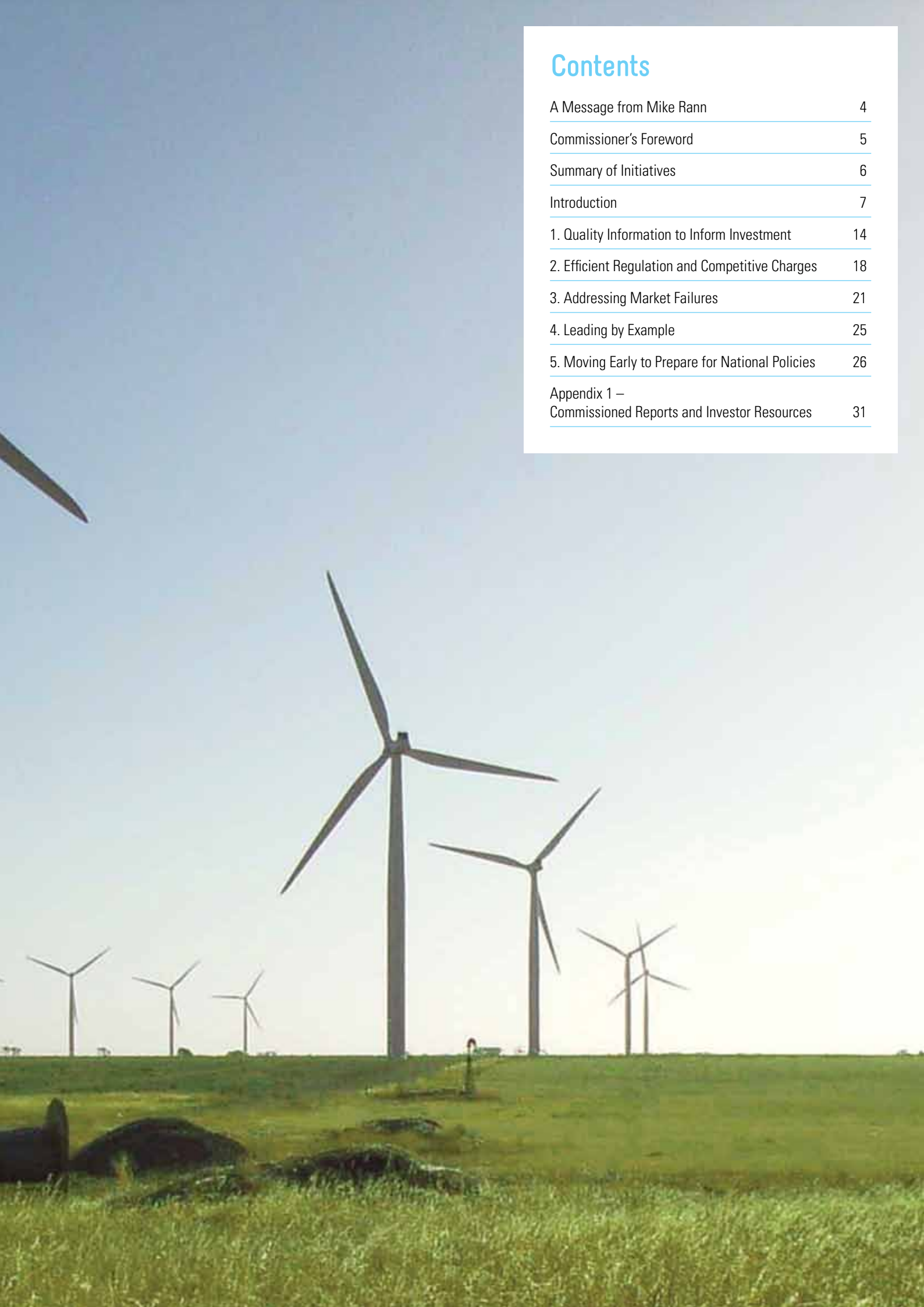
Photo cover

The 1 MW solar installation at the
Royal Adelaide Showgrounds was
the first megawatt scale industrial
roof-top solar plant in Australia.



Contents

A Message from Mike Rann	4
Commissioner's Foreword	5
Summary of Initiatives	6
Introduction	7
1. Quality Information to Inform Investment	14
2. Efficient Regulation and Competitive Charges	18
3. Addressing Market Failures	21
4. Leading by Example	25
5. Moving Early to Prepare for National Policies	26
Appendix 1 – Commissioned Reports and Investor Resources	31



A Message from Mike Rann

South Australia's commitment to a low-carbon economy, as outlined in this document, is helping us to secure significant economic and environmental benefits, now and for the future.

We are showing that the renewable energy sector can stand comfortably alongside industries such as mining, defence and advanced manufacturing as pillars of our State's diversified economy.

Our success in this area is not solely attributable to our world-class natural resources. We have moved quickly and decisively to tailor our regulatory frameworks and to provide investment clarity and certainty, which has resulted in South Australia hosting around 50 per cent (around \$2.8 billion) of national investment in wind power, and close to 90 per cent (around \$680 million) of Australia's total geothermal energy investment.

We have also performed strongly in distributed energy, hosting a high proportion of homes with solar panels, as well as being the first State to introduce feed-in laws. The scale and scope of these, and other renewable energy projects – both in operation and in the pipeline – are outlined in this publication.

The results of these initiatives are already being delivered. In 2010/11, wind energy contributed over 20 per cent of annual electricity production in the State. With this achievement, South Australia has achieved its ambitious 2014 target of 20 per cent renewable energy production three years ahead of schedule.

The early achievement of this goal places our State nine years ahead of the Commonwealth's nationally-mandated requirement of having 20 per cent of electricity generated from renewable sources by 2020.

These past achievements and the initiatives in this Plan have positioned us to take full advantage of the opportunities that will be presented by the Commonwealth Government's visionary Clean Energy Future Plan. However, the Government realises that we have to keep working on maintaining that leadership position.

South Australia's success in attracting investment not only helps our environment, it stimulates growth in the clean energy industries of the future, and provides employment and economic opportunities for many regional economies. Independent assessments show that, to date, South Australia's mid-north region has hosted \$800 million in investment in wind energy projects that have created jobs for 185 people in construction, manufacturing and support services.

In order to build on our position of strength, the South Australian Government has now committed to achieving 33 per cent electricity generation from renewable sources by 2020, and established a \$20 million Renewable Energy Fund to assist with further leveraging renewable energy investment in our State.

These ambitions, as well as the creation and oversight of a strategic framework to achieve them, continue to be driven by our RenewablesSA Board.

This Plan sets out how we intend to do that by drawing upon the roles only State Governments can play in this area.

I commend this Plan to you, in the interests of a clean energy future and of our planet.



Mike Rann
Premier of South Australia
Minister for Sustainability
and Climate Change
Minister for Economic Development

Commissioner's Foreword

Given our current performance in renewable energy, the State is well placed to establish itself as the nation's leader in clean energy.

The basis for our advantage is our natural endowment in world-class natural renewable energy resources in wind, solar and geothermal. To attract the investment required to tap these resources, the State Government put in place the most supportive regulatory frameworks for renewable energy development in Australia.

Going forward, the overall goal is to make South Australia the most attractive destination for renewable energy investors through five key means: by providing an efficient and streamlined regulatory environment; generating quality information to inform investment; selectively intervening to address market failures; Government demonstrating and leading by example; and positioning the State to take advantage of anticipated national climate change policies.

These roles complement the policy settings being put in place nationally. South Australia is a leading region in international terms in hosting renewable energy investment. We recognise that our long term ambitions to build this reputation will require us to play a disproportionate part in the realisation of national clean energy objectives.

South Australia's Renewable Energy Fund has provided funding support to assist the development of quality proposals that may operate without additional subsidy or which may be strong contenders for Commonwealth Government funding. These projects cover a wide spectrum of the renewable energy sector ranging from geothermal energy research; a detailed commercial and technical

feasibility assessment of large scale wind farming in the wind resource rich region of the Eyre Peninsula; the development of a solar thermal air-conditioner prototype; biomass trials; electricity production from organic wastes; development of local capabilities in solar tracking technologies and investigations into an investment opportunity for biomass generation on Kangaroo Island.

Results are already being delivered, with the first project funded in 2009, the South Australian Centre for Geothermal Energy Research, successfully attracting close to \$2 million for various industry oriented research programs from the Commonwealth Government, universities and the private sector support to date.

The RenewablesSA Board has taken a strategic view of the State's prospects in a world with carbon pricing. It sees value in recommending a contemporary limit to the carbon intensity of new electricity generation, as well as levels that the State can aspire to achieve by 2020. In a low carbon economy, South Australian industries will be better prepared for the impacts of carbon pricing and in addition, will gain a competitive advantage in selling to carbon sensitive markets than their counterparts in the other mainland States.

This plan sets out the themes which have been adopted by the South Australian Government in striving toward positive environmental and economic goals simultaneously by extending our credentials in renewable energy.



Tim O'Loughlin
Commissioner for Renewable Energy

Summary of Initiatives

1 / Quality Information to Inform Investment

- 1.1 The South Australian Government will commission landmark studies relevant to the further development of the Green Grid concept as a long term project which offers the prospect of opening a whole new province for wind generation.
 - 1.2 The South Australian Government will support studies by ElectraNet to provide a contemporary assessment of the capacity of the existing electricity transmission network in the State, to support additional wind energy.
 - 1.3 The Government will support the further development of business cases for the expansion of electrical infrastructure to enable higher levels of intermittent generation and open up new, remote renewable sites.
 - 1.4 South Australia will seek to establish a network of the leading international provinces which have a common interest in accommodating higher levels of renewable energy at least cost and without detriment to security of supply, with the objective of pooling research and learnings from different approaches.
-

2 / Efficient Regulation and Competitive Charges

- 2.1 The South Australian Government will commence public consultation on draft legislation providing access for renewable investors to Government owned land used for pastoral purposes.
 - 2.2 In conjunction with the Central Region Local Government Association, the South Australian Government will appoint a regionally based wind farm liaison manager to provide local communities and councils with information and advice about new and existing wind farm developments in the State.
 - 2.3 The Government will conduct a review of the capacity of existing regulatory processes for marine (wave and tidal) energy with a view to put in place a framework that addresses the specific needs of these investors.
 - 2.4 The Government will continue to make available its Case Management Services to streamline and coordinate processes for obtaining development approval and other licensing required for major projects.
-

3 / Addressing Market Failures

- 3.1 The Government will continue to generate quality information and advice in strategic areas such as biofuels and develop strategies to lever support from the Commonwealth Government.
 - 3.2 The South Australian Government will provide a further grant of \$2 million to support the next phase of commercial geothermal energy research at the South Australian Centre for Geothermal Energy Research.
 - 3.3 The Government will provisionally allocate \$1.5 million for joint innovative solar research and development projects bids for the Australian Solar Institute's funding round in the second half of 2011.
 - 3.4 The Government will continue to use the Renewable Energy Fund to maximise the public benefit outcomes for South Australia in bio-energy, fuel algae, geothermal, solar and wave technology generally, with specific emphasis on assisting proponents to attract Commonwealth funds.
-

4 / Leading by Example

- 4.1 The South Australian Government will invite interested parties to respond to an Expression of Interest to develop models for financing, establishing and implementing community owned solar photo-voltaic projects in South Australia.
 - 4.2 The South Australian Government reaffirms its commitment to supporting large-scale renewable energy investment by purchasing accredited GreenPower™ to satisfy 50% of its electricity requirements by 2014.
-

5 / Moving Early to Prepare for National Policies

- 5.1 The South Australian Government will release a discussion paper to consult on limiting the carbon intensity of new electricity generation in South Australia to 0.7 tonnes of CO₂e per MWh.
 - 5.2 A new emissions intensity target will be set for electricity generation in the State at 0.5 tonnes of CO₂e per MWh by 2020.
 - 5.3 The South Australian Government will report annually on the current and forecast carbon intensity of South Australia's electricity generation.
 - 5.4 The Government will promote the commercial benefits of investing in South Australia's low-carbon economy, providing advantages for industries which compete in carbon-sensitive markets.
 - 5.5 The South Australian Government will leverage the State's leadership in the deployment of renewable energy to build competitive new industry research capabilities, expand the local value chain and create long-term green jobs.
-



Introduction

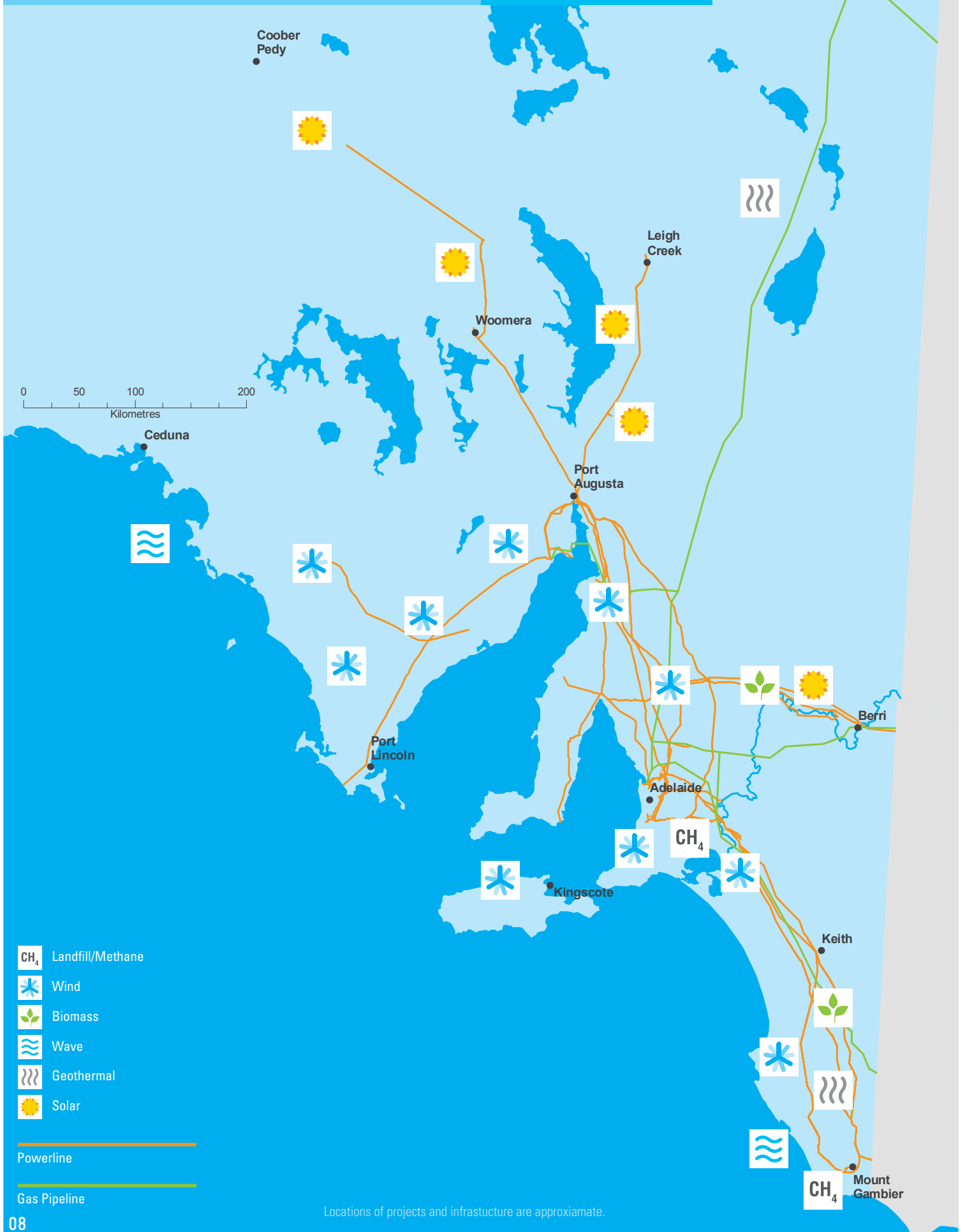
South Australia is unique in its endowment and diversity of renewable energy resources. The mix includes world class wind resources located in remote areas of the State with low population densities; solar and geothermal resources which are outstanding in world terms; and highly prospective wave energy resources.

However South Australia's success in drawing renewable energy investment is not just the product of its natural resources. The State Government moved early to gain an advantage in the development of renewable energy sources by leading the nation in setting policy frameworks and regulatory processes to provide greater consistency, transparency and the certainty that investors need to capitalise on these outstanding resources.

FIGURE 1

Potential Zones for Renewable Energy, South Australia

Figure 1 maps the State's potential zones for renewable energy development in relation to the State's electricity and gas transmission facilities.



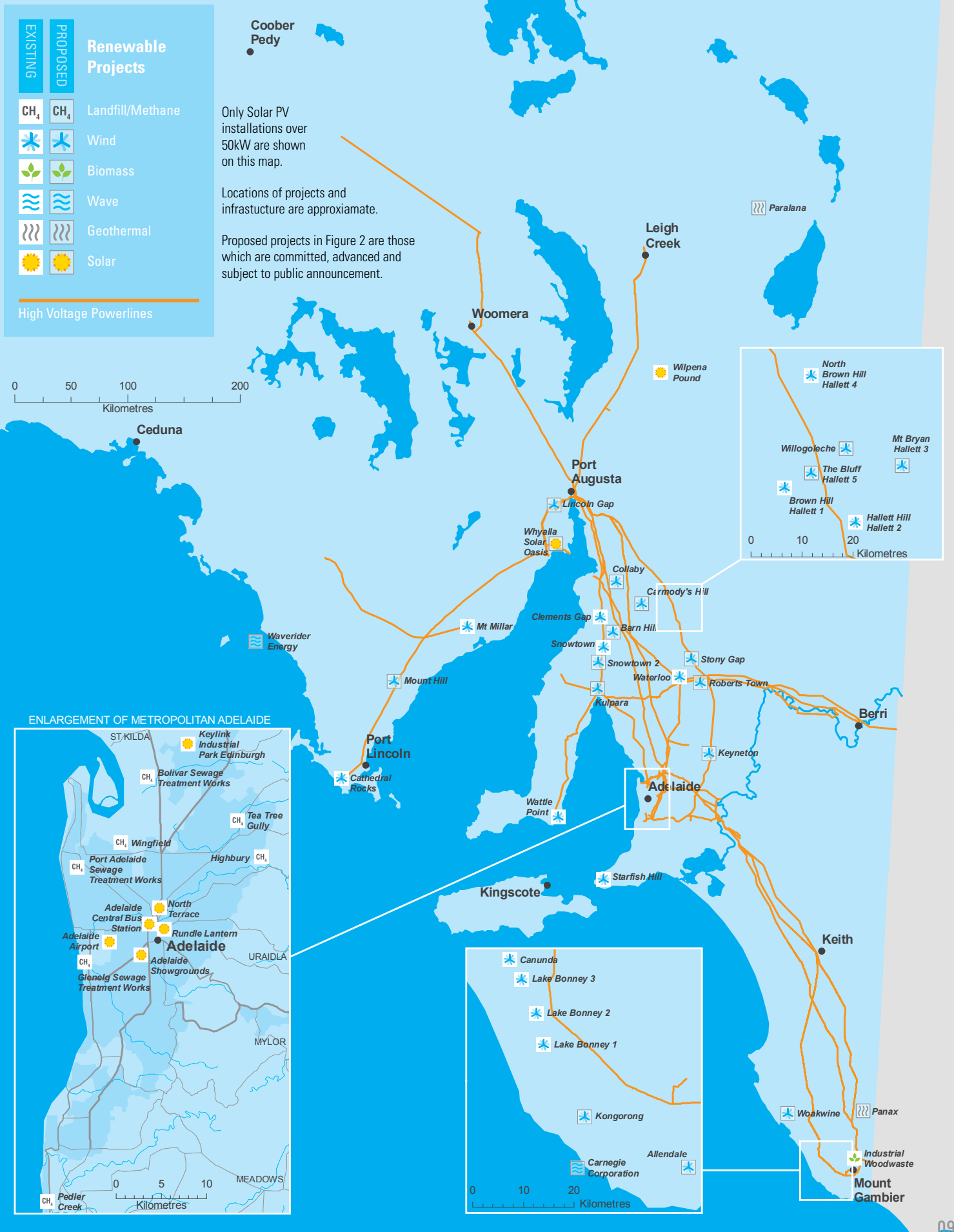
Locations of projects and infrastructure are approximate.

FIGURE 2

Existing and Proposed Renewable Energy Projects in South Australia

Figure 2 shows the location of existing and proposed renewable energy projects in South Australia.

Innamincka 
Innamincka



Renewable Energy in South Australia – Technology Deployment

South Australia is highly prospective for renewable energy investment. It has a natural endowment of wind, solar, geothermal, marine and land resources providing an excellent base for renewable energy generation.

Wind

- To date, around \$2.8 billion has been invested in wind generation, resulting in 54% of the nation's installed wind capacity with 14 operational wind farms representing 1,150 MW of power.
- From a global context, South Australia is one of the leading jurisdictions in the world for wind power. If South Australia was a nation State it would have the second highest market penetration of wind in the world, second only to Denmark.
- South Australia is the destination of choice in part due to the State's land use planning system which is often regarded as national best practice for accommodating wind farms.
- The assessment of the wind resource on the Eyre Peninsula by Macquarie Capital revealed significant areas with wind speeds above 8 metres per second, considered excellent for wind energy generation.

Solar

- South Australia was the first State in Australia to introduce a Solar Feed-in Scheme to provide a financial incentive for domestic installations of solar photo-voltaic systems.
- As at the end of August 2011, there was approximately 195 MW of solar capacity eligible for the feed-in tariff, comprising 127 MW of installed grid-connected solar systems and a further 68 MW of capacity with approval to connect to the grid.¹
- The South Australian Government has invested \$8 million in one of the largest solar installations in Australia of 1 MW at the Adelaide Showgrounds; installed solar panels on prominent Government buildings; and established a requirement for installation of panels on all new and refurbished Government buildings.
- The irradiance levels at Roxby Downs in the north of the State are world class and have been recorded at 2500 kilowatt hours per square metre (kWh/m²) per annum.² This compares to Spain, southern Europe, northern Africa and Middle East, which have recorded levels of 2000-2300 kWh/m² per annum. The levels in south-east USA are also in that range and for some exceptional sites have been estimated at up to 2600 kWh/m² per annum.

Wave

- Two companies have publicly announced projects in South Australia. Carnegie Corporation is site testing along the Limestone Coast with a view to build a 50 MW wave power station. Approval has also been granted to Waverider Energy for the construction of a \$5 million wave energy project on the State's west coast.

Geothermal

- South Australia was the first State to introduce a regulatory framework specifically tailored to the rapidly-developing geothermal industry.
- By the end of 2010, South Australia had attracted 86% of Australia's total \$680 million estimated investment in geothermal exploration and proof of concept projects and 25 companies had applied for 210 Geothermal Exploration Licences (GELs) in South Australia, representing 55% of the nation's geothermal licence applications.
- From 2005-10, the State Government provided \$1.3 million in tied grants for geothermal energy research and geothermal energy exploration, most from South Australia's Plan for Accelerating Exploration (PACE) program.
- The South Australian State Government provides stewardship and secretariat support for the peak whole-of-sector organisation for geothermal energy in Australia, the Australian Geothermal Energy Group (AGEG).³
- The State Government's Regional Development Infrastructure Fund is contributing half the cost of developing the transmission infrastructure for Australia's first 1 MW 'hot fractured rock' geothermal power plant in the Cooper Basin.
- South Australia also represents Australia as the Contracting Party to the International Energy Agency's Geothermal Implementing Agreement.
- The Vice Chairman of the Executive Committee for the IEA GIA is based within the South Australian Government. In this role, the South Australian government is providing leadership for processes that increase the sharing of knowledge and information worldwide, to foster fast progress by the Australian geothermal industry.

¹ Information provided by the Department of Transport, Energy and Infrastructure, September 2011.

² Weather station data for May 2009-April 2010, CSP Services.

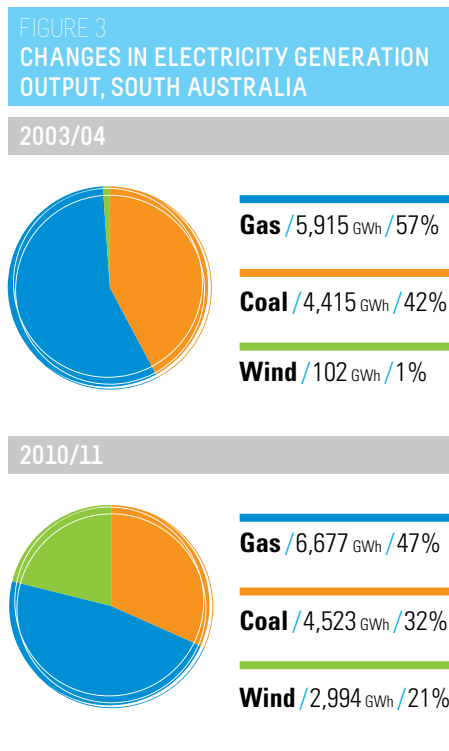
³ The AGEG has 108 organisation members, including 86 companies, 13 universities and 9 government agencies covering all States, the Northern Territory and the Commonwealth. The AGEG works in close cooperation with the Australian Geothermal Energy Association. The Reporting Code for geothermal exploration results, resources and reserves published by an AGEG-AGEA committee is an internationally respected standard. AGEG-AGEA also run an annual national conference, and the International Geothermal Association voted to hold its next World Geothermal Conference in 2015 in Australia with AGEG, AGEA and the NZ Geothermal Association as host partners.

South Australia's success in attracting a disproportionate amount of the nation's renewable energy investment is reflected in the increasing proportion that wind power contributes to the State's electricity generation.

In just eight years, wind energy in the State has increased from virtually negligible levels to approximately 21% of South Australia's annual electricity production.

This has meant that the South Australian Government's target of having 20% of our energy coming from renewable sources by 2014 has been met three years ahead of schedule.

Figure 3 shows the changes in generation output by wind during this period.



Note: Graphs do not indicate supply by diesel generation. In 2003-04 and 2010-11, diesel supplied 2 GWh and 3 GWh respectively.

Source: South Australian Supply Demand Outlook, Australian Energy Market Operator, July 2010 and June 2011.

Moreover, considerable progress is now being made towards the South Australian Government's further commitment of having one third of electricity production from renewable energy sources by 2020.

The achievement of this target will have a profound effect upon the State's economy.

The carbon intensity of the State's electricity generation would fall to around 0.5 tonnes of CO₂-e for each mega watt-hour (MWh) produced. This is just two-thirds of the projected outcome for Australia as a whole as shown in Figure 4.

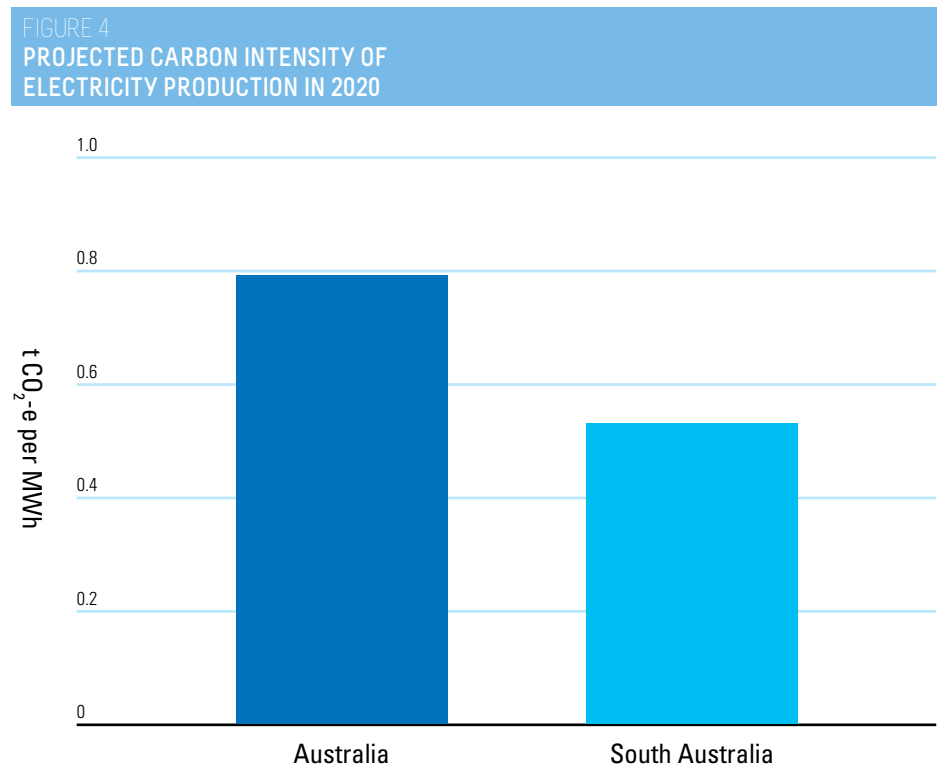
Achieving this level of carbon intensity will see South Australia continue as Australia's engine-room for renewable energy. It will also generate a competitive advantage for the State's economy.

By growing its renewable energy industries, South Australia will make itself less vulnerable to the cost impacts of carbon prices. Businesses in South Australia will also be better positioned in selling their products into carbon sensitive markets.

The State Government is committed to building the local renewable energy value chain by leveraging the State's leadership in renewable energy deployment. A key element will be to use the growing demand for clean power to open up value chain opportunities to industry in South Australia. Not only will this help create local jobs and investment, it will also help capture new innovations in renewable technology and its deployment.

A Clean Technology Industry Development Plan is being developed to provide more detail on future industry development activities related to the Cleantech value chain, including manufacturing and knowledge intensive services.

There will also be significant, indirect benefits. Manufacturers and primary producers looking to sell their products into carbon sensitive markets will be able to draw upon South Australia's success in reducing the carbon intensity of its electricity generation. Examples of companies using their low carbon advantage are emerging and more can be expected as the world comes to demand lower carbon products.



Notes: Based on modelling which assumes South Australia achieves its renewable energy production target of 33% by 2020 and a scenario where Australia adopts a target of reducing emissions by 5% relative to 2000 levels (CPRS-5).

Source: Projected Carbon Intensity for South Australian Renewable Energy Target in 2020, McLennan Magasanik Associates, January 2010.

The achievement of South Australia's 33% renewable energy target cannot be assumed. The successes of the past have come from managing world-class renewable energy resources with informed and effective policies and more will be needed as competition for renewable energy investment intensifies. This plan provides a framework for these policies.

The policies applied in the past and those set out in this document are intended to deliver on the important role that State Government plays in supporting renewable energy investment as part of its overall response to climate change.

This role recognises that national governments, acting individually and collectively, have primary responsibility for putting in place the high-level policy settings needed to deliver substantial reductions in greenhouse emissions. The Commonwealth Government's commitment to setting a carbon price is strongly supported. One of its outcomes will be to open up further investment in renewable energy. This will be achieved by the price advantage the carbon price delivers for generators of clean power.

This process will be further assisted by the Commonwealth Government's existing support program of \$3.2 billion under the Australian Renewable Energy Agency and its new clean energy program of \$10 billion over five years from 2013-14.

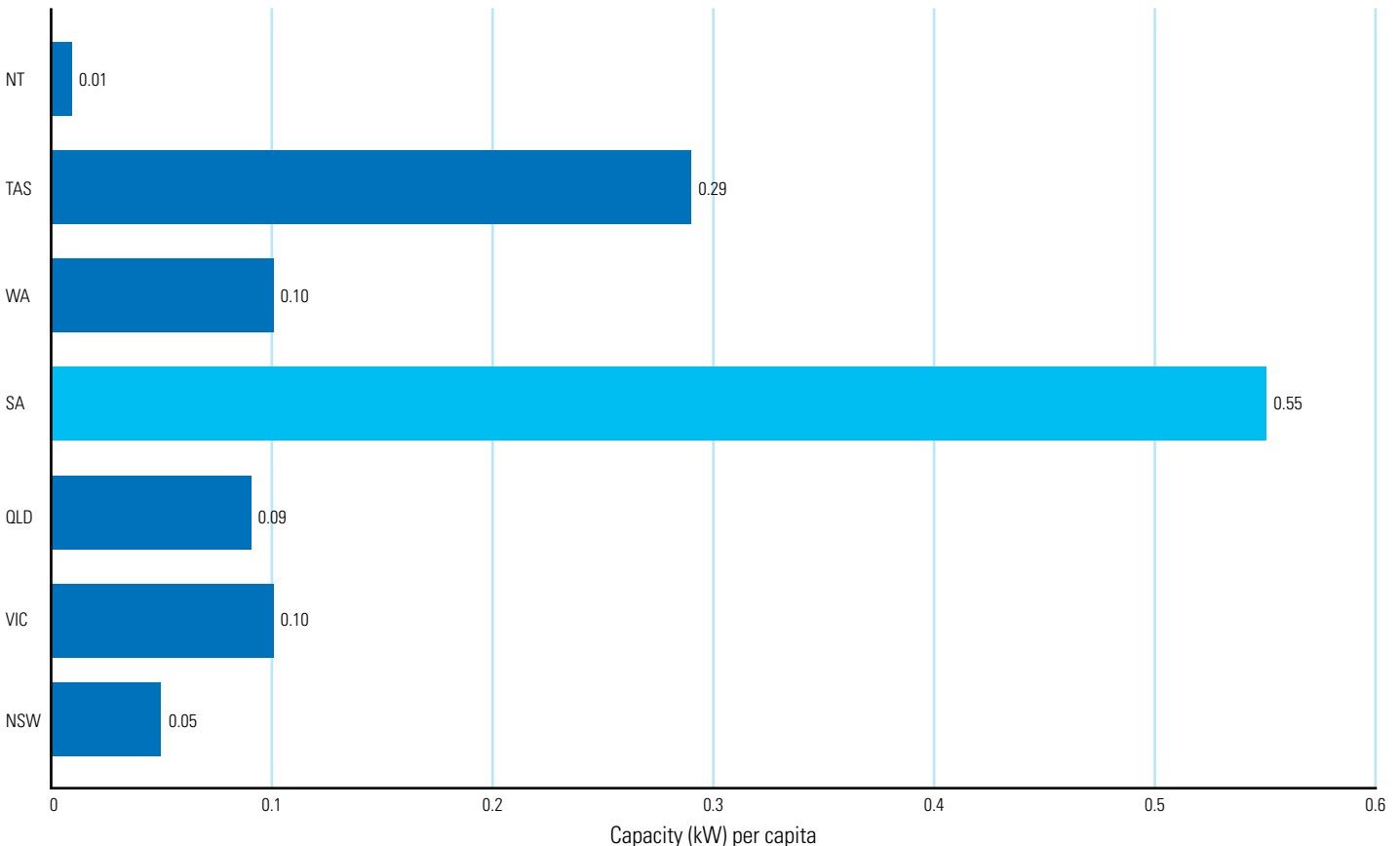
The Commonwealth Treasury modelling projects that the renewable energy will meet around 40% of Australia's electricity generation by 2050.

South Australia is one of the leading jurisdictions in Australia for hosting renewable energy, as demonstrated by Figure 5 which shows levels of installed capacity excluding hydro based energy per head of population.

There is a critical role for State Governments to play in supporting this investment by helping to translate those policies into projects on the ground.

South Australia's overall strategy is to apply policies which complement the national policy agenda and which smooth the way for growth in renewable energy. However, the Government is prepared to go beyond this approach in cases where it believes it can take early action to position the State for increased benefit from national policies.

FIGURE 5
PER CAPITA INSTALLED CAPACITY OF NON-HYDRO RENEWABLE ENERGY

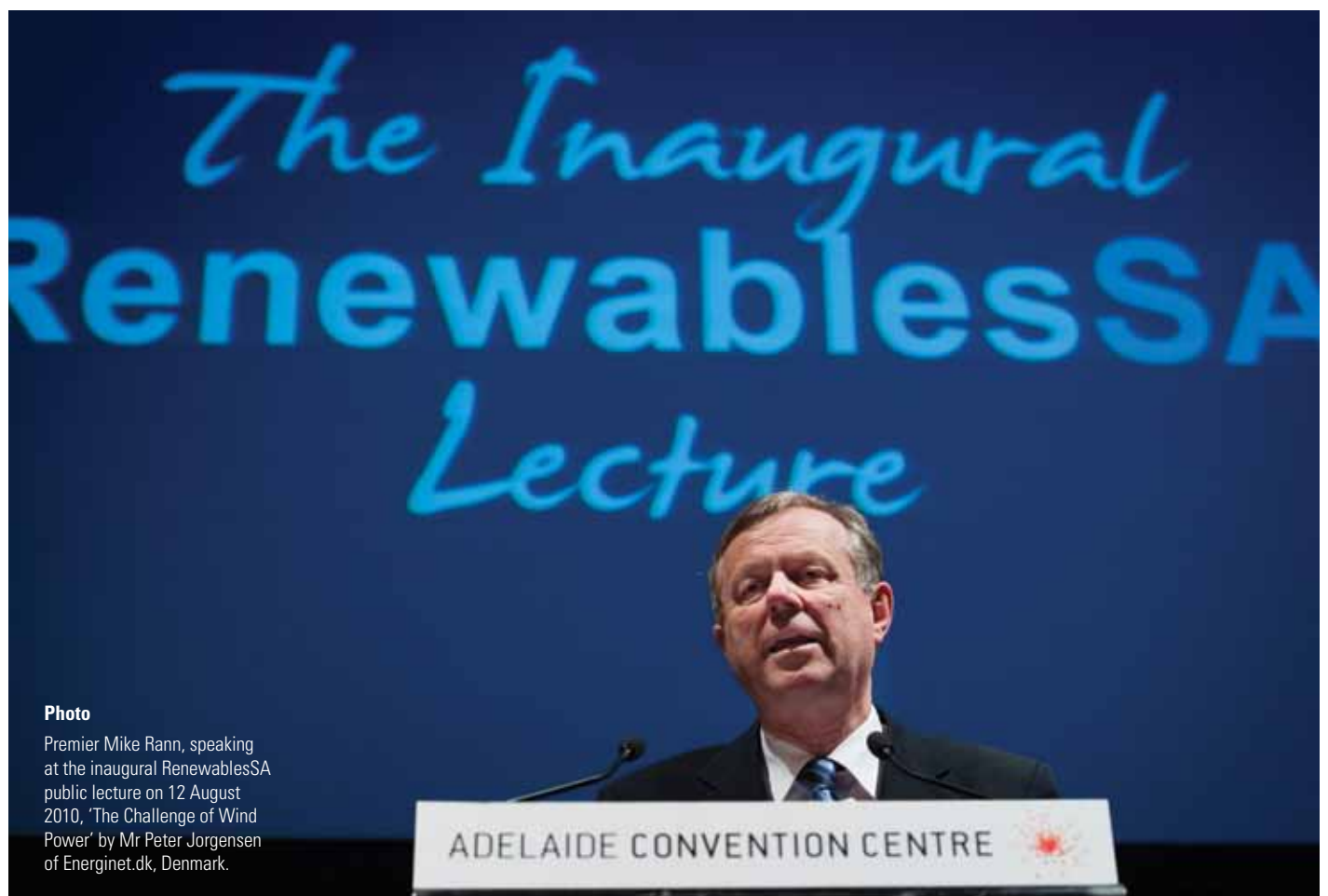


Source: ABARE Energy in Australia 2011 and 3101.0 Australian Demographic Statistics, Australian Bureau of Statistics, 2010.

Within this context, the principal roles for the South Australian Government in renewable energy are:

- 1 Dissemination of detailed, timely and commercially-relevant information to ensure the investment market is fully informed of opportunities within the State;
- 2 Provision of efficient regulation and a competitive Government fee-charging regime;
- 3 Intervention to address market failures created by specific regional circumstances;
- 4 Leading by example to establish a climate that builds investor confidence in renewable energy; and
- 5 Acting early to position the State to benefit from imminent national policies and to better respond to cost impacts.

The following sets out the Government's actions to date in these areas and those planned for the future.



Photo

Premier Mike Rann, speaking at the inaugural RenewablesSA public lecture on 12 August 2010, 'The Challenge of Wind Power' by Mr Peter Jorgensen of Energinet.dk, Denmark.

1 / Quality Information to Inform Investment

One effective role for the Government is to support the creation and dissemination of high quality information that assists potential investors.

As part of this role, the Government has supported a \$1 million feasibility study by Macquarie Capital to establish the market, regulatory and physical conditions needed to unlock the Eyre Peninsula wind resource under the Green Grid study.

The Green Grid study has found that a commercial case exists for investment of \$5.8 billion into 2,000 MW of wind power generation and transmission facilities. The case is contingent on several variables, particularly modifications to the regulatory environment needed to support investment in new transmission facilities.

The study is now being used by private sector parties that have expressed an interest in investing in projects on the Eyre Peninsula to press for the regulatory changes that are needed to support the commercial case and to prepare a case for a grant towards the cost of transmission facilities from the Commonwealth Government's Connecting Renewables Initiative.

To this end, the South Australian Government is currently planning a summit to bring together developers, industry representatives, policy makers and community representatives to build a collective understanding of the transmission infrastructure and other investment opportunities to unlock regional development opportunities in the Eyre Peninsula. In conjunction with the summit, RenewablesSA is commissioning two landmark studies to inform the wider market of the extent of this opportunity:

- An economic and technical feasibility study of storing surplus wind power. This could identify investment options for reducing the need for significant transmission infrastructure to new areas, while allowing greater expansion of intermittent wind generation; and
- A study into the impact of land use planning interventions on the economics of wind farms, which will assess the project costs for wind farms locating close to existing transmission lines and compare this with the costs of opening large new wind provinces which are currently not serviced by electricity

infrastructure. This study is intended to shed new light on the costs of meeting the national Renewable Energy Target.

The Government recognises the impact that providing quality information can have on the State's investment. This is especially the case for large scale projects which are capital intensive and long-life, such as Green Grid.

To support this and other projects, the Government will build a body of practical commercial and engineering assessments over time.

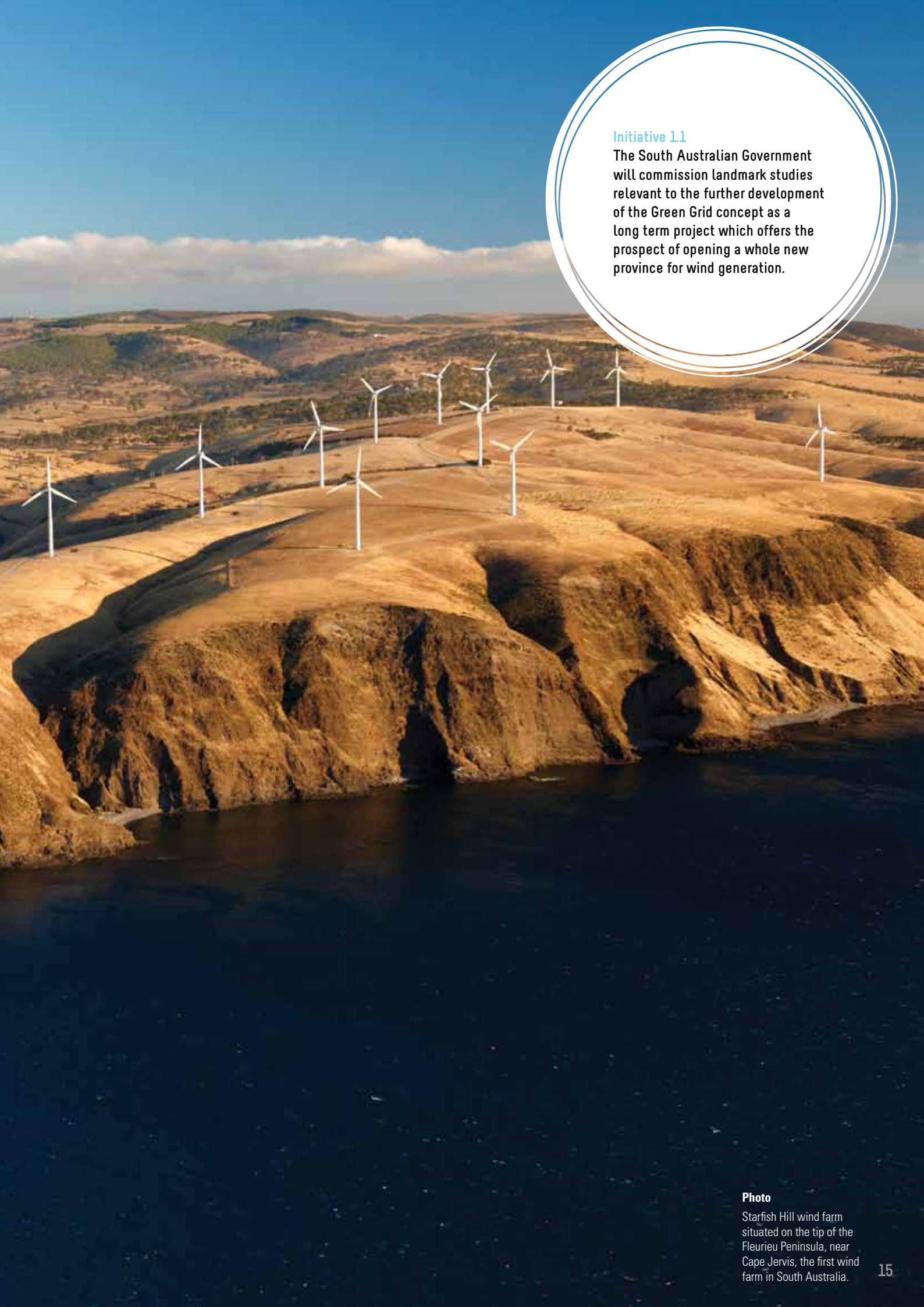
These actions will build on the Government's existing initiatives to accumulate and disseminate quality information such as:

- Establishing RenewablesSA to provide a central point of information dissemination and provide a guide for potential investors seeking detailed information on State Government policies and processes.
- Providing a single entry point for investors interested in data on the State's wind, solar and wave resources and high resolution spatial planning information important to the selection of a suitable site.
- Commissioning and making publicly available modelled solar insolation data relevant for siting of solar thermal and solar photo-voltaic technologies at four key sites in South Australia.⁵ The data can be used by potential investors to run design simulations and estimate the likely electricity output that a solar power station would produce. RenewablesSA has also retained a full year of weather station data confirming the world class quality of the solar resources in the north of the State.
- Steps by the Australian Geothermal Energy Group (AGEG) and Australian Geothermal Energy Association to participate in the development of standards for the deployment of geothermal (ground sourced) heat pumps. Mapping the subsurface depths to 18 degrees Celsius will assist in identifying opportunities for the deployment of cost effective ground source heat pumps.
- Commissioning ROAM Consulting to analyse the commerciality of South Australia's solar resource compared with three other States taking into account losses associated with transporting electricity over distances. The study indicates that with the Olympic Dam mining expansion proceeding, the South Australian site is the most attractive in terms of revenues for a solar plant.⁶

⁵ Analysis of 10 Year Record by 3-Tier at Pimba, Port Augusta, Neuroodla and Northwest Bend. Accessible at <http://www.renewablesa.sa.gov.au/investor-information/resources#Solar>

⁶ ROAM Consulting, Solar Power Station Marginal Loss Factors, September 2010.





Initiative 1.1

The South Australian Government will commission landmark studies relevant to the further development of the Green Grid concept as a long term project which offers the prospect of opening a whole new province for wind generation.

Photo

Starfish Hill wind farm situated on the tip of the Fleurieu Peninsula, near Cape Jervis, the first wind farm in South Australia.

- Supporting the development of a Pilot Renewable Energy Technology Road Map for South Australia by the School of Energy and Resources, University College London (Adelaide). The project will apply a technology and economic approach to developing a scenario based energy roadmap specifically for South Australia to appeal to prospective investors.

South Australia's success in attracting around \$2.8 billion of investment in wind farms⁷ has generated discussion about the ability of the existing transmission network to host more. It is expected that future information requirements will evolve largely around transmission constraints and opportunities.

A contemporary assessment of the capacity of the existing high-voltage transmission network to support new renewable energy connections in South Australia is important to support a climate for further generation investment in this State. To this end, RenewablesSA has supported new studies by ElectraNet, South Australia's electricity transmission network service provider to refresh existing studies on how much grid capacity is available for future wind connections taking into account technical and economic constraints.

The results are important to the large pipeline of locally based wind projects that developers have publicly announced as investment interests. More immediately, it provides assurance to investors in more advanced projects as well as those which are more prospective.

The results of this study will be communicated by ElectraNet and RenewablesSA to existing and potential wind investors.

The response to this assessment will help define future information needs. In the longer-term, it is anticipated that a broader study will be required that helps define prospective transmission investments to accommodate geothermal, solar and additional wind power.

The preparation of business cases to increase interconnection into other States and strengthen existing transmission infrastructure could focus on geothermal and large-scale solar farms as well as wind.

The information generated from them will be disseminated widely to improve investors understanding of the opportunities available in the State. This will augment the ongoing analytical work being carried out by Australian Energy Market Operator (AEMO) and ElectraNet on transmission planning and investment.

One of the objectives is to ensure that South Australia's potential, as well as its constraints, are understood fully in the annual preparation of the National Transmission Network Development Plan by the AEMO. This includes consideration of the possible construction of Scale Efficient Network Extensions within the State.

There is also a more general need to build confidence that the issue can be managed. To that end, the Government is keen to learn from the experience of other leading jurisdictions. The international leader in wind is Denmark.

In 2010, RenewablesSA hosted a public lecture and industry workshop by the Vice President of Denmark's electricity division, Energinet.dk, a highly acclaimed international expert in managing the integration of high levels of renewable energy in the transmission networks. The visit focussed on strategies for managing the integration of high levels of wind power and measures such as the strength of the international grid; coherent and flexible energy systems; and active control of demand, including smart grid applications.

Much of the analytic work on transmission is focussed on selling into interstate markets.

Another area for further investigation is the potential for re-configuring local demand to allow for greater accommodation of intermittent renewable energy. This accommodation needs to be accomplished without compromise to security of supply.

This is an issue faced by all jurisdictions committed to supporting renewable energy but especially by those that have been successful in achieving high levels of renewable energy generation. Figure 6 highlights the contribution of wind energy, relative to the demand and supply environment, in the South Australian market.

A small number of jurisdictions occupy leading positions in hosting renewable energy around the world. These jurisdictions, which include South Australia, Denmark, Castilla and Leon and Galicia in Spain, Scotland and Texas in the US, face common issues in transmission, storage and local demand management.

All of these jurisdictions are actively considering opportunities to address these issues such as the potential of smart grids and electric vehicles to assist in smoothing demand; uses for surplus power, particularly opportunities which allow for storage; and matching discretionary demand in its timing with wind forecasts to make more use of wind generating capacity.

Addressing these issues may provide significant advantages for energy efficiency, and through that, the overall cost competitiveness of the South Australian economy.

This competitiveness is already being assisted in national terms by South Australia's success in attracting wind investment. This boost to competitiveness comes in the form of the downwards pressure being exerted on wholesale electricity prices by concentrations of wind power generation. Research into wholesale price outcomes for 2008-10 by the Centre for Energy and Environmental Markets at the University of New South Wales has concluded that:

*"The results show a clear trend for prices to be higher on low wind power days at all hours of the day. This trend is quite pronounced in autumn, spring and winter at all hours of the day, whereas in summer the major differences occur during the afternoon. For low wind power days, the average daily price profile peaks at 4pm in summer and 6.30pm in winter. For high wind power days the equivalent peak times are similar for each season but the actual peak values are much lower. This suggests that during low wind power days, the price on average will be higher at all times of the day and there is a higher chance of extreme price spikes."*⁸

Another separate analysis examined wholesale electricity price outcomes in South Australia with and without the presence of wind generation. It found prices in 2008/09 averaged up to 50% lower with wind generation present in the market.⁹

A third, separate study has forecast that South Australia's wholesale electricity prices from 2013 will rise relatively less than prices in other States in the national market because of the addition of wind power generation.¹⁰

Clearly, the beneficial impact of wind on South Australian power prices will continue for many years to come and will grow as further capacity is added.

FIGURE 6
SOUTH AUSTRALIAN WIND STATISTICS IN 2010

System penetration record*	61%
Generation record	977 MW or 96%**
Minimum demand in 2010	814 MW
Maximum demand in 2010	3,321 MW
* Measure of wind supply to overall system demand ** Measure of wind generation to installed wind generation capacity	
Source: AEMO data 2010.	

⁷ Clean Energy Council, National Wind Snapshot, July 2011.

⁸ Centre for Energy and Environmental Markets (University of New South Wales), High penetration wind generation impacts on the Australian National Electricity Market, February 2011.

⁹ SKM MMA, The impact of wind power in South Australia on retail prices, December 2010.

¹⁰ ROAM Consulting, Solar Power Station Marginal Loss Factors, September 2010.

Initiative 1.2

The South Australian Government will support studies by ElectraNet to provide a contemporary assessment of the capacity of the existing electricity transmission network in the State, to support additional wind energy.

Initiative 1.3

The Government will support the further development of business cases for the expansion of electrical infrastructure to enable higher levels of intermittent generation and open up new, remote renewable sites.

Initiative 1.4

South Australia will seek to establish a network of the leading international provinces which have a common interest in accommodating higher levels of renewable energy at least cost and without detriment to security of supply, with the objective of pooling research and learnings from different approaches.



Photo

Mr Peter Jorgensen, Vice President of Denmark's electricity division, Energinet.dk, speaking at a RenewablesSA public lecture on 12 August 2010 on Denmark's approach to managing the integration of high levels of renewable energy in their transmission electricity network.

2 / Efficient Regulation and Competitive Charges

Providing quality detailed information is important to increasing renewable energy investment and generation in the State but there is more that State Governments can do to assist.

Another important role is for the Government is to provide a competitive regulatory and fee charging environment.

The South Australian Government has already taken the lead by becoming Australia's first and only Government to provide payroll tax relief specifically for investors in renewable energy projects.

Since 1 July 2010, investors have been able to have the payroll tax expense incurred in the construction phase of their projects rebated to them to a maximum of \$1 million for wind farms and \$5 million for solar farms. This payroll tax rebate gives South Australia the nation's most competitive fee charging regime. The Government is also leading the way in providing efficient and certain regulation. For example, the Government is working to make its own land holdings as accessible as freehold land to wind and solar investors.

This level of accessibility is constrained at present by the Pastoral Land Management and Conservation Act 1989 which limits activities on Government-owned land subject to pastoral lease to pastoral activities. Draft legislation is being released for public consultation to provide a faster excise process for land required for solar developments and a special licence for wind developers that provides for joint use and tenure for at least 50 years.

Another important part of the Government's approach to regulation is to make the State's investment climate as certain as possible. South Australia's land use planning system is recognised by investors generally, and the wind industry specifically, as the fairest, most transparent and most expeditious in Australia.

However, a recent Court decision to uphold an appeal against a wind farm development on the basis of impacts on visual amenity in the State's south east has the potential to undermine this certainty for communities, the wind industry, the State economy and regional economies.

The Government has expressed its concerns about the impacts of this unprecedented decision and is currently considering options for restoring certainty in investment.

The first step is recognising that communities and local councils which host renewable energy investment have a legitimate need to access to information and advice about existing and new developments and to have their issues addressed.

To assist in addressing these needs, the South Australian Government, in conjunction with the Central Regional Local Government Association, has announced that it is supporting the appointment of a regionally based representative to provide communities and local councils with impartial information and advice on wind farms. This regionally based liaison manager will also report back to the Government on emerging issues.

The initial focus of the wind farm liaison manager will be regions in the State that host nationally significant concentrations of wind farms installations such as the mid north.

It is not only wind energy that benefits from a certain and expeditious regulatory system. Each renewable energy source brings its own particular requirements to the regulatory processes.

For example, the framework for wave energy is at a particularly early stage of its development and is potentially affected by multiple legislation covering areas such as land use, native vegetation, foreshore access, and seabed access and care.

It is important that policy is developed to meet the specific needs of wave energy investors, just as policy frameworks have been developed for wind and geothermal investors. This is particularly so for South Australia, which has a particularly good wave resource on many of its hundreds of kilometres of coastline.

The South Australian Government is working to address the specific needs of wave energy policy with an approach that will also give consideration to the designation of a specific marine energy hub, to assist in timely access to infrastructure, including shared transmission infrastructure.

No matter how effective the regulatory framework, it is important that investors are able to navigate it as easily as possible. The South Australian Government makes Case Management Services available to eligible proponents to streamline and coordinate development assessment processes and legislative requirements relating to environment, heritage, native title and land rights. Key considerations such as access to transmission, water, roads and other infrastructure are also coordinated to expedite the delivery of major projects. Enquiries in the first instance can be made with RenewablesSA.



Initiative 2.1

The South Australian Government will commence public consultation on draft legislation providing access for renewable investors to Government owned land used for pastoral purposes.

Initiative 2.2

In conjunction with the Central Region Local Government Association, the South Australian Government will appoint a regionally based wind farm liaison manager to provide local communities and councils with information and advice about new and existing wind farm developments in the State.

Initiative 2.3

The Government will conduct a review of the capacity of existing regulatory processes for marine (wave and tidal) energy with a view to put in place a framework that addresses the specific needs of these investors.

Initiative 2.4

The Government will continue to make available its Case Management Services to streamline and coordinate processes for obtaining development approval and other licensing required for major projects.

Photo

Clements Gap wind farms.

Initiative 3.1

The Government will continue to generate quality information and advice in strategic areas such as bio-fuels and develop strategies to lever support from the Commonwealth Government.

Initiative 3.2

The South Australian Government will provide a further grant of \$2 million to support the next phase of commercial geothermal energy research at the South Australian Centre for Geothermal Energy Research.



Photo

The \$5 million National Collaborative Research Infrastructure Strategy (NCRIS) Photobioreactor Facility based at the South Australian Research and Development Institute's Aquatic Sciences laboratories at West Beach Adelaide, provides capability for the research and development of microalgae for biofuel production.

3 / Addressing Market Failures

The third role for Government – after providing information and efficient regulation – is addressing market failures.

In economic terms, climate change is a market failure insofar as the costs of emitting are not imposed on economies and markets therefore do not respond to those costs.

The Commonwealth Government is addressing this failure directly through its Clean Energy Future initiative, which puts a price on carbon. The South Australian Government supports this plan as it presents a comprehensive response to climate change which includes policies for renewable energy development and deployment.

Within this context, the rationale for intervention by State and Regional Governments is based on one of two conditions being met:

- Market failures created by specific local factors; and
- Opportunity to prepare regional economies early for national policies so that they can take advantage of opportunities and minimise cost impacts.

Through RenewablesSA, the South Australian Government is acting to address this form of market failure.

As discussed previously, one source of market failure is the lack of quality information to support investment. This applies particularly to information about specific local factors where potential for market failure is high.

In South Australia, the first of these conditions appears to apply particularly to the bio-energy sector. Bio-energy projects frequently require commitments from multiple feedstock producers acting in concert to create markets. However, often the

emergence of these markets is conditional upon security of feedstock supply from suppliers acting collectively.

So far, the Government has acted to support generation of high quality information for three bio-energy projects.

There is considerable potential to produce bio fuels from residues in the State's forest and forest processing industries, and through the development of biomass tree crops on marginally productive lands, meeting export and domestic biomass energy requirements.

A grant of \$300,000 has been provided to Syngas Ltd and Yorke Peninsula Alkaline Soils Group to assist with biomass collection field trials. There is potential to replicate the results of the field trial, which will be made public subject to commercial sensitivity, in other areas of South Australia. The involvement of the State Government assists in generating interest among growers and bringing them together to explore this opportunity collectively.

RenewablesSA is also providing \$254,520 to RuralAus to investigate the feasibility of investing in a 10 megawatt generating plant using forest residues to create a clean and secure source of electricity for Kangaroo Island.

In the same vein, the Government is providing \$274,000 to Clean Carbon Capture, a South Australian joint venture looking to develop a bio-mass electricity plant using pyrolysis of organic waste. The Government's contribution will be applied to reduce technical uncertainties in the waste to energy conversion process, thereby improving the ability of the joint venture to attract investment from the farm equity market.

In 2010, Regional Development Australia Limestone Coast commissioned a report assessing the region's potential for utilising

the various waste products from timber harvesting activities, for the purpose of generating heat and/or power for local consumption or feeding into the national electricity grid.

As more opportunities emerge from the bio-energy sector, the Government will continue to provide assistance in those circumstances where its involvement can assist in bringing together developers, suppliers and investors to assess and progress projects that are economically viable and will add to the State's renewable energy future.

The State is also well positioned to produce microalgal biofuels. The South Australian Research and Development Institute (SARDI) is a world leader in research in this area. SARDI has formed the Algal Fuels Consortium, an alliance of researchers including CSIRO, Flinders University and Flinders Partners to develop a pilot-scale second generation biorefinery for sustainable production of microalgae biofuels and value added products.

In partnership with the Commonwealth Government, the South Australian Government has provided funding to establish the \$6.2 million National Collaborative Research Infrastructure Strategy Photo-bioreactor Facility to provide research and development services to clients, and investigate microalgal biofuel production and processing.

South Australia is ideally positioned to host this and other microalgal fuel production projects.

The State has a number of locations which can provide low cost access to the essential ingredients – land, water, nutrients and sunlight. Technological solutions in algal biosequestration is an area in which South Australia has disproportionately strong opportunities and strategic interests.

The Microalgae Biofuels Industry Development Plan for South Australia (MBIDP) was completed in December 2009. The final report makes 13 recommendations to progress research and development, pursue market development measures and create a flexible policy framework to support innovative business models for commercialisation. A report on potential investment opportunities for biodiesel for the South Australian Government was completed in June 2010.

Since then, RenewablesSA has used its role of disseminating information to facilitate discussion between farmers and the Smorgon Group. This has resulted in significant plantings of mustard seed as a feedstock for bio-diesel. The specific strain of mustard seed has been created by the Smorgon Group working in partnership with SARDI.

A different kind of intervention is needed to address market failure in another form of renewable energy – geothermal energy.

South Australia has significant potential for geothermal energy. The State's successes in attracting and hosting an overwhelming amount of the nation's project investment and exploration licences in the sector are described earlier in this report.

However, it has become evident that there is a need to stimulate investment from more companies in the risk averse climate prevailing after the Global Financial Crisis.

It is beyond the role and resources of the State Government to involve itself directly in investing in this area. The immediate need is to assist those that are investing to prove the potential of the State's geothermal provinces making this form of investment more

attractive to new investors. To that end, in 2009, the Government provided a foundation grant of \$1.6 million for the establishment of the South Australian Centre for Geothermal Energy Research at the University of Adelaide. The Centre has been operational for two years and has established a highly industry oriented and nationally relevant research program, which has successfully leveraged close to \$2 million in Commonwealth Government and private sector support.

In recognition of these successes, the South Australian Government is providing a further \$1 million from the Renewable Energy Fund to the Centre and its ongoing research activities associated with commercialising vast geothermal energy resources in South Australia. Together with \$1 million leveraged from the Departments of Primary Industries (South Australia) and Trade and Economic Development, this brings the total Government support for the development of the Centre as a world-class hub for practical and high priority geothermal research to \$3.6 million.

The South Australian Government has also responded to opportunities to support the commercialisation of new technologies in other renewable energy areas in which the State has a comparative advantage. A grant of \$100,000 has been provided to South Australian based companies Solar Shop and Hydragate, to finalise the development of a solar PV tracking device for small scale systems. The technology being developed has the potential to be deployed in urban environments and remote, off-grid communities.

In the same vein, a grant of \$200,000 has been provided to the University of South Australia to develop a proto-type solar thermal air-conditioning unit suited to the residential sector.

The State Government can assist local researchers and investors to access funds being made available as part of the Commonwealth Government's Clean Energy Future package. One effective way to do this is to use the Renewable Energy Fund to provide seed money to assist the development of quality proposals for Commonwealth funding.

By way of example, \$1.5 million has been provisionally allocated from the Renewable Energy Fund to be applied to innovative solar research and development project bids for the Australian Solar Institute's funding round in the second half of 2011. The South Australian Government is keen to elicit quality proposals from the research community involving government funders, universities and the private sector, with any funding proposal seeking to leverage the support from the Renewable Energy Fund subject to individual endorsement by the South Australian Government.

There is an emerging list of opportunities through the Commonwealth Government's Clean Energy Future package. The South Australian Government's approach to allocating support from the Renewable Energy Fund will recognise that the principal funding role rests with the Commonwealth Government through its new climate change funding mechanisms.



INDUSTRIAL SCALE WIND TUNNEL

Industrial Scale Wind Tunnel, currently under construction at the Thebarton Research Precinct.

Image provided by Centre for Energy Technology, University of Adelaide



Photo

Salamander-1 well testing at Penola, March 2010. The testing is part of Panax's geothermal interests in hot sedimentary aquifers in the Otway Basin in South Australia.



Initiative 3.3

The Government will provisionally allocate \$1.5 million for joint innovative solar research and development project bids for the Australian Solar Institute's funding round in the second half of 2011.

Initiative 3.4

The Government will continue to use the Renewable Energy Fund to maximise the public benefit outcomes for South Australia in the bio-energy, fuel algae, geothermal, solar and wave technology generally, with specific emphasis on assisting proponents to attract Commonwealth funds.

Initiative 4.1

The South Australian Government will invite interested parties to respond to an Expression of Interest to develop models for financing, establishing and implementing community owned solar photo-voltaic projects in South Australia.

Initiative 4.2

The South Australian Government reaffirms its commitment to supporting large-scale renewable energy investment by purchasing accredited GreenPower™ to satisfy 50% of its electricity requirements by 2014.



Photo

The 1 MW solar installation at the Royal Adelaide Showgrounds was the first megawatt scale industrial roof-top solar plant in Australia.

4 / Leading by Example

Government can provide information, the right settings in regulation and use seed funding to address local market failures. However, the Government is also an active participant in the economy and society itself.

In this capacity, the Government can provide leadership and give the private sector confidence in making its own investments. For example, the application of many renewable energy technologies is still at an early stage. People and companies are often willing to commit but can be held back by lack of information on how technologies perform in the field. This is particularly true of decentralised technologies such as solar panels, micro wind turbines, solar thermal applications and co-generation.

Governments committed to supporting deployment of new and emerging technologies can assist in their roll-out by using these technologies on their own assets or sponsoring their use by others.

The South Australian Government has been active in this space. Solar panels have been installed on public buildings and schools as well as on major public buildings such as Parliament House, the Art Gallery, Museum and the State Library. Installation of panels is now a mandatory part of the project scope for all new Government office buildings and service centres and major refurbishments of existing buildings.

The Government has also provided the financial support needed for the 1 MW solar installation at the Adelaide Showgrounds, one of the largest installations of its kind in Australia.

Now that it is operating, local industry is drawing upon data from its performance to provide potential investors with more detail and greater certainty over smaller scale installations.

The South Australian Government is also supporting the adoption of solar technologies at the community level. The Government introduced Australia's first feed-in scheme to accelerate the take-up of domestic solar panels. The next frontier is facilitating access to this technology for individuals and families whose circumstances do not allow for them to install solar panels such as people living in apartments and in rental accommodation.

To this end, the Government is looking to support the development of prototype community-owned and operated solar farms.

An expression of interest to identify suitable models for financing, establishing and implementing community mid-scale, pilot solar photo-voltaic projects in South Australia is being released with this plan.

The overall objective is to use the application of up to \$1 million in public funds as a catalyst for the development of a model template for community-owned solar farms. It is expected that eventually this model will be used as a vehicle for allowing people to take advantage of the predicted, continued fall in PV prices.

At the other end of the scale, the Government is supporting large-scale renewable energy investment through its purchases of power and requirements built into tender agreements for energy intensive projects.

One example is the Adelaide Desalination Plant which will require 500 GWh/annum after an initial demand of 200 GWh/annum. This demand for power will be met with renewable energy.

South Australia was the first government in the nation to commit to sourcing 20 per cent of electricity requirements - for schools, hospitals and government departments - from accredited GreenPower™ sources. Those purchases will increase to 50 per cent in 2014.

The Government's leadership role extends beyond its own policies and purchasing programs.

A particular opportunity exists in developing the State's workplace to take full advantage of continued investment in renewable energy.

There is a need to strengthen the pool of graduate professionals within the State, some with deep technical knowledge and others capable of integrating multiple and interrelated disciplines of science, engineering and project management combined with entrepreneurial financial skills to attract lending and investment.

The Government will work with universities, both local and those from overseas, to examine critical professional needs required by employers.

The objective will be to establish the most suitable mix of graduate and postgraduate programs, including new offerings, to best deliver future graduates relevant to industry needs.

In addition to higher level tertiary skills generated by the State's universities, the Government, in conjunction with industry, is positioning the vocational education and training system to better respond to and match, existing and emerging skills supply with skills demand from strategic industries, including renewable energy.

A \$125 million Sustainable Industries Education Centre will be constructed at Tonsley Park to serve as a training hub for the building and construction sector and will offer new training in renewable energy using dedicated hands-on learning laboratories. It is anticipated that the Centre will train around 8,000 students per annum in new building materials and construction technologies.

The Government has also recognised that many of the State's renewable energy developments will be situated in rural areas and will place specific demands on local labour forces. Accordingly regional skill development will need to be considered along with flexible and online delivery of appropriate training programs.

5 / Moving Early to Prepare for National Policies

The State Government can provide quality information as well as streamlined and efficient information.

It can use its funds to address local market failures and stimulate investment, and it can lead by example. But ultimately, State Governments operate within national frameworks and national policies. An important way for the South Australian Government to support all of its renewable energy sectors is to assist them to respond to these national settings and to take advantage of the opportunities they present.

On 10 July 2011, the Commonwealth Government announced the details of its carbon price mechanism and a number of associated policies.

This represents a profound reform for Australia's economy. It will underpin the competitiveness of Australia's economy by preparing the nation for a carbon-constrained world.

The South Australian Government is positioning itself to take full advantage of the many opportunities expected to flow from these reforms.

The Commonwealth plan also offers substantial financial incentives for new renewable energy projects.

The State Government expects that the many investigations it has commissioned will provide the foundation for quality proposals for accessing financial assistance from the Commonwealth.

These investigations include studies into three separate bio-energy projects; studies on the Green Grid proposal, including a pre-feasibility study of energy storage options for South Australia; electricity transmission requirements; off-grid applications of renewables; micro-wind turbine trials; prospectus for investment in algal fuels; and sponsored geothermal research at the University of Adelaide.

Of these, the Green Grid project presents a particularly outstanding opportunity.

The study commissioned by the Government has identified that a commercial case exists for building 2,000MW of wind generation on parts of the Eyre Peninsula which are

sparsely populated and have an excellent wind resource.

This project has the capacity to contribute 15% of the total national renewable energy target. It offers the potential for achieving that target at significantly less cost than the costs of the current model which adds wind generating capacity incrementally.

For South Australia, it also offers accelerated de-carbonisation of the State's economy.

The competitive advantages of a low-carbon economy are only starting to emerge. Australia is not positioned well at present to compete in carbon-sensitive/export markets. Assuming the national target of 20 per cent renewable energy is met, the carbon intensity of electricity in Australia is projected to fall to 0.79 tonnes CO₂e/MWh at 2020.¹¹

Based on the latest available data from the IEA, there were 0.88 kilograms of carbon dioxide emissions for each kilowatt hour of electricity and heat generation in Australia in 2008. In comparison, as shown in Figure 7, the International Energy Agency's estimates for 2008 shows the world average is 0.50 and OECD average is 0.43 kilograms of carbon dioxide emissions per kilowatt hour of electricity and heat generation.¹²

South Australia has experienced a changing electricity generation base in recent years with the increasing contribution of wind to electricity supply. Data from the National Greenhouse Accounts shows CO₂-e emissions in South Australia have reduced from 11,063 gigagrams in 2005 to 9,802 gigagrams in 2009.¹³

These reduced emissions have been attributed to the increased contribution of wind generation, reduced levels of imported electricity and lower average greenhouse emissions of South Australian generators relative to interstate counterparts. These emission reductions corresponded with the commissioning of over 550 megawatts of wind capacity in the State over the same period, as shown in Figure 8. As part of the Green Grid feasibility study, Macquarie Capital estimated that an additional installation of 2,000 MW of wind generation in the Eyre Peninsula would reduce emissions from the national grid by a further 2.75 mega tonnes.¹⁴

¹¹ Projected Carbon Intensity for South Australian Renewable Energy Target in 2020" McLennan Magasanik Associates, January 2010.

¹² CO₂ Emissions from Fuel Combustion Highlights (2010 Edition), International Energy Agency, December 2010. IEA estimates for intensity are based on emissions from electricity generation and heat.

¹³ National Greenhouse Gas Inventory, Scope 2 emissions indirect from purchased electricity, [Accessed from <http://ageis.climatechange.gov.au>].

¹⁴ Macquarie Capital 2010, Green Grid – Unlocking Renewable Energy Resources in South Australia.





SWL

WILL
401

Photo

Production of wind towers,
RPG Australia,
Kilburn South Australia.

The South Australian Government is committed to accelerating the de-carbonisation of the economy for two reasons. First, to minimise the costs to the economy of a carbon price which the Commonwealth Government has announced plans to establish in 2012. Second, to better prepare our industries to compete in carbon sensitive markets.

To this end, the Government is releasing a discussion paper to initiate consultation over setting a limit of 0.7 tonnes of CO₂e/MWh for new electricity generating plant in South Australia. This limit will be the toughest in Australia and will effectively prevent the construction of new coal-fired plant in the State.

The discussion paper further proposes a case-by-case approach to considering an emissions intensity threshold for specific projects such as off-grid diesel, coal-to-syngas and coal-to-liquids where power generation can form part of a larger process. Stakeholder feedback on the criteria to be used in considering the individual circumstances of these projects will be sought as part of the consultation process on the discussion paper.

The Government also intends to set a new target for the overall carbon intensity of electricity in the State.

An independent report concludes that the carbon intensity of South Australia's electricity generation can fall to 0.5 tonnes of CO₂e/MWh by 2020.¹⁵

This is two-thirds of the level projected for the rest of Australia and would bring the State into line with the international standards for developing countries.

Setting a target of 0.5 tonnes of CO₂e/MWh is an ambitious yet achievable target. In effect, the State's reliance on renewable and gas-fired electricity generation frees it from the relatively high carbon intensity of the Australian economy taken as a whole. The job now is to capitalise on that head start by constraining the State's use of carbon and attracting more renewable energy investment. This target and the measures outlined in this plan aim to achieve that.

This new target will be included in the update of targets being made to the State Government's climate change legislation.

To monitor progress, RenewablesSA will be preparing and disseminating regular reports on the current and forecast carbon intensity of South Australia's electricity generation. Based on the latest data available, Figure 9 shows the relative position of South Australia in relation to some of the other mainland States in terms of emissions intensity per unit of electricity consumed from the grid in 2008.

Working with DTED, this data will be advised to industry along with information on how businesses in other economies with high levels of renewables are leveraging off their low-carbon energy slate to their commercial advantage.

The State Government is committed to maximising the economic benefits associated with South Australia's leadership in renewable energy deployment. The State's leadership in use and deployment of renewable energy sources, together with the forthcoming price on carbon and the rapid urbanisation in the high growth economies to our north, provide us with opportunities for building manufacturing,

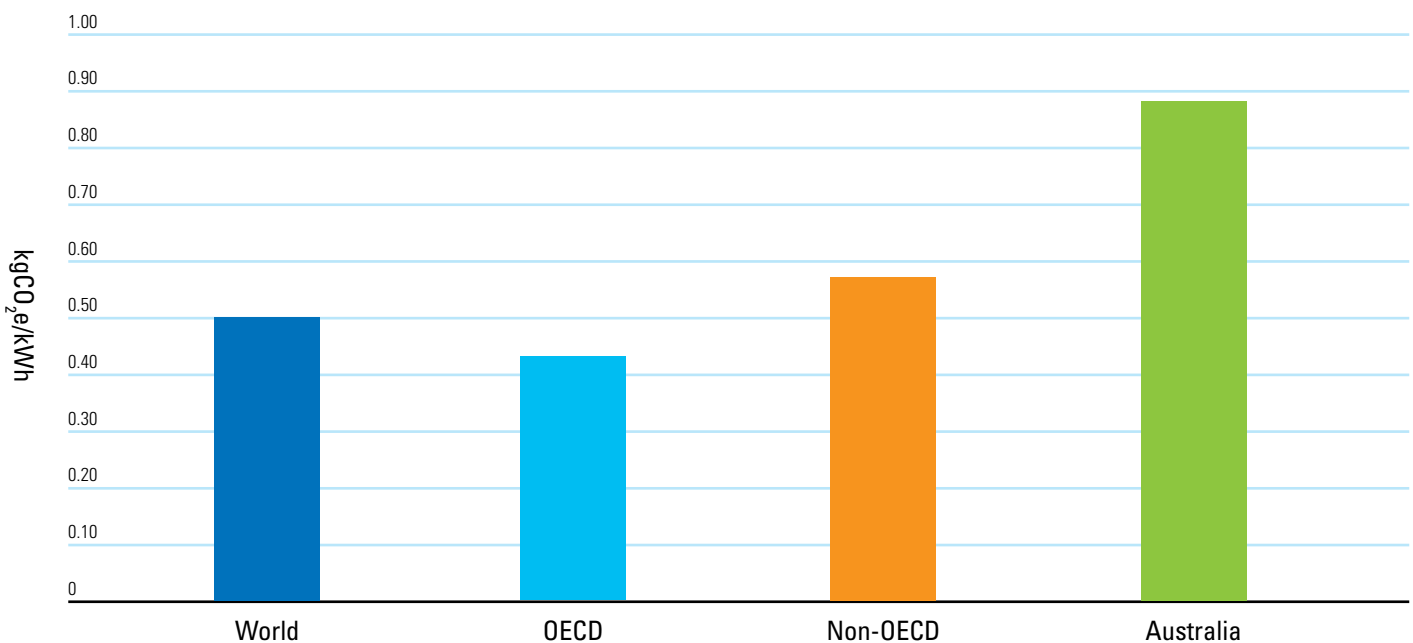
service industry and research capabilities. South Australia will seek to leverage the market opportunities thus created to build a value chain from deployment of renewable energy to the development of emerging industries.

As part of the State Government's commitment to further develop South Australia's renewable energy industry, the following initiatives are being undertaken.

- The re-development of Tonsley Park as a clean technology industry hub to provide:
 - 61 hectares of prime industrial land in the southern suburbs of Adelaide to facilitate the growth of the renewable energy industry with a focus on advanced manufacturing and knowledge intensive services;
 - An estimated positive annual boost to the economy of in excess of \$400 million, a construction impact of more than \$1 billion and an employment impact of approximately 8,700 jobs; and
 - World-leading research and development and a technology showcase to demonstrate the State's renewable energy capabilities.
- The preparation of a compelling business case to attract major national and overseas renewable energy companies to South Australia which will involve:
 - The identification of local supply chain and local research capabilities to support the growth of the renewable energy industry; and
 - The promotion of Tonsley Park and other proposed clean technology precincts set-up business operations in the State providing a springboard to local and overseas market opportunities.

¹⁵ op.cit, McLennan Magasanik Associates, January 2010.

FIGURE 7
CO₂ EMISSIONS FROM ELECTRICITY AND HEAT, 2008



Source: /EA 2010, CO₂ emissions from fuel combustion

Initiative 5.1

The South Australian Government will release a discussion paper to consult on limiting the carbon intensity of new electricity generation in South Australia to 0.7 tonnes of CO₂e per MWh.

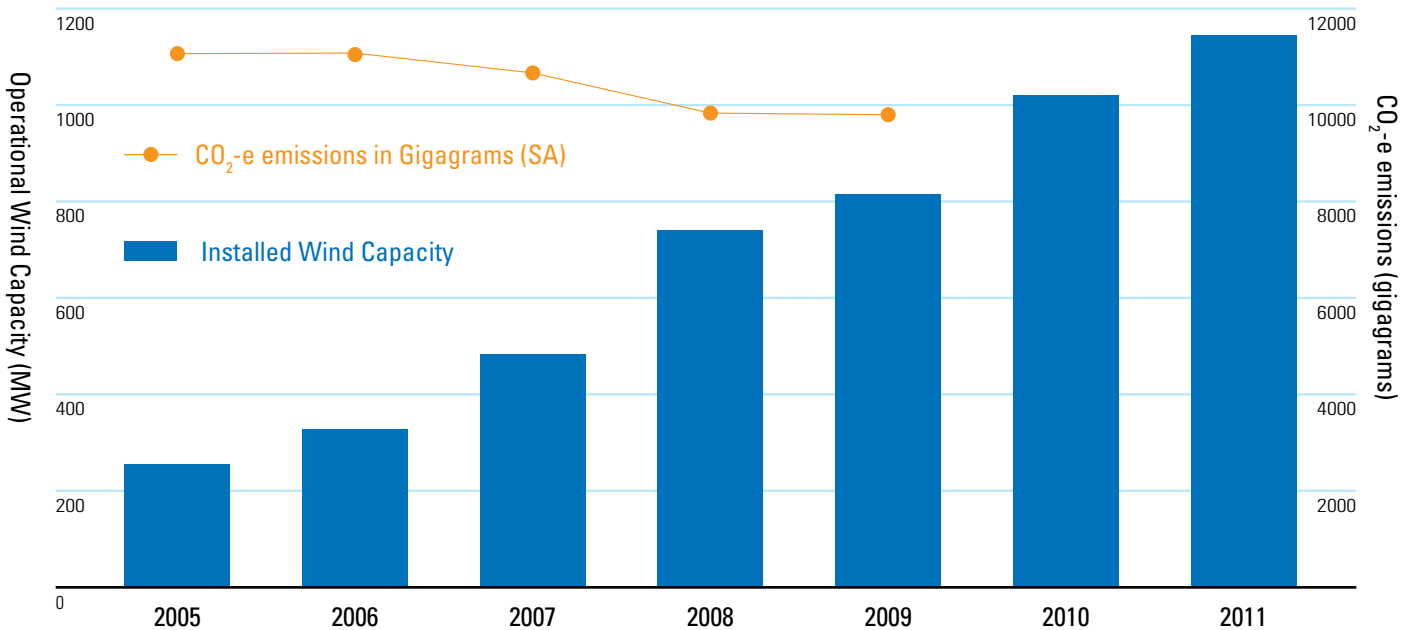
Initiative 5.3

The South Australian Government will report annually on the current and forecast carbon intensity of South Australia's electricity generation.

Initiative 5.2

A new emissions intensity target will be set for electricity generation in the State at 0.5 tonnes of CO₂e per MWh by 2020.

FIGURE 8
EMISSIONS FROM ELECTRICITY CONSUMED IN SOUTH AUSTRALIA



Note: Graph shows commissioned wind farm capacity by the end of each calendar year. Emissions data based on scope 2 indirect from purchased electricity and is not yet available for 2010 and 2011.
Source: Department of Climate Change and Energy Efficiency 2011, National Greenhouse Gas Inventory (data downloaded on 27 July 2011) and RenewablesSA data.

Initiative 5.4

The Government will promote the commercial benefits of investing in South Australia's low-carbon economy, providing advantages for industries which compete in carbon-sensitive markets.

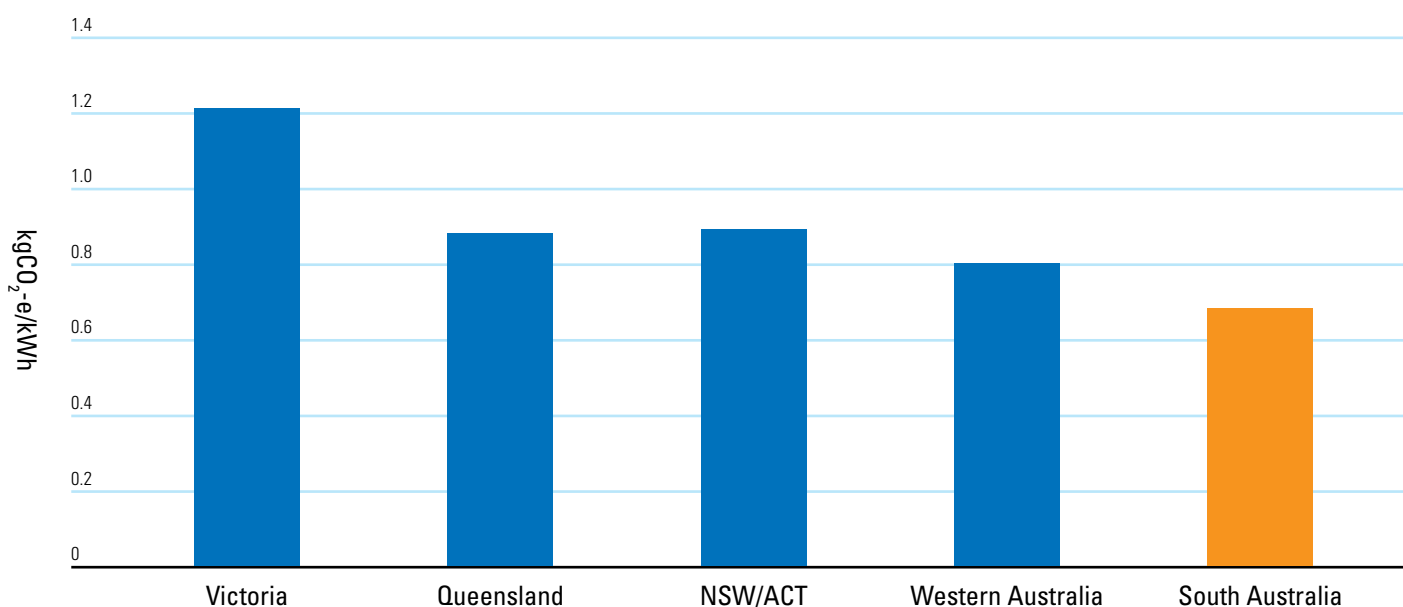
Initiative 5.5

The South Australian Government will leverage the State's leadership in the deployment of renewable energy to build competitive new industry research capabilities, expand the local value chain and create long-term green jobs.

- Cultivating the development of South Australia's renewable energy supply chain and product development capabilities by:
 - Leveraging clean technology supply chain opportunities through South Australia's major projects with an emphasis on mining, mineral processing, agriculture and infrastructure developments;
 - Providing assistance to the commercialisation of new and innovative clean technologies through Commonwealth and State Government support and funding, specifically through a new Cleantech Partnering Program and improved collaboration between industry and research institutions;
 - Establishing a comprehensive database on South Australia's renewable energy industry capabilities by the SA Industry Capability Network;
- Promoting the State Government's Industry Participation Policy to ensure both that local industry has the opportunity to bid for major projects, and that local industry capabilities are raised over time to ensure full value is realised for the State from emerging industry opportunities; and
- Supporting resource efficiency initiatives through funding of programs through Innovate SA, the Business Sustainability Alliance and the Eco-Innovation Program.
- The development of a dedicated clean technology export facilitation program to:
 - Target local renewable energy companies for the Gateway and Tradestart Programs;
 - In collaboration with Austrade and appropriate industry associations, conduct international market analysis and establish communication mechanisms to inform local industry of potential export opportunities;
 - Ensure that clean technologies are included in trade missions; and
 - Develop and publish a South Australian Clean Technology Industry Directory and establish systems to ensure that the Directory is kept up to date.

The Department of Trade and Economic Development operates in partnership with a wide range of industries, industry associations, universities and research organisations, and is currently engaging with key businesses and others to develop a long term plan for the South Australian Clean Technology industry. This plan is expected to be released later in 2011.

FIGURE 9
EMISSIONS PER KILOWATT HOUR OF ELECTRICITY CONSUMED FROM THE GRID, 2008



Source: Department of Climate Change and Energy Efficiency 2011, National Greenhouse Account Factors

Appendix 1 – Commissioned Reports and Investor Resources

General

MMA – Potential for Renewable Energy in South Australia

National Institute of Economic and Industry Research – The Future Prospects for Renewable Energy in South Australia

Projected Carbon Intensity for South Australian Renewable Energy Target in 2020

Investor Resources

ROAM Consulting – Solar Power Station Revenue Modelling and Marginal Loss Factors

Macquarie Capital Green Grid Report

Resource Mapping – Wind, Solar, Geothermal

Solar Generation Data – 1MW installation at Adelaide Showgrounds (and other plant sites)

Alternative Energy Solutions Project: a business case for forest waste feedstock energy production

Policy Development

Draft Legislation on Accessing Pastoral Land

Discussion Paper on Setting an Emissions Intensity Limit for New Electricity Generation

WorleyParsons – Emissions Intensity Limit for New Utility Scale Electricity Generation

Macquarie Capital Assessment of Scale Efficient Network Extension Options (Submitted to Australian Energy Market Commission)

Streamlining Regulatory Process and Competitive Charging

Payroll Tax Rebate for Renewable Energy Projects

Case Management Services

Funding Support

Expression of Interest for Community Solar Farms

Renewable Energy Fund

Office of the Commissioner for Renewable Energy

Level 17, 31 Flinders Street
Adelaide
South Australia 5000

Phone: 61 8 8204 1028
Fax: 61 8 8207 2320

www.renewablesa.sa.gov.au

Published: October 2011

Disclaimer: No responsibility for any loss or damage caused by reliance on any of the information or advice provided by or on behalf of the State of South Australia, or for any loss or damage arising from acts or omissions made, is accepted by the State of South Australia, their officers, servants or agents. Produced by RenewablesSA © October 2011. Content correct at time of printing.

Paper Stock: *A Renewable Energy Plan for South Australia* has been printed on the paper stock 'Environment' which is made from 100% post consumer waste. It is certified Processed Chlorine Free (PCF) and is manufactured using renewable energy.



RENEWABLE ENERGY



FOREST MANAGEMENT



RECYCLED CONTENT



BLEACHING PROCESS



ECO-LABELS



**Government of
South Australia**

RenewablesSA is an initiative of the South Australian Government to support the further growth of South Australia's renewable energy industry.