

DEVELOPING A NEW CLIMATE CHANGE STRATEGY FOR SOUTH AUSTRALIA

Innovate consultation paper





INTRODUCTION

The transition to a low carbon economy is occurring around the world. In the European Union, the environmental goods and services sector employs more than four million people¹. Despite Europe's recent financial instability, the renewable energy industry grew by 74 per cent. Europe's energy and emissions reduction targets are anticipated to create 700,000 new jobs by 2030². Rapid expansion of the low carbon economy and associated job creation are being embraced by our major trading partners, including the United States, India and China.

Expert reports have shown that early transition to a low-carbon economy maximises opportunities. Innovation is key to the transition. As the 2011 Garnaut report noted, "The transition to a low-carbon economy will be a story of innovation."³

South Australia has already seen the benefits of activities associated with a low carbon economy. These includes significant growth and job creation in renewable energy, and the waste and resource recovery sector, amongst others.

Government has a role to play in helping foster and drive innovation, however it must be led by industry. The purpose of this paper is to explore options to foster innovation and drive job creation to underpin the state's future prosperity and economic competitiveness.

This paper provides an overview of:

- The economic opportunities arising from climate change action
- 'Clean tech' industries in the new carbon economy
- Opportunities for innovation within our existing industry sectors
- The importance of partnering with various sectors and facilitating innovation.

Community input is welcomed on any issues raised within this paper, in particular in relation to:

- Whether there are any 'gaps' in terms of the industries, issues, policies and initiatives
- Examples from other parts of the world that could inform the South Australian approach to transition the economy
- The preferred method of Government procurement to facilitate the development of 'green' or 'clean tech' industries
- How the South Australian brand could be leveraged to promote our innovative or 'clean tech' industries
- What the Government can do to support and promote the commercialisation of local research and development.

¹ European Commission, *Environmental economy - employment and growth*, Eurostats, 2015 accessed on 2 September 2015, at http://ec.europa.eu/eurostat/statistics-explained/index.php/Environmental_economy_-_employment_and_growth

² European Commission, *Green Jobs: Employment Potential and Challenges*, 2015 accessed on September 2015 at http://ec.europa.eu/europe2020/pdf/themes/2015/green_jobs.pdf

³ Garnaut, R. 2011, *The Garnaut Review 2011: Australia in the global response to climate change*.



CAPTURING THE ECONOMIC OPPORTUNITIES

The demand for goods and services that contribute to the transition to a low carbon economy and assist individuals, businesses and regions to be climate resilient is set to rise over the coming years, particularly among our Asian trading partners. China intends to reduce the greenhouse gas emissions intensity of its economy by 60-65% of 2005 levels by 2030 and increase the share of non-fossil fuels in primary energy consumption to around 20% by 2030. Similarly, India has set an investment target of at least \$100 billion in renewable energy development, with the aim of establishing a generating capacity of 175 gigawatts (GW) by 2022.

Transformation of energy, transport, manufacturing and primary industries will require significant global investment, creating impetus and opportunities for innovation. This will result in a more efficient, well adapted industry sector, the emergence of new 'clean tech' industries and associated processes and services, job creation, and greater economic competitiveness. It will also require a shift to more sustainable agriculture and forestry practices. Businesses that are able to bring innovations such as low carbon materials and products to market rapidly and at scale will gain early advantages over competitors. These include product leadership, higher market share, and influence over emerging standards.

POTENTIAL VALUE OF RENEWABLE TECHNOLOGY INVESTMENT

By 2040, the world's power-generating capacity mix will have transformed: from today's system composed of two-thirds fossil fuels to one with 60% from zero-emission energy sources. It is estimated that as much as \$8 trillion will be invested in renewable technologies by 2040. (Henbest & Giannakopoulou, 2015).

South Australia is well positioned to capitalise on these opportunities by providing services such as consulting and education, along with expertise in wind farm or solar technologies that assist in transitioning to low carbon energy systems. We also have significant capacity to seize economic development opportunities and build on existing strengths in the agricultural, viticultural and resources sectors.

SOUTH AUSTRALIA'S ECONOMIC PRIORITIES

Taking action to address climate change and embrace innovation within our economy reflects the South Australian Government's economic agenda through its 10 economic priorities.

Strategic decisions have seen South Australia capitalise on existing opportunities. Early adoption of renewable energy generation through clear and consistent policies regarding the sector, including supportive regulatory frameworks for renewable energy development, has resulted in over \$6 billion of investment in the State to date. Forty per cent of this investment has occurred in regional areas.

The Government has set a target for \$10 billion of investment in low carbon energy by 2025, as well as the new target of 50% of electricity from renewable energy sources by 2025. The State Government is currently seeking feedback on the Low Carbon Energy Investment Plan for South Australia strategy paper to support this target.

Similarly, clear targets and the adoption of a zero waste agenda has seen the development of a \$1 billion waste and resource recovery industry that employs almost 5000 South Australians.

Priority #1: Unlocking the full potential of South Australia's resources, energy and renewable assets

Priority #2: Premium food and wine produced in our clean environment and exported to the world

Priority #4: The Knowledge State – attracting a diverse student body and commercialising our research

Priority #6: Growth through innovation

Priority #9: Promoting South Australia's international connections and engagement

Priority #10: South Australia's small businesses have access to capital and global markets

South Australia's economic priorities of specific relevance to the Climate Change Strategy



CLEAN TECH': NEW INDUSTRIES IN THE LOW CARBON ECONOMY

Clean technologies or 'clean tech' is an emerging field and provides growth opportunities for the South Australian economy. The term describes products, services and processes that can optimise operational performance and productivity, reduce the necessity for natural resource exploitation and cut or eliminate emissions and wastes. Clean tech businesses include those that are focussed on renewable energy development, water technologies, waste management and recycling, green building design and construction, energy efficiency, biomaterials, energy storage, vehicle technologies, environmental services, biofuels and carbon⁴.

4. O'Brien, 2011

SOUTH AUSTRALIAN CLEAN TECH AND INNOVATION

South Australian firms have already embraced some of these opportunities. Clean tech solutions are driving growth while helping to reduce costs. A number of companies have established and are currently involved in the development of renewable energy technologies for various industrial and utility-scale applications. Examples of these technologies include various solar thermal technologies and alternative liquid fuels such as biodiesel. In some cases, this technology is also being exported to emerging international markets.



In addition, local companies specialising in solar photovoltaic and emerging battery storage solutions are entering the market place and a number of sites in South Australia are being established as demonstration projects for this technology.

These developments are increasing opportunities for advanced manufacturing and job creation in South Australia.

Local companies have also developed cutting-edge energy saving and performance improving technologies for commercial, industrial and residential heating, ventilation and air conditioning (HVAC), along with energy management systems. These technologies are being exported to global markets.

Innovative actions from South Australian companies have also led to practical solutions for reducing the greenhouse footprint of our waste sector. For example, a number of sites now capture landfill gas which can be used to generate electricity, power local site operations and in some cases, can feed back into the electricity grid. Resource recovery from waste streams has created new markets for products manufactured from recycled materials.

South Australia is also home to diverse and knowledge rich service and research sectors that are providing specialist carbon management and climate change adaptation services. These selectors will support the private sector and government to hasten the transition to a low carbon and resilient economy.

CLEAN TECH MARKET TRENDS

Global growth in investment, development and the uptake of clean technologies has been on a generally upward trajectory over the last decade, largely dependent upon policy support and access to capital. The main areas of investment over recent years have been renewable energy systems via asset financing or development of small distributed capacity systems from renewable sources⁵. Global investment in clean energy has grown from \$60 billion in 2004 to \$310 billion in 2014⁶. In 2012, global sales in hybrid-electric vehicles passed one million, up 42% from 2011 levels⁷.

The potential value of future global investment in the clean tech sector is estimated at \$8 trillion by 2040⁸. Correct policy settings and adequate support for industry is required to hasten this economic transition and capture a share of this investment for South Australia.

Capitalising on investment opportunities will require a focus on areas of South Australia's comparative advantage. These areas include consultancy services, research and development, project demonstration or technological waste or energy solutions. Export of these industries to global markets may present significant opportunities for the South Australian economy, positioning the state to prosper in a low carbon economy. Other areas of economic opportunities for South Australia include biogas and biofuels and renewable energy storage systems research and development; demonstration of innovative approaches to climate change adaptation, carbon sequestration solutions and waste and water recycling.

The State Government has already undertaken a number of measures to support innovation and growth more broadly in the economy. In the 2015/16 State budget, the Government announced the following measures over the forward estimates which will assist in stimulating jobs and business development and could be leveraged toward clean tech sector growth and development:

- Extending the small business payroll tax rebate, meaning that over 130,000 South Australian businesses (90% approx.) will save \$11.3 million in 2015/16. The cost of doing business in South Australia will fall substantially for those companies wanting to create new businesses or expand existing ones.
- A \$15 million Industry Attraction Fund to secure new investment in South Australia through targeted assistance to support the attraction of new and growing businesses to the state and the development of key industries within the state.
- \$1 million as part of \$5.4 million for the development of the Northern Economic Plan. Support is being provided to assist businesses and industries in the North as the state transitions from traditional manufacturing to new growth industries. The Northern Economic Plan is intended to protect and create jobs.

CLEAN ENERGY INVESTMENT STATISTIC

"Global investment in clean energy has grown from \$60 billion in 2004 to \$310 billion in 2014". (Mills, 2015)

5. *Australian Cleantech, 2014*

6. *Mills, 2015*

7. *International Energy Agency, 2013*

8. *Mills, 2015*



A PARTNERSHIP APPROACH

It is important that much of the transition to the low carbon economy be led by the private sector. Implementing alternative energy and energy efficiency measures can offer businesses and households the potential for direct savings, and thereby provide additional business opportunities. Pursuing low carbon technologies and innovations, particularly proven solutions, can also enable businesses to hedge risks, capture new business opportunities and remain competitive as new markets and technologies emerge.

Innovative solutions in relation to primary industries also exist, particularly in the forestry, fisheries and aquaculture sector. For example, using more sustainably sourced timber products can reduce our carbon footprint and create ongoing economic opportunities in the forestry sector. Pursuing new species or farming systems and longer-term strategic work such as investing in science and infrastructure in our aquaculture and fisheries sectors may also improve habitat function and overall production as environmental change occurs into the future.

It is clear, however, that an industry-led transition requires the appropriate policy settings to provide the impetus for this transition and encourage growth in new industries. The Premier's Climate Change Council's advice, *South Australia's Climate Change Vision: Pathways to 2050*, emphasises the need for the State Government to partner with industry and the business community to transition South Australia to a low carbon economy while delivering industry outcomes. It also highlights the importance of identifying and using the State Government's regulatory and procurement levers to support climate change action and industry development.

Facilitating innovation, entrepreneurship and commercialisation of new technologies requires identifying existing barriers and implementing solutions to overcome them. Recent engagement with private sector companies in the clean tech sector through mediums such as the Green Jobs Forum roundtable discussion held in June 2015 identified a number of barriers to new industries and technologies. These include:

- the perception of a lack of local market for some technologies and businesses to justify locating or maintaining product development in South Australia and to maintain credibility in export markets
- a lack of a compelling business case for adopting some greener technologies
- equity and grant debt financing constraints
- a lack of compliance and audit of regulatory requirements such as residential energy efficiency.

The opportunity for State Government to use regulation and procurement to support new industries was reinforced as particularly critical to drive innovation and jobs in renewable energy, energy efficiency, green buildings and water technologies within South Australia. The importance of government as an advocate for businesses was also discussed, particularly in regard to resolving regulatory barriers outside of the state's control, such as those associated with electricity networks and building construction.

It was acknowledged that access to finance could be a barrier where lenders may be circumspect about lending to smaller firms or start-ups with a limited credit track record, irrespective of the merits of their venture. There may be potential roles the State Government could assume to de-risk investments or facilitate finance in addition to current programs and activities. These could include coordinating knowledge sharing and networking forums between financiers and proponents of new technologies to better educate financiers on the merits of investing in new technology; and supporting companies directly with various finance arrangements.

Government support for growing export markets was also broadly discussed during consultations, including the value of opening doors and facilitating connections overseas. Specific mechanisms identified by industry included trade missions and Austrade's network, export capacity building programs, and stronger investment in branding and accreditation. These mechanisms give international consumers and governments a clear idea of South Australia's green credentials and enable companies to leverage Government endorsements and branding. The Government has adopted a common brand to ensure that a consistent and professional image is maintained with the general public.

There may be scope for the South Australian brand to be leveraged to promote innovative businesses that are assisting in the transition to a low carbon, climate resilient economy. To differentiate between the standard state brand, this could involve using a unique logo to specifically market and represent low carbon businesses.

This is consistent with the Premier's Climate Change Council's advice to the Minister for Climate Change to support branding and recognition of products and services that have made contributions to the low carbon economy.

The *Green Jobs Forum* identified that there is a need to deepen collaboration between industry and research institutions as a means of driving innovation into the next wave of technologies and the jobs of the future. South Australia has three long-established and well-regarded universities, complemented by leading private universities. These universities and research institutions have the potential to provide an ongoing source of talent, ideas and expertise that can support and sustain South Australian businesses as we transition to a low carbon, climate resilient economy.

Developing human capital by striving to grow the numbers of local and international students studying a range of subjects within our universities and training organisations will both equip our workforce to service our low carbon economy and establish an international reputation for the quality of our educational institutions.





CARBON NEUTRAL ADELAIDE

The commitment to make the City of Adelaide the world's first carbon neutral city provides opportunities to drive innovation. The plan includes a range of strategies designed to drive further emissions reductions, increase the demand for renewable energy, build the State's green industries, increase resource efficiency, improve waste management and facilitate the transition to cleaner transport modes. Adelaide will become a showcase of successful mitigation initiatives that can be adopted across the State, Australia and internationally. The Carbon Neutral Adelaide announcement is already helping increase the city's competitiveness. Recently, Adelaide has been selected as a location to launch new battery storage products, where the Carbon Neutral Adelaide initiative and the State's other clean energy policies

were cited as factors in choosing Adelaide. The Government aims to work with the Adelaide City Council to achieve this bold ambition.

The State Government and the Adelaide City Council are also collaborating with Cisco Australia on the Smart City Initiative. The initiative complements Carbon Neutral Adelaide by introducing smart digital technologies which could assist in the transformation of infrastructure and create new, intelligent ways of making the city more resource efficient and reduce emissions.

Further information is available in the *Reduce* and *Carbon Neutral Adelaide* papers.



REFERENCES

Australian Cleantech. (2014). *Australasian Cleantech Review 2014: Asia Drives Investment & Trade, Industry Status & Forecast Trends, March 2014*. 2014: Australian Clean Tech Pty Ltd.

European Commission. (2015) Environmental economy - employment and growth, Eurostats accessed on 27 August 2015 at http://ec.europa.eu/eurostat/statistics-explained/index.php/Environmental_economy_-_employment_and_growth

European Commission. (2015) Green Jobs: Employment Potential and Challenges accessed on 27 August 2015 at http://ec.europa.eu/europe2020/pdf/themes/2015/green_jobs.pdf

Fabrizi, S. (2015, August 25). Speech given at Politics of Climate Change event. Sydney.

Garnaut, R. (2011). *The Garnaut Review 2011: Australia in the global response to climate change*. Melbourne : Cambridge University Press.

Henbest, S., & Giannakopoulou, E. (2015). *New Energy Outlook 2015: Powering a Changing World*. Sydney: Bloomberg New Energy Finance.

International Energy Agency. (2013). *Tracking Clean Energy Progress 2013: IEA Input to the Clean Energy Ministerial*. Paris: International Energy Agency.

Mills, L. (2015). Global Trends in Clean Energy Investment. Bloomberg New Energy Finance.

O'Brien, J. (2011). Clean Technology Investments: Short and long term trends. *The European Financial Review*.

GLOSSARY & ACRONYMS

BATTERY STORAGE

An electrical device that has capability to store generated electricity from a variety of generating sources including solar and wind.

CARBON NEUTRAL

Net greenhouse gas emissions are zero. This can be achieved by preventing or offsetting emissions (e.g. by supporting a tree planting scheme that will absorb carbon dioxide), or a combination of the two.

CLEAN TECH

A description relating to products, services and processes that can optimise operational performance and productivity, reduce the necessity for natural resource exploitation and cut or eliminate emissions and wastes.

CLIMATE CHANGE

Any change in climate over time, whether due to natural variability or as a result of human activity.

EMISSIONS REDUCTION TARGET

A measurable target to reduce the amount of greenhouse gas emissions released.

ENERGY EFFICIENCY

The ratio of energy required to produce a certain level of a service such as kilowatt per unit of heat or light.

GREENHOUSE GAS EMISSIONS

The release of greenhouse gases into the atmosphere. A greenhouse gas is an atmospheric gas that absorbs and emits infrared or heat radiation, giving rise to the greenhouse effect. Typical greenhouse gases include carbon dioxide, methane, nitrous oxide and refrigerants.

LAND USE, LAND USE CHANGE AND FORESTRY (LULUCF)

A sector of a greenhouse gas inventory that covers emissions and removals of greenhouse gases resulting from direct human-induced land use, changes in land use and forestry activities.

LOW CARBON ECONOMY

An economy based on low carbon power sources that therefore has a minimal output of greenhouse gas (GHG) emissions.

PREMIER'S CLIMATE CHANGE COUNCIL (PCCC)

The Premier's Climate Change Council was established under the *Climate Change and Greenhouse Emissions Reduction Act 2007*. The primary function of the Council is to provide independent advice to the Minister responsible for Climate Change about matters associated with reducing greenhouse gas emissions and adapting to climate change.

RENEWABLE ENERGY

Energy that comes from resources which are naturally replenished on a human timescale such as sunlight, wind, rain, tides, waves, and geothermal heat.

RENEWABLE ENERGY TARGET (RET)

A policy which mandates a percentage of the electricity purchased by a retailer to be sourced from renewable energy generation. A generator is provided with certificates by the Clean Energy Regulator, which are 'surrendered' upon the sale of this energy. The intent of the RET is to encourage investment into new renewable energy sources.

RENEWABLES SA

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

SOLAR ENERGY

The harnessing of the radiant light and heat from the sun using a range of technologies such as photovoltaic (panels) or thermal power generation in order to produce electricity.

SOUTH AUSTRALIA'S CLIMATE CHANGE VISION: PATHWAYS TO 2050

The official advice presented to the Minister for Climate Change by the Premier's Climate Change Council (PCCC) in February 2014.

WIND ENERGY

A form of electricity generation using wind turbines to extract electrical power from air flow.



www.environment.sa.gov.au/climatechange