Pathways to 2050
Which pathway will we choose?

Value of agricultural product from the Murray Darling Basin drops by 49-72% by 2050

Hotter drier climate with more extreme events

In Adelaide, days over 35°C jump from 17 to 47 by 2070

Longer fire season, greater impacts from bushfires

Sea level rise of up to 1m could inundate 48,000 homes

More acidic oceans

Carbon addiction
Emissions continue to rise

Collective action
Emissions stabilised at half today’s levels by 2080

Business impacted by climate change

Three potential scenarios explored by the Intergovernmental Panel on Climate Change (IPCC). The results highlight that humanity’s choices today will drastically affect our future and our economy.1,2
Climate impacts generally constrained but not avoided. Technology and price changes may disrupt markets. Energy systems undergo rapid change. May rely on investment to remove emissions from the air. Reduced risk of irreversible changes.

**Aggressive action**
- Emissions halved by 2050
- More likely than not to exceed 2°C
- Not likely to exceed 2°C

Business impacted by policy change.
With any challenge comes an equal measure of opportunity. Industry, business, governments and the community can seize these opportunities and be prepared for the changes that are already underway.

Premier’s Climate Change Council

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. The Council members are appointed from a range of sectors, including the business community, the environment and conservation sector, the scientific community and state and local governments. The current membership comprises Mr Bruce Carter (Chair), Ms Ros DeGaris, Mr Brian Foster, Dr Campbell Gemmell, Ms Nicole Halsey, Mr Fred Hansen, Mr Tim Kelly, Dr Prue McMichael, Mr John O’Brien, Prof Jean Palutikof and Ms Verity Sanders.
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Message from the Chair

South Australia has a proud record of climate change action. However, we now face some important decisions. Policy changes in the national political environment and increasing certainty in climate science means South Australia needs to decide its future in this key area.

Climate change is fundamentally altering our economy and our lifestyles. Our recent heatwave and bushfires serve as reminders that extreme climate events are expected to become more frequent and more severe. The announcement of Holden’s closure by 2017 reminds us that we prosper as part of a global economy.

This climate change vision is an important piece of work for understanding how much we can create our future and avoid being at the mercy of changes. It is a vision for all governments, regardless of ideologies, and the Premier’s Climate Change Council has called for bipartisan commitment to progress this work.

We have developed this vision to inform South Australia’s future. We recommend that business and community form effective partnerships with governments to pursue those opportunities that will benefit our state, safeguard our living standards and protect our natural resources.

Our vision sets its sights on 2050 and our recommendations will position South Australia over the next ten to fifteen years. It is – we trust – an ambitious and optimistic vision, but also a practical one.

For the past two years, Council’s role has been to work with industry, academics and local communities to advise the South Australian Government on climate change action.

This vision is the culmination of those discussions and also builds on a recent review of major initiatives that tells us what has worked and informs decisions about where to invest for the future. Realising our climate change vision is not government’s responsibility alone. No single entity can, by itself, deal with the challenges of climate change. This is why our vision includes recommendations for business and the community, as well as for government. It is through our combined actions that we can continue as nationally and internationally recognised leaders in climate change action.

Governments need to continue leading, but businesses and industry need to exploit opportunities to innovate and adapt, just as the community needs to use its voice and consumer power to drive change.

On behalf of the Premier’s Climate Change Council, I present a vision of how we can confront climate change and ensure a vibrant and sustainable future for all South Australians.

It is incumbent on us all to ensure the security, sustainability and prosperity of all South Australians, now and across the generations.

Bruce Carter
Chair
Premier’s Climate Change Council
The planet is warming. It is unequivocal. Global temperatures have risen 0.85°C since 1850, and humans have been the primary cause. Already we are seeing the effects of climate change: the atmosphere and oceans are warmer, glaciers are shrinking, ice sheets and Arctic sea ice are losing mass, and sea levels are rising.

The outlook for South Australia is a hotter, drier climate – with more frequent and longer heatwaves, drought and increased bushfire risk. Rising sea levels will accelerate coastal erosion and cause more extensive inundation. These forecasts have economic, health and wellbeing implications for South Australians.

Businesses such as agriculture, construction and logistics need to adapt. Public and private property and infrastructure will be impacted and insurance may be harder to access. Weather events can increase the costs of basic goods and cause significant hardship or inconvenience as climate change disrupts people’s lives, communities and business.

If we do not take collective action now, the overwhelming message from scientists is that temperatures will rise further – up to 4°C by 2100. The Intergovernmental Panel on Climate Change’s latest report, Climate Change 2013: The Physical Science Basis has a clear message. If we are to limit temperature rise to 2°C, then we need to take rapid action, and transition swiftly to a low carbon economy. Only the most aggressive scenarios for reducing emissions are consistent with avoiding dangerous climate change.

We face a clear choice. The world must act urgently if we are to limit warming to 2°C. South Australia must act in ways that will serve us well and contribute to a global response. This is the best way for us to play our part in the transition to a low carbon future.

South Australia is on the right track. We have created a favourable regulatory environment and attracted nearly $5.5 billion investment in renewable energy, particularly windpower. The 2014 renewable electricity targets were achieved ahead of schedule, and we are on track to meet our 2020 target.
South Australia’s legislated renewable electricity targets

- Increase renewable energy generation to at least 20% of electricity generated in South Australia by 2014.
- Increase renewable energy consumption to at least 20% of electricity consumed in South Australia by 2014.
- Increase renewable energy generation to at least 33% of electricity generated in South Australia by 2020.

We need to build on this success to reach the 2050 target. This vision provides a pathway to meet our target, and in doing so achieve a low carbon future for South Australia.

South Australia’s 2050 target

- Reduce greenhouse gas emissions in the state by at least 60%, to an amount that is equal to or less than 40% of 1990 levels.

South Australia is not alone on the path to a low carbon future. The Australian Government has committed to reduce emissions by 5% below 2000 levels by 2020. It has also committed to a 2050 target to reduce emissions by 80% below 2000 levels. To achieve its 2020 target, the Australian Government has announced a Direct Action Plan that includes a $2.55 billion fund to reduce emissions.

Internationally, the trend to reduce greenhouse gas emissions is significant and accelerating. Ninety-nine countries, including our major trading partners and neighbours, have 2020 emissions reduction pledges backed by domestic policies and measures. Countries are implementing policies such as renewable energy targets, emissions trading schemes and vehicle emissions targets.

Significant political, social, financial or climatic events across the global scale could revolutionise the trajectory of carbon emissions, taking the world from business as usual to the aggressive mitigation path that is required. Key economies such as China, the European Union and the United States could demand that trading partners meet low carbon benchmarks.

Climate change presents an enormous challenge – socially, economically and to the environment. As we transition to a low carbon future, we will also have to adapt to warming that is already occurring as a result of our greenhouse gas emissions from past decades.

However, with any challenge comes an equal measure of opportunity. Industry, business, governments and the community can seize these opportunities and be prepared for the changes that are already underway. This vision outlines a pathway to meet our challenges and targets in 2050, with a clear focus for action over the next 10 to 15 years.
A vision for South Australia

Our vision is for a prosperous South Australia that is healthy, equitable and sustainable. The Premier’s Climate Change Council believes that a successful response to the challenges we face from climate change will improve our wellbeing and our economic resilience.

We need to lead and focus our efforts to deliver benefits for South Australia.

This vision foresees a low carbon South Australia that is adapting to climate change and embracing the opportunities it presents. It proposes that all South Australians share responsibility for transitioning our state and our economy. Importantly, it maps out a role for the South Australian Government in facilitating this transition. The vision sets out a number of recommendations and priority actions that will become the subject of an SA Government response as legislated under the Climate Change and Greenhouse Emissions Reduction Act 2007.

In this vision
Our leadership in reducing emissions and adapting to climate change is maintained and developed further.

Our people use their skills, knowledge and connections to keep making SA great and we do it equitably, supporting our most vulnerable.

Our energy generation, distribution and demand is clean, efficient, reliable and competitive. It no longer causes a climate change impact.

Our natural resources, especially water resources, are protected, enhanced and resilient to changes. Our reliance on our environmental assets for our wellbeing and ongoing prosperity is widely acknowledged and valued.

Our cities and towns are well designed and deliver an enviable lifestyle. They connect us as communities to our leisure and work activities. They deliver the infrastructure for efficient, comfortable buildings and competitive businesses. They help us adapt to climate challenges and reduce our emissions footprint.

Our economic transition is led by our businesses. They seize the opportunities to solve the everyday challenges of making SA a better place, and many thrive by selling those solutions across the world.

South Australia has benefited from its climate change leadership to date. Between 2004 and 2011, South Australia performed better than the national average in stabilising and reducing emissions*. Our Adaptation Framework is internationally recognised and has received national awards.

The Council has firsthand experience in the power of leadership and political will to get things done. Climate change is no exception. It is a critical issue for this state and needs SA Government to be persistent in leading the transformation throughout our economy and preparing for the impacts of climate change.

Our climate change leadership is an opportunity to position our economy. South Australia needs to demonstrate leadership with community and industry actions to become as efficient and competitive as possible, and with government structuring our society for a low carbon economy.

A steady policy direction and delivering on commitments will create certainty and confidence in South Australia’s low carbon vision.

Recommendation 1
Continue to show strong leadership on climate change
Recommendation 1

The Council recommends that climate change leadership be the responsibility of the Premier of South Australia so that climate change considerations are integrated into all SA Government decision making and long-term initiatives.

Leadership needs to be used to deliver clear benefits for the state and we should not underestimate the value of advocacy and promotion in national and international arenas. We need to recognise leadership and provide incentives for the high performers who are tackling climate change.

Priority action 1.1
Promote our low carbon and adaptation leadership, linked to a state branding strategy that also promotes the climate change leaders in our economy.

Priority action 1.2
Use sector agreements under the Climate Change and Greenhouse Emissions Reduction Act 2007 to partner with industry and community, and support climate change action. Leaders also act as an exemplar for the whole community.

Many energy efficiency opportunities in the SA Government’s own buildings make for cost-effective investments and could be directed toward South Australian based low emissions products and services.

Priority action 1.3
Set a greenhouse reduction target for the SA Government and invest in cost-effective opportunities to reduce its own carbon emissions.

Business leaders have reinforced that consistent commitment from the SA Government is essential for business to prioritise and act on climate change. Consistent messages are also important to support the long-term culture change in the community that will come as our collective understanding of climate change issues increases.

The Council’s work to date has also identified that ten to fifteen year tangible goals are needed in addition to the long-term targets so sectors can create a stepped approach to a low carbon economy and begin adaptation actions that will benefit from early intervention.

Recommendation 2

The Council recommends that the SA Government negotiate bipartisan agreement for deep cuts in greenhouse emissions by 2050 and interim greenhouse and renewable energy targets for 2025.
Engaging our community as partners in tackling climate change

Listening to community
The Council has engaged a variety of stakeholders across business, government, industry and community groups to develop this vision. This is only the start of an important process to build shared understanding across all sectors about what it means to operate successfully in a carbon constrained world and a changing climate. Broad consultation will enable the SA Government to harness communities’ ideas and develop a clear pathway for action. The Australian Government and local governments are important partners in this process. This vision marks a starting point for consultation.

Recommendation 3
The Council recommends that the SA Government consult widely to develop 10–15 year goals and actions for transforming South Australia to a low carbon economy by 2050 to build shared understanding and a commitment to action.

Priority action 3.1
The Department of the Premier and Cabinet leads the consultation process and development of cross-agency initiatives to respond to the Council’s advice.

Recommendation 3
Undertake comprehensive consultation across community, industry, business and government
Engaging all community
South Australians can be powerful agents for change. Individual choices ultimately shape our future as people act in their roles as consumers, business owners, employees, community members and voters. Many of the emissions relating to lifestyle, housing and work can be influenced by everyday decisions. Emission reductions made simply by a change in behaviour can be one of the simplest and cheapest forms of climate change action. Accurate, up-to-date and accessible information is needed to assist individuals to understand how climate change is having an impact. They need relevant, localised information to appreciate their vulnerability and options for climate change action. They can then make informed reduction and adaptation decisions.

Priority action 3.2
Make climate change information readily available to the community in accessible language and format.

Partnerships with the community promise wider reach and more creative approaches than government could achieve alone.

Governments and business should foster the community’s innovative ideas and solutions to respond to climate change by investing in strategies that encourage community contribution. The following case study is one of many that could be considered. It presents a competition approach trialled in the United Kingdom.

Case study
In 2008, the UK National Endowment for Science, Technology and the Arts (NESTA) ran a national competition, called the Big Green Challenge, with a £1 million prize designed to stimulate and support community led responses to climate change. 355 groups came forward with a wide range of imaginative and practical ideas. From a shortlist of 100, ten finalists were shortlisted who then put their ideas into practice to compete for the £1 million prize. The finalists reduced CO₂ emissions in their communities by between 10–46% in the Big Green Challenge delivery year.

Evaluation of the Big Green Challenge highlighted that:
- Performance-based funding offers potential to mobilise community resources to achieve specific goals and to accelerate change
- Identifying and rewarding success can help communities mobilise more resources than they might be able to do on their own; the prize conveyed a sense of importance to achieve this outcome
- Providing small grants to pilot the delivery of innovative ideas is a useful model for selecting organisations with the most potential
- None of the finalists would have achieved what they did without access to other financial resources or in-kind support as a prize is not a substitute for grant funding.

Priority action 3.3
Run a community challenge in South Australia to engage and partner with community and business in finding innovative solutions to the opportunities and challenges created by climate change.

“Partnerships are an important component of climate change intervention initiatives; they enable collaboration of ideas and knowledge including essential regional input from people who know local problems and solutions.”
Reducing emissions

72% of South Australia’s emissions are from electricity, gas and transport fuels.
Reducing our emissions

South Australian emissions are dominated by the production and use of energy, including electricity, coal, gas and transport fuels. Other sources of emissions include waste, industrial processes, livestock, soils and land management. Figure 1

Energy sources
Use of electricity, gas and transport fuels make up 72% of South Australia’s emissions. Gas has long been considered a transition fuel that helps the move to a low carbon economy. Carbon capture and storage technologies being developed globally may also have the potential to reduce emissions from the burning of fossil fuels. These technologies will however add to the cost of this fuel source and are yet to prove their competitiveness.

To date, renewable energy technologies have been an expensive alternative to coal and gas, but their cost has been falling. South Australia’s abundant supply of sun, wind, wave power and geothermal (hot rock) energy position it well to take advantage of renewable energy technologies.

Forms of delivered energy
Transformation of our electricity system will be critical as it accounts for 27% of emissions. We are well on the path: nearly one-third of our electricity is generated from renewable energy sources – wind and roof-top solar. We will be challenged by our need to import electricity (which fluctuates annually), due to the high emissions intensity of electricity produced by Victoria’s brown coal power stations.

Transport fuels (petrol and diesel) and direct gas use for heating activities each contribute 20% to emissions. These fuels also supply electricity in remote areas which are not connected to the main electricity grid. Replacement with renewable fuels to meet heating and transport requirements has been under development for the past decade, but finding a competitively priced solution remains a challenge. Biomass and biogas energy for heating and electricity generation is likely to remain a relevant energy source where it is readily available, but it will be limited by the availability of organic source material. Electricity provides an alternative energy source for transport, as long as electricity storage technology improves. South Australian companies have been active in the development of biofuels for transport (including second generation fuels that use non-food sources of organic material such as algae).

Energy end users
Over a quarter of South Australia’s emissions are associated with industrial activities in manufacturing, mining and processing. The largest sources of emission reductions may come from electrical efficiency in motors, compressed air and pumping. Onsite electricity co-generation to generate heat for use in industrial processes represents an opportunity to double onsite energy efficiency, as it is currently used in only a few South Australian businesses. A greater shift will come when more businesses invest in fundamental changes to products and processes. These are strategic decisions that need to be made in the context of the challenges and opportunities in a low carbon economy.

Figure 1
Breakdown of South Australian emissions
The design of buildings, utilities and infrastructure impacts on our energy use and defines the way energy is delivered. Electricity and gas are used in more than 700,000 homes, accounting for 10% of emissions. Commercial buildings, car travel and freight activities each account for about 10% of emissions. Freight activities are particularly important as they underpin the success of the manufacturing sector. Emissions can be reduced through urban planning and design that encourages cycling, walking and public transport use, and the use of low emission vehicles such as electric or hybrid cars. Future models of electricity supply and patterns of usage may lead to more local generation in the form of solar systems and tri-generation that efficiently provides electricity, heating and cooling at the same time. Local generation could be coupled with local energy management to provide energy storage and smart ways to reduce peaks in electricity demand.

**GreenPower**

The GreenPower scheme has empowered energy consumers, both businesses and individuals, to make choices that support renewable energy. Governments’ role in supporting GreenPower has helped achieve emissions reductions beyond those achieved by the Renewable Energy Target.

The SA Government has currently deferred its commitment to purchase GreenPower, but needs to continue finding ways to support and improve the scheme. The SA Government could benefit from the strategic purchase and promotion of GreenPower in areas of high public visibility, such as the SA Museum, metro tickets (green ticket options), public events and green recharging of electric vehicles.

GreenPower is a scheme accredited by state governments that allows electricity retailers to purchase renewable energy on behalf of consumers. Governments were the founding customers for the scheme and last year it led to $80 million across Australia being invested in renewable energy.

**Key benefits of government support for the GreenPower scheme:**

- Increasing renewable energy use above that required by law
- Targeting to specific state renewable energy projects
- Strengthening the GreenPower brand to encourage businesses and households to also purchase GreenPower
- Setting a necessary framework to give customers the ability and choice to purchase renewable energy.

**Priority action 4.1**

Advocate for the evolution of the GreenPower scheme to ensure South Australians continue to have easy ways to choose value-for-money low carbon alternatives.
Emissions from livestock, soils and land management
Livestock, primarily sheep and cattle, generate more than 10% of South Australia’s emissions. Research is underway to reduce emissions through breeding, feeding and manure management. In addition, social preferences may change over time to different sources of meat, fibre and dairy substitutes. Figure 2

Land management and forestry contribute 5% to emissions in South Australia. Agriculture and forestry play an important role in the removal, emission and storage of greenhouse gases. Plants and soils remove and store carbon from the atmosphere; vegetation clearance and soil disturbance release emissions back into the atmosphere. Net vegetation clearance was responsible for emissions of almost 10% in 1990, but this sector is now (2011) a net remover of carbon from the atmosphere.

Primary producers and landholders play an important role in reducing emissions through their management practices. Decisions such as low-till farming, restoration of degraded farmland, revegetation activities, and protection and amelioration of soils and existing vegetation will reduce South Australian emissions. The Australian Government’s Carbon Farming Initiative was set up to incentivise such decisions.

Decarbonising our energy systems
Decisions on energy sources, distribution and use must underpin our transition to a low carbon economy by 2050. Our emissions target can only be achieved with energy systems that produce few or no carbon emissions. A market framework that provides value for consumers to buy renewable and low emissions energy solutions will be an important component.

Transition relies on cleaner energy becoming cost-competitive and affordable and with regions continuing to have access to secure and reliable supplies. The cost of wind and solar energy has dropped significantly over the last 20 years, and projections indicate that the cheapest power in the future will come from renewable energy. Since 2003, South Australia has attracted investment of $5.5 billion in renewable energy. The SA Government recently announced an investment target for low carbon technologies of $10 billion by 2025.

Priority action 4.2
Develop a low carbon energy investment plan for meeting the new $10 billion investment target, primarily focused on renewable energy.

The challenge for South Australia is to ensure that investment decisions in our energy infrastructure are consistent with a transition to a low carbon future. This may involve recognising incumbent advantage and actively working to ensure regulations support new technologies and options. It should use a shadow carbon price when analysing options for long-term infrastructure expenditure and in fact for all long-term initiatives.

Priority action 4.3
Use a shadow carbon price and evaluate climate change risks for all infrastructure investments.

The Council believes that driving the changes needed across the energy system will require strong leadership and planning by the SA Government. A dual aim of leadership in the energy sector should be to position South Australia to maximise the economic benefits from the energy transition.
Low cost abatement
With present resource constraints in private and public sectors, funding for emissions reduction programs are best directed towards low cost abatement activities that generate additional benefits for South Australia and leverage other funding sources.

With tightening budgets, it becomes even more important to ensure that every marginal dollar of program funding spent on climate change is directed at the areas which generate the most benefits³.

The Commonwealth approach to reducing emissions is a Direct Action Plan that includes a $2.55 billion Emissions Reduction Fund (ERF) which will use a reverse auction to purchase lowest cost abatement. The fund could provide a significant resource to support emissions reduction in South Australia and many actions that target low cost abatement will generate additional benefits for South Australia at the same time as reducing emissions. South Australia will need to position itself to benefit from participation in the fund.

Priority action 4.4
Advocate for stronger climate change action nationally and work to benefit from a considerable share of the $2.55 billion Emissions Reduction Fund.
Recommendation 4

The Council recommends that the SA Government identify cost-effective abatement options that deliver valued outcomes, and work with industry sectors to design programs that are eligible for funding under the Commonwealth’s Emissions Reduction Fund.

The ERF is unlikely to fund all low cost abatement and governments will be able to use additional approaches to complement the fund. Some climate change action, such as energy efficiency in buildings, delivers direct financial benefits but there are barriers to the initial investment. Other actions have significant additional benefits, such as supporting low income households or biodiversity preservation. In addition, some benefits are cost-effective over longer-term timeframes, especially in the case of infrastructure investment.

Priority action 4.5

Develop a framework for prioritising investments in climate change action in order to maximise the net long-term benefits of investment and review state goals.

Recommendation 4

Reduce emissions by capturing all cost-effective abatement
Adaptation

Already the nation’s driest state, South Australia faces a tough challenge in climate change, particularly in securing a reliable water supply. Our economic productivity is undermined by many weather events that will become more frequent as the climate changes.
Adapting to climate change

Water supply
Rainfall declines across southeastern parts of the country, including the lower Murray-Darling Basin, have been associated with widespread, long-term drought. Rainfall has reduced significantly – by 15% – during the autumn and winter seasons since the mid-1990s. The economic impact of a hotter and drier climate on water supply infrastructure for Adelaide is likely to be significant by 2070.

The SA Government should plan for and invest in alternative approaches to water security that minimise future water price increases for the community and businesses, and support environmental outcomes.

Priority action 5.1
Develop integrated water management plans to maximise the economic, social and environmental benefits from multiple sources of water.

Heatwaves
In January 2014, Adelaide once again set a record with five consecutive days of 42°C and above, and the city observed its fourth-highest temperature of 45.1°C. While peak temperatures did not generally reach those experienced in 2009 in areas of southeastern Australia, including Adelaide, the extreme heat persisted for a longer period. The average number of days above 35°C in Adelaide could increase from 17 days currently, to 21–26 days by 2030, and to 24–47 days by 2070. As the number of very hot days (above 35°C) increases, more people are vulnerable to heat-related illnesses and death, particularly the elderly. An estimated 200 people over 65 die annually in Adelaide from heat-related deaths (1997–1999 average). This could potentially rise to 342–371 by 2020 and 482–664 by 2050.

Heatwaves also have economic impacts, causing damage to infrastructure, reducing productivity (because people work more slowly in the heat), increasing costs to business and threatening primary production.

Bushfires
Bushfires and the potential for loss of human and animal life, livelihoods and natural habitat are one of the greatest risks during hot, dry summers. The incidence of fire weather, as represented by the Forest Fire Danger Index (FFDI), has increased across much of Australia since 1973. The most significant changes in FFDI have occurred in the southern half of mainland Australia, particularly in the south and southeast of the continent. Recent analysis of FFDI data also showed a lengthening fire season across southern Australia.

The greater awareness that bushfires under extreme and catastrophic conditions cannot be controlled, is counteracted by the many dwellings and assets already vulnerable to fire risk. Land divisions, dwellings and assets continue to be built in or adjacent areas of dense native vegetation and high fire risk.

Coastal zone
South Australia is vulnerable to sea level rise and extreme events as more than 90% of the population is located in coastal settlements, and nearly half of the coast is composed of sandy beaches. Sea levels in South Australia have risen by 20 cm since 1880, and have been rising at an accelerated rate of 4.3 mm per annum since 1992. The Intergovernmental Panel on Climate Change projects that a future sea level rise of up to 98 cm by 2100 is possible.

In South Australia, between 31,000 and 48,000 residential buildings (worth $5 billion and $8 billion), up to 6763 km of roads (worth $9.5 billion), up to 219 km of railways (worth $900 million) and up to 1488 commercial buildings (worth $27 billion) may be at risk.

The current review of South Australia’s planning system provides a mechanism to incorporate better approaches to reducing the exposure of new developments (people and property) to hazards. A priority action to address vulnerability to climate related hazards is included in the section Low carbon and adaptive settlements.
Natural environments
Land-based species and ecosystems restricted to Kangaroo Island and the Mount Lofty Ranges are likely to be among the most vulnerable to climate change. Coastal ecosystems will also be vulnerable to sea level rise, storm surges and reduced rainfall. Riparian and low lying areas will be vulnerable to more extreme rainfall events and flash flooding. Ecosystem change is also likely to impact on internationally significant migratory bird species.

The community along with the natural resources and primary industry sectors will need to work cooperatively to value and sustain the biodiversity assets and the natural landscapes and seascapes that are important to our state. Priorities are maintaining and restoring the linkages between key fragmented habitats, providing adequate protection to critical conservation areas on the land and in the sea, and focusing conservation efforts on protecting species with the capacity to adapt.

Priority action 5.2
Direct investment toward programs and projects that safeguard the resilience of species and ecosystems at risk from climate change.

Agriculture
Agriculture plays an important role in the South Australian economy. The state’s agricultural production was valued at $4.7 billion in 2009–10. South Australia produces almost half of the nation’s wine grapes and above 57% of national wine exports, valued at over $1.3 billion in 2009–10. Reduced rainfall and water availability coupled to a warming climate could affect the state’s iconic wine-growing regions. Rising temperatures are likely to have a major influence on wine grapes bringing the harvest forward by a month and yielding lower quality grapes which would eventually affect grape prices.

Since 1997 South Australia’s agricultural regions have experienced a marked decline in growing season (April–September) rainfall. This decline is mostly due to a drying trend in autumn and, to a lesser extent, in winter. Season breaks are occurring later, and bringing less rainfall.

Despite these changes, the primary production sector has proved resilient and has significant opportunities into the future. With global food demand expected to increase 35% over 2007 demands by 2025, and the growing wealth of Asian trading partners likely to increase the demand for high value, high quality food and beverages, producers will have opportunities to achieve higher returns.

Priority action 5.3
Identify land of agricultural and conservation value to be protected from urban encroachment.

Prioritising adaptation actions
South Australian communities and industries have embraced the need to plan and act to reduce the impacts of climate change. South Australia’s Adaptation Framework is supporting regions to assess vulnerability and prioritise adaptation actions.

Some adaptation actions identified by communities as necessary to reduce their vulnerability to climate change are likely to require significant infrastructure investment. While adaptation planning is driven locally, a state-wide framework to assess priorities and direct resources will be required due to the limited financial and technical resources available in many regional areas.

The Council’s experience from discussing responses to sea level rise, for example, is that barriers remain within the SA Government and that solutions can only be arrived at collaboratively with stakeholders. It is clear from the adaptation planning conducted to date that regions will have common priorities. SA Government leadership will be essential to address priorities, and interpret climate change data and modelling.

In the delivery of adaptation action, all levels of government need to work collaboratively with businesses and the community to develop effective solutions. In the first instance, a modest re-prioritising of regional investment will provide the necessary momentum to increase community and regional engagement and connectivity.

South Australia will need a firm ongoing commitment to drive these negotiations and action.
Recommendation 5

The Council recommends that the SA Government identify funding sources for the implementation of adaptation priorities.

Priority action 5.4
Develop a state-wide framework to prioritise and implement adaptation actions.

Priority action 5.5
Support regional stakeholders to set goals to ensure progress against each regional priority.

Protecting our most vulnerable from the impacts of climate change

Government and community services organisations have a responsibility to protect and support those members of the community most vulnerable to climate change, particularly those who rely on community services for basic survival and those who live in remote indigenous communities. An additional burden is placed on volunteers during events such as bushfires, particularly farmers and landholders whose livelihood is at risk.

Those who are most disadvantaged will also be most affected by the impacts of climate change. Usually on fixed incomes, they carry the burden of cost of living pressures and have less opportunity to take individual action. It is essential that the most vulnerable be supported to reduce their heating, cooling and utility bills. Community services play a critical role in supporting the vulnerable in times of crisis caused by climatic events.

The key climate change issues facing the community services sector in South Australia are not well understood. The opportunities to build capacity and develop the necessary skills to manage growth in demand and possible disruptions to services as a result of climate change have not been identified. The sector has been overlooked in policy setting, investment and strategic planning, and requires considerable support to prepare for climate challenges. The consequences of failure in the community services sector are very serious as they impact the basic needs for human survival and can lead to homelessness, deprivation, hunger, isolation and death[17].

Now is the time to begin planning and investing, to build the resilience of the community services sector to ensure it can continue to support its clientele.

Recommendation 6

The Council recommends that the SA Government partner with the community services sector to build its capacity to respond to impacts of climate change.

Priority action 6.1
Undertake, in partnership with the sector, a comprehensive risk analysis of the capacity of the community services sector to adapt to the impacts of climate change.

Priority action 6.2
Investigate the effectiveness of existing exemptions, rebates or concessions for transport, energy and water services to ensure vulnerable community members and the community services sector are adequately protected.
Low carbon and adaptive settlements

Land-use planning has emerged as a consistent theme throughout the Council’s term and it is clear the planning system needs to deliver sound, long-term decisions that will help us adapt to climate change and become low carbon. Planning policy and decision making is complicated by the conflicting views of individuals, communities and interest groups. Where planning policies that benefit future generations at the cost of the current generation have been proposed (such as rezoning coastal land that is vulnerable to sea level rise), strong opposition from landowners has resulted in maladaptive outcomes. Ambitions to deal with climate change are therefore not always translated into sound long-term decisions.

The current review of the Development Act 1993 by the Expert Panel on Planning Reform provides a timely opportunity for climate change considerations to be fully integrated into the South Australian land-use planning system.

Recommendation 7

The Council recommends that the Expert Panel on Planning Reform and the SA Government ensure that consideration of climate change is integrated into the South Australian land-use planning system by embedding climate change into the Objects of the relevant Act.

Priority action 7.1

Identify opportunities throughout the planning system to improve decision making and climate change outcomes.

Planning for climate resilient settlements and infrastructure

The design, function and layout of our settlements and infrastructure are largely determined by land-use planning decisions and investment in the built environment. Most buildings and infrastructure have a life in the order of 50–70 years, therefore land-use planning and investment decisions made today have a long legacy.

One-fifth of our greenhouse gas emissions come from the energy used in buildings and an additional 10% from passenger transport. Urban form is a driver of energy use, but much of it has been developed with little consideration of climate change.

“Urban form offers governments one of the most important opportunities to mitigate, and adapt to, the impacts of climate change.”

Future greenfield and infill development should be designed so that it is socially, economically and environmentally sustainable. Development should be designed to be climate resilient, integrating energy efficiency, green infrastructure and water sensitive urban design principles at all stages, from the precinct to individual allotment scale. Infill development should be prioritised over growth at the urban fringe, so that valuable primary production and biodiversity assets essential to the community’s wellbeing and economic prosperity are protected from urban encroachment.

Recommendation 7

Ensure the land-use planning system supports adaptation and transition
Priority action 7.2
Undertake indicative modelling of a range of urban growth boundary scenarios for Adelaide to demonstrate the potentially significant emissions savings that can be achieved and cost savings more generally.

The Council has delivered advice on facilitating climate smart precincts, and envisages a future built environment that is denser, and integrates land use, transport and water sensitive urban design. It will incorporate mixed-use development focused around key transport nodes and corridors, and provide viable low carbon transport options, such as cycling and walking, that reduce reliance on private vehicles. The sense of community will be strengthened as vibrant higher density neighbourhoods offer improved access to services, facilities and recreational activities with an overall improvement in amenity and comfort. The Council has heard that alternative ways of delivering energy in developments often face barriers not faced by business-as-usual approaches. Master planning processes, planning policies and building codes can be used to establish development and infrastructure (such as transport) that improve low carbon and adaptation outcomes.

Priority action 7.3
Incorporate low carbon and adaptation outcomes as a requirement into tender processes for the sale and/or development of SA Government land assets.

Priority action 7.4
Use industry recognition and improved regulatory processing timeframes to incentivise high performing development for low carbon and adaptation outcomes.

New development adds less than 5% to our building stock every year so we must also drive improvements to our existing buildings. Building upgrades that reduce energy and water demands, and incorporate renewable energy, reduce emissions and increase resilience to climate change. Housing affordability will also be improved by lower utility bills.

Priority action 7.5
Continue to develop and promote building upgrade finance, and create financing mechanisms for the residential sector that make it easy for investments to be recouped through energy and water savings.

Reducing the vulnerability of settlements and infrastructure to climate change
Future development must consider and respond to the likely regional and local impacts of climate change in its planning, design and construction. Climate change is expected to increase the severity and frequency of extreme weather events in South Australia. The state is particularly vulnerable to natural hazards, such as sea level rise, bushfire threat and flooding, which will be exacerbated by climate change. Future social and economic costs associated with climate change hazards, such as increased frequency of bushfires, heavy and sustained rainfall, high winds, sustained heat waves, sea level rise and coastal inundation, could be significant.

Development decisions should have regard to future climate related hazards. Decisions that allow development to be located in vulnerable areas will be difficult to reverse as there will be significant pressure to stay and defend, rather than relocate or retreat. It will also build community expectations for governments to fund protective infrastructure, and/or respond to future disasters, with future generations bearing the cost. In areas of identified risk, existing building owners need support to manage their risk, as it is not always possible for emergency services to protect buildings during extreme events.

Priority action 7.6
Identify and map areas that will be at significant risk of climate change hazards, including sea level rise, bushfire and flooding. Integrate identified climate change risks into The Planning Strategy for South Australia and council development plans.
Business
Supporting business to lead our transformation

Climate change presents transformational challenges and opportunities for the South Australian economy.

The industries and businesses that sustain our economic competitiveness will be those that are strategically orientated to the demands of a low carbon global economy. This is about being innovative, forward looking and well informed about how climatic change and carbon responses drive changes in value chains, supply availability and customer preferences.

In particular, South Australian businesses have the opportunity to be providers of services and solutions in clean technologies. They will also need to be increasingly efficient in the use of resources such as energy, water and waste.

The manner in which we respond to these climate challenges and opportunities will be a key part of the broader structural transformation in South Australia – as we continue to grow and develop into a more diverse, knowledge-intensive, higher value and internationally networked economy.

While Council expects these transformations to be industry-led, it also expects government at all levels to play a strong partnering role by establishing the right economic and regulatory foundations.

At the state level, this means ensuring the SA Government’s economic development and regulatory agenda is properly aligned to the requirements of the emerging low carbon economy. Business licensing, regulation and approvals regimes need to encourage management of climate challenges. For example, oversight by the Environment Protection Authority of industrial greenhouse emissions could be used to support industry processes and emissions reduction approaches that better manage energy use and carbon intensity.

Recommendation 8

The Council recommends that the SA Government partner with the business community to identify key challenges that will unlock both climate benefits and industry development outcomes.

The Council’s work has identified many industry development opportunities across the sectors that this vision has addressed. Examples are:

- Innovative products to support a high performing building and construction sector
- Building on our strengths in delivering adaptation planning and responses
- Solving key challenges in the energy sector like affordability of supplies and energy storage
- Regional and natural resource opportunities such as renewable energy and carbon farming
- New products and services for greenhouse gas efficiency and low carbon energy
- Development of export markets for low carbon and adaptation knowledge and expertise.

Recommendation 8

Create the settings for an industry led transition
Economic advantage
The Council believes that the energy sector provides an example of how South Australia can extract economic advantage from the global and national transformations taking place.

- Provide leadership at a national and international level to champion an energy transition, and promote South Australian success as a low carbon jurisdiction with competitive energy supplies.
- Develop and export our low carbon products, services and solutions to interstate markets and international markets.
- Become a net exporter of renewable electricity to interstate markets.
- Develop and provide infrastructure for our economy that builds a low carbon reputation to attract, retain and support businesses in South Australia through a lower exposure to the price risks of future carbon constraints.

![19](image)

The local markets for many innovations will depend on industry participation. This will include:

- Sectors developing and following plans to reduce emissions, with disclosure of achievements and measurable outcomes
- Business committing to actions that deliver an improvement in greenhouse gas efficiency or an adaptation benefit, investing in and adopting low carbon technologies and practices
- Business actively partnering with government and helping define the most effective support government can provide.
- Sector agreements can be used to establish industry partnerships that set goals, define the pathway and timelines for changes and develop solutions. Agreements should involve a diverse network, deliver information and improve industry capability.

Priority action 8.1
Identify and use SA Government’s regulatory and procurement levers to support the dual objectives of climate change action and industry development. Reduce regulations, policies and processes that inhibit sustainable practices.

Priority action 8.2
Design structural adjustment programs following Holden’s closure to support the continued transition to a low carbon economy.

The Council believes an integrated approach to development will allow regions to achieve economic transformation with low carbon outcomes and effective responses to climate change. The diverse economy in the area defined by the Eyre Peninsula and Upper Spencer Gulf is already undergoing changes across manufacturing, mining, farming and fishing. Early work has explored a cooperation across environment, climate and development issues.

Priority action 8.3
Trial a partnership to develop integrated solutions for industry development based on a low carbon economy vision for the Eyre Peninsula and Upper Spencer Gulf Region.

In promoting the advantages of doing business in South Australia, priority should be given to promoting businesses that are already climate change leaders. This has been a theme of our discussions with businesses and peak bodies. Council believes climate change leadership can and should be considered in existing initiatives, including Advantage SA’s work on the state brand and in key sectors such as premium food and wine, and advanced manufacturing.

Priority action 8.4
Support branding and recognition of products and services that have contributed to achieving a low carbon economy, including awards for climate achievements that support sectoral goals.

The SA Government should consider the extent to which its research and development agenda currently supports Council’s vision for a business-led transition to a low carbon economy, as well as the business case for a specific centre of excellence in climate change solutions (as outlined below).

Priority action 8.5
Establish a centre for climate change solutions to provide a hub for climate change knowledge, ideas and contacts.
A centre for climate change solutions
A dedicated centre would provide a hub for connecting businesses, academia and government in South Australia and should be financed by all three.

The centre could be supported and governed by the members of industry partnerships.

It could be the ‘go-to’ place for climate change knowledge, ideas and contacts by:

- displaying innovative prototypes from concept to development/pilot plant
- advising on training needs for workforce transition
- holding a database of sector agreements and interested parties in greenhouse gas efficiency
- collecting data to monitor low carbon economy measures
- networking on greenhouse gas and resource efficient activities
- networking for incentives/funding
- sharing information on global, national and state programs and progress
- sourcing supporting information on patents, papers and conferences for researchers
- advising the SA Government on state’s action towards a low carbon economy
- recognising/branding products that achieve high performance for climate change.
South Australia’s imagined future in 2050 will depend on what policies governments around the world adopt to cut greenhouse gas emissions.

The diagram (inside cover) illustrates three potential futures, influenced by the depth of emission cuts and industry development. What we do know is that in 2050 it will be a different world, and South Australia will be a different society: socially, technologically, environmentally, and in the way we go about our business.

**When we meet the 2050 target of 60% reduction in greenhouse gas emissions we will be living in a low carbon economy.**

It is 2050 and South Australia’s population is about 2.2 million; the world’s population is about 9 billion. South Australia relies on overseas migration to sustain its growth and workforce. The proportion of people older than 65 years has increased to 31% of the total population, and outnumbers children under 15 years.

As people are now living and working longer, older people’s contribution to South Australia’s productivity remains strong.

The weather is far more dynamic than it was at the start of the century. It is no longer seen as the problem it once was. Our dwellings are affordable and environmentally and thermally efficient. Our renewable energy, water saving practices and distributed systems mean low energy bills and decreased water usage. Air quality has improved with less reliance on transport, lower industrial and vehicle emissions, technological advances, and integrated design of the built environment and transport infrastructure.

Sustainability and prosperity measures give us new and better ways of doing things. Innovation in managerial, operational and technological advancements boost our competitive edge, generate new products and enable entry into new markets in the dominant overseas markets of China, Brazil and India. 3D printing, robotics and drones have revolutionised the manufacturing and service industries and people work in jobs that were not yet thought of in the early part of the century.

Our cities, towns and settlements are transformed into more attractive places to live, work and play through sustainable
design and function. The urban sprawl and demand for single person households seen in 2014 is limited through smart planning and social policies. We make better use of developed land and preserve our valuable agricultural land, biodiversity and water resources. Mitigation and adaptation initiatives introduced in the first quarter of the century relocated at-risk communities living in low lying areas, and those becoming too hot and dry.

Advances in medical technology and changes to social and health policies address the climbing health costs of 2014. Our aged and more disadvantaged communities are cared for and have access to well-designed community hubs. Our competitive advantage in health services make us a net exporter of medical technology and skills in aged care.

Ambitious business ventures and innovation are supported by new business models, and a workforce skilled in management, design, marketing, software and logistics. Our investment in education, skills and research focus on global Asian markets that were emerging in the first two decades and create a sustainable and prosperous state by ensuring a balance between the economic, ecological, social and cultural dimensions.

South Australia's people are resilient and adaptable. Individuals are well connected to their communities – they find local solutions and have consumer patterns and lifestyle choices that ensure resources are shared more equitably. South Australians continue to enjoy what they have always loved about living in South Australia – the lifestyle, the landscape and the culture.

South Australia is proud of the foresight and commitment shown in the early part of the century by its leaders, businesses and community, who were determined to leave a positive legacy for their children and grandchildren.

South Australia can grow and prosper on the pathway to a low carbon economy.

“A sustainable society has to be imagined first before it can be created.”

Pathways to 2050
Conclusion
The world is confronted with the choice of a planet warmed by 2°C, or a dangerous outcome of warming of up to 4°C. The Council’s vision shows that we can and should pursue a low carbon future and there is much to be gained by making this choice. The Council recommends that we choose and manage a transition pathway and reduce the risk of watching our state transformed by events beyond our control.

South Australia must recognise the opportunities presented by changes and choose to pursue them in order to become a low carbon economy that is adapting effectively to climate change. This will require strong strategic leadership aimed at pursuing benefits for South Australia, and depend on an agile response to unpredictable changes.

We need a commitment to partnerships to make this happen, involving our communities and businesses in making the choices that will lead to a strong, prosperous state. We need to use our advantage as a smaller, well-networked state to demonstrate that our connections are part of our strength.

South Australians need to act as effective change agents in tackling climate change and we need to support our most vulnerable community members as a priority.

Our transition to the efficient use of zero carbon energy is at the heart of achieving a low carbon economy. As we do this we need to position South Australia to maximise the economic benefits from the energy transition.

The protection and enhancement of our natural assets is essential to our future prosperity and we must build resilience in our landscapes, seascapes and regional communities in order to support them in adapting to the changes ahead.

This means supporting local champions for climate change action and ensuring local decision makers are well informed about the challenges for their region. The transformation that is faced in regions needs to be supported by diversifying the economies of regional communities.

Adapting our built environment to be climate resilient will mean making smart planning and investment decisions for new development that consider the long-term impacts of climate change and embrace the challenge of low carbon impact. We also need to reduce the vulnerability and improve the performance of our existing settlements and infrastructure.

Finally, the transition of our economy needs to be industry-led and partnerships between business, government, academia and community are at the heart of our advice.

We can develop and promote our good-for-business reputation and low carbon brand to remain an attractive place to develop the new businesses that will thrive in a low carbon world.

To achieve this aim we need to bring climate change action into the mainstream of state economic priorities and policy. We need to make a start now to build the infrastructure and economic foundations for our low carbon future.
Appendix

Summary of recommendations and priority actions

Recommendation 1
Continue to show strong leadership on climate change
The Council recommends that climate change leadership be the responsibility of the Premier of South Australia so that climate change considerations are integrated into all SA Government decision making and long-term initiatives................................................................. 11

Priority action 1.1
Promote our low carbon and adaptation leadership, linked to a state branding strategy that also promotes the climate change leaders in our economy................................................................. 11

Priority action 1.2
Use sector agreements under the Climate Change and Greenhouse Emissions Reduction Act 2007 to partner with industry and community and support climate change action......................................... 11

Priority action 1.3
Set a greenhouse reduction target for SA Government and invest in cost-effective opportunities to reduce the SA Government’s own carbon emissions................................................................. 11

Recommendation 2
Develop bipartisan agreement for an enduring commitment
The Council recommends that the SA Government negotiate bipartisan agreement for deep cuts in greenhouse emissions by 2050 and interim greenhouse and renewable energy targets for 2025. .................................................. 11

Recommendation 3
Undertake comprehensive consultation across community, industry, business and government
The Council recommends that the SA Government consult widely to identify cost-effective opportunities to reduce the SA Government’s own carbon emissions................................................................. 11

Priority action 3.1
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Priority action 3.2
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Priority action 3.3
Run a community challenge in South Australia to engage and partner with community and business in finding innovative solutions to the opportunities and challenges created by climate change................................................................. 13

Recommendation 4
Reduce emissions by capturing all cost effective abatement
The Council recommends that the SA Government identify cost-effective abatement options that deliver valued outcomes and work with industry sectors to design programs that are eligible for funding under the Commonwealth’s Emissions Reduction Fund................................................................. 19

Priority action 4.1
Advocate for the evolution of the GreenPower scheme to ensure South Australians continue to have easy ways to choose value-for-money low carbon alternatives................................................................. 16

Priority action 4.2
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Priority action 4.3
Use a shadow carbon price and evaluate climate change risks for all infrastructure investments................................................................. 17

Priority action 4.4
Advocate for stronger climate change action nationally and work to benefit from a considerable share of the $2.55 billion Emissions Reduction Fund................................................................. 18

Priority action 4.5
Develop a framework for prioritising investments in climate change action in order to maximise the net long-term benefits of investment and review state goals................................................................. 19

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Priority action 5.2
Direct investment toward programs and projects that safeguard the resilience of species and ecosystems at risk from climate change.... 22

Priority action 5.3
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Download a copy of South Australia’s climate change vision from: www.sa.gov.au
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