

HOW AUSTRALIA CAN THRIVE IN A LOW CARBON WORLD PATHWAYS TO PROSPERITY IN 2050



Global decarbonisation will have positive and negative implications for the Australian economy and managing the transition will be challenging due to the scale of investment involved.

We know that Australia's economy is flexible, adaptable and resilient, and Australia has abundant renewable energy resources and other natural resources that could be the basis of future comparative advantage.

This project explores what a very low carbon economy could look like.



Project Brief
May 2014

If the world takes strong action to mitigate the impacts of climate change, what are the implications for Australia?

Avoiding dangerous climate change

The international community has recognised the need to limit global warming to <math><2^{\circ}\text{C}</math> above pre-industrial levels¹.

This is in Australia's interest because we are particularly vulnerable to the likely impacts of climate change, such as increased frequency and intensity of heat waves, bushfires and other extreme weather events, which could have flow on economic, social and environmental impacts.

Today it can be hard to imagine how we might achieve this. We know that between now and 2050 global greenhouse gas emissions must decrease by more than half, while at the same time, the global population is expected to grow by one third and the global economy is expected to quadruple. There is no denying that decarbonising the global economy will be challenging.

But who would have imagined, in 1933 when the world was struggling to emerge from the Great Depression, that 36 years later there would be a man standing on the moon?

And who would have imagined, in the 1980s when telephones had rotary dials and were only found in houses and offices, just how much the smartphones of today are capable of? That time period, 36 years, is the same time period that we have for reducing carbon emissions to almost zero.

Technology can help make great change possible. This project will explore how this transition might unfold.

Australia's challenge

Deep decarbonisation is likely to drive substantial changes in the global economy and there will be significant positive and negative implications for economies and industries.

Australia's economy is emissions intensive, driven by our emissions intensive power sector and the prominence of energy intensive industries and livestock.

¹ Agreed at the 15th Conference of the Parties in Copenhagen in 2009

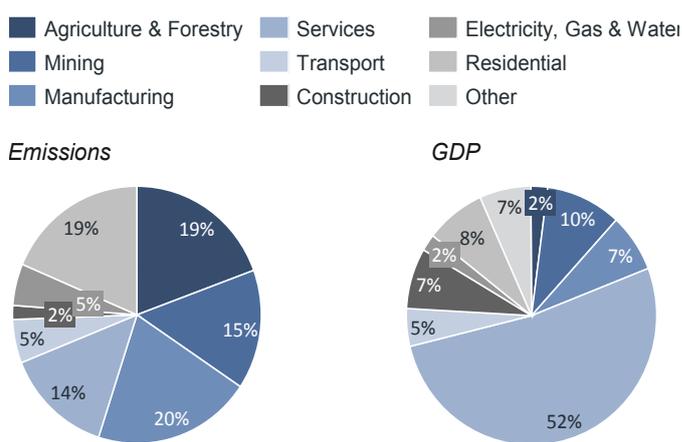
The Climate Change Authority² has calculated that Australia's share of the global carbon budget will be near zero by 2050, or earlier if progress is slow before 2020. It also argues this can be achieved at a manageable cost.

Global decarbonisation is already underway

Australia's key trading partners are decarbonising in anticipation of a low carbon world and in many cases decarbonisation is also aligned with their development goals, which include improved air quality, energy security and improved standards of living.

As a result, the competitiveness of Australia's emissions intensive economy and some of our key exports, including coal, gas, oil and beef, could be threatened.

Exhibit 1: Australia's emissions and GDP composition, %, 2011-12 (ABS 5206.0 Australian National Accounts, 2012 and Department of Environment, National Greenhouse Gas Inventory)



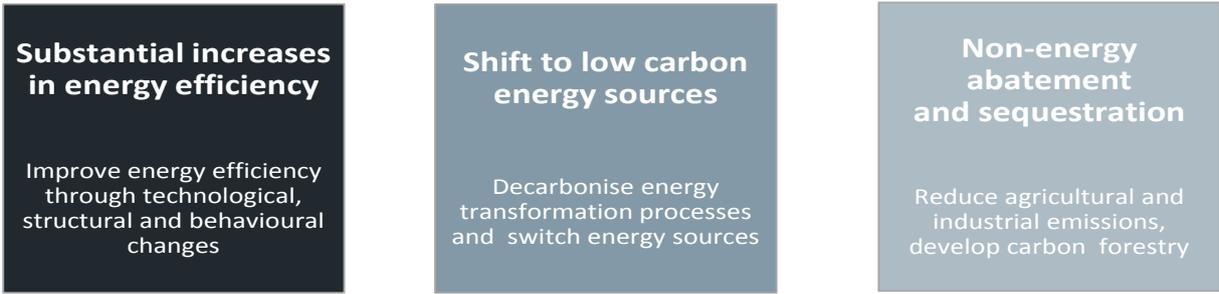
Australia can benefit from global decarbonisation

Australia's economy is flexible, adaptable and resilient, and we have a long history of benefiting from new trends in the global economy.

In the past, Australia's prosperity has been built on gold mining and wool production, today the main export drivers include tourism, education, coal production and minerals extraction.

It is important to remember that a large and growing part of Australia's economy is based on services which are not emissions intensive. In comparison, agriculture, mining and manufacturing are responsible for over 50% of the

² Reducing Australia's Greenhouse Gas Emissions: Targets and Progress Review Final Report, 2014



country’s emissions, while they contribute 20% to our GDP.

In the future, Australia could have a comparative advantage derived from our abundance of low carbon energy resources and other natural assets such as biomass and potential for geological storage.

There will be opportunities for Australia in a low carbon world and deep decarbonisation can be viewed as another major global trend that Australia can respond to and benefit from. It has also been suggested that Australia could be a low carbon superpower thanks to these natural advantages.

Deep decarbonisation pathways

Australia is fortunate to have a range of options and great potential for decarbonisation

For all countries, deep decarbonisation pathways are likely to be characterised by:

- > Substantial increases in energy efficiency
- > A switch to low carbon energy sources
- > Abatement and sequestration of non-energy emissions from industry and land (including carbon forestry)

Australia has great potential in all these areas, providing us with a range of options for decarbonisation. These include abundant renewable energy resources, substantial potential for bioenergy generation, bio-sequestration and geo-sequestration.

Based on these characteristics, Australia has the potential to generate a large amount of near zero emissions electricity, primarily through the use of renewable energy technologies and fossil fuels combined with carbon capture and storage.

This electricity could then be used to power processes that currently rely on fossil fuel combustion.

This would mean, for example, that we use electricity to fuel our vehicles instead of petrol, that we cook and heat our homes with electricity as opposed to gas, and that some large industrial processes use electricity to create heat rather than coal or gas.

A large part of the remaining emissions could be reduced through use of bioenergy and carbon capture and storage, or sequestered through reforestation.

This project explores how Australia can decarbonise prosperously

While there are multiple possible deep decarbonisation pathways, this project is conducting economic modelling of an example pathway to demonstrate how deep decarbonisation could be achieved whilst growing the economy and maintaining prosperity.

There are a range of technological, economic, social and political factors that will influence the decarbonisation pathway, so alternate pathways are being described to take account of these factors, and to demonstrate the interdependencies and trade-offs among the options.

The key challenges are being identified to highlight the decisions required to enable deep decarbonisation. The opportunities for Australia are also being explored to show what a prosperous and decarbonised Australian economy might look like.

The 2050 Deep Decarbonisation Pathways Project: How Australia can thrive in a low carbon world

The project is coordinated globally but driven locally

This project has participation from thirteen countries which collectively represent more than 75% of global greenhouse gas emissions, and is being coordinated by the Sustainable Development Solutions Network (SDSN).

The SDSN is an international network of universities and research institutions and the countries participating in the project are: Australia, Brazil, Canada, China, Europe, India, Indonesia, Japan, Mexico, Russia, South Africa, South Korea and the United States.

This means that we will gain insights such as what China is predicting in terms of renewable energy growth, what Europe and the US are assuming with regards to take up of energy efficiency, and what India's demand for coal may be.

ClimateWorks Australia and the Australian National University were appointed by the SDSN to jointly lead Australia's involvement, with modelling by CSIRO and the Centre of Policy Studies at Victoria University.

Whilst a common set of assumptions about future global trends is being used, local context and constraints are central to the analysis, e.g. Australia's emissions intensive industries and exports.

The project takes a novel approach

Rather than focussing on how the global abatement task should be allocated, all country teams are developing national deep decarbonisation pathways and the technological solutions for achieving it.

Country pathways will then be aggregated to form a global deep decarbonisation scenario, consistent with the objective of limiting global temperature rise to 2° Celsius. Country pathways are being developed within a coordinated global framework

allowing collaboration and information sharing amongst country teams.

A common set of assumptions about future global trends (e.g. energy prices) are also being used, however local context and constraints are considered (e.g. the relatively high contribution of energy intensive industries to Australia's economy).

The findings will be reported internationally and locally

The project was launched in Australia on the 21st of May 2014 by Professor Jeff Sachs, although work has been underway since the start of 2014. Each of the participating countries are preparing summaries of example pathways modelled and demonstration of the technological solutions for deep decarbonisation, which will be included in a SDSN 'Phase 1' report to be released in July 2014.

This report will be presented to UN Secretary General Ban Ki Moon in preparation for the UN General Assembly meeting and Climate Change Summit in New York City in September 2014, providing Australia's story to a global audience.

Australian report launch in September 2014

A comprehensive Australian report, accompanied by the detailed technical appendices, will be released to coincide with the UN Climate Change Summit in September 2014.

This report is intended to stimulate discussion amongst Australian industry and government stakeholders about the options for deep decarbonisation and what needs to be done to enable deep decarbonisation of the Australian economy while maintaining strong economic growth. Extensive stakeholder engagement will be undertaken to support this discussion.

Further work will be undertaken in 2015 based on the outcomes of local stakeholder engagement and the requirements of the SDSN, in preparation for a final report which will support negotiations at the COP21 climate conference in Paris in December 2015.

ClimateWorks Australia is an independent non-profit organisation whose mission is to facilitate substantial emissions reductions in the next five years in Australia by working with government, business, industry groups and the community via a collaborative research and action-based approach.

ClimateWorks Australia is hosted by Monash University in partnership with The Myer Foundation.



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