

ClimateWorks Submission to the Energy Green Paper – 4 November 2014

ClimateWorks Australia is an independent, evidence-based non-profit organisation, a partnership between Monash University and The Myer Foundation. This submission adds to ClimateWorks' submission to the Energy White Paper Issues Paper, in particular to note the findings of ClimateWorks' research completed since that submission, based on the relevant major issues presented in the Green Paper.

Reliable energy supply

As noted in ClimateWorks' submission to the Issues Paper, there are significant opportunities to improve energy security, in particular through measures to support gas efficiency and transport fuel efficiency.

Since that submission, ClimateWorks has published a report – *Improving Australia's light vehicle fuel efficiency*¹ – which finds that there is a strong case for the introduction of vehicle fuel efficiency standards in Australia as a means to improve Australia's fuel security while delivering fuel cost savings to consumers. The report finds that adoption of best practice standards could reduce demand for imported oil by up to 66 billion barrels by 2024, equivalent to 50% of all automotive fuel used in Australia in 2012. Australia is increasingly reliant on crude and fuel imports, with imports having grown from around 60% in 2000 to over 90% today.² An interruption to fuel supplies could have major implications – for example, a report by the NRMA estimates that average stockholdings of food in supermarkets are 7 days for refrigerated/frozen foods and about nine to 10 days in the case of packaged foods. By reducing reliance on imported fuel, vehicle fuel efficiency can help reduce this risk.³ A short summary of this report and other relevant research is attached.

ClimateWorks has also been working with Future Climate Australia to investigate issues that have been raised as a potential impediment to the introduction of vehicle fuel efficiency standards in Australia. In particular, the following issues have been investigated:

¹ Available via http://climateworksaustralia.org/sites/default/files/documents/publications/climateworks_vehicle_efficiency_standards_briefing_paper_feb2014_0.pdf.

² NRMA, *Australia's Liquid Fuel Security Part 2*, February 2014.

³ NRMA, *Australia's Liquid Fuel Security Part 1*, February 2013.

- **Concerns that Australia’s fuel quality – in particular its sulphur content – is insufficient to support more efficient vehicle technologies:** The attached briefing note from Anup Bandivadekar, Passenger Vehicle Program Director at the International Council on Clean Transportation concludes that “there is no direct relationship between fuel sulphur content and vehicle CO₂ emissions, and Australia's current fuel quality does not present any impediment to delivering CO₂ emission reduction at rates comparable with other regions of the world”.
- **Concerns that the efficiency of Australia’s vehicle fleet cannot be compared to the higher efficiency of vehicle fleets in other countries, particularly in European countries where average vehicle sizes are smaller:** Analysis of data from the National Transport Commission report Carbon Dioxide Emissions from New Australian Vehicles 2013 Information Paper (May 2014) suggests that if Australia’s current passenger vehicle mix were to be applied to the UK’s vehicle fleet, the UK’s average emissions for passenger vehicles would still be 140g CO₂/km in 2013, significantly lower than Australia’s 190g/km. This indicates that significantly improved efficiency standards are possible even with Australia’s large car mix.

ClimateWorks and Future Climate Australia have offered to brief the Energy White Paper team and other interested stakeholders within the Government on these issues, and are available to do so in the coming weeks.

Improving energy productivity

ClimateWorks welcomes the suggestion in the Energy White Paper that energy productivity could be improved through a national Energy Productivity Plan. In developing this plan, the Government should consider the following:

- There are significant efficiency improvements to be made by accelerating implementation of new technologies and bringing average efficiency assets and processes up to best practice. This follows from the findings of recent ClimateWorks research, which identified that the industrial processes and buildings of leading companies are significantly more efficient than those of average companies. For example, industrial companies that achieved the most energy savings were found to have implemented around six times more than the average companies, with this same trend seen across different sectors and different levels of energy intensity. Likewise, for commercial buildings, Green Star rated new office buildings were found to emit 46% less than the average office built to minimum standards.
- Most businesses and households are missing out on the benefits of improved energy efficiency, and these benefits are potentially very significant. An example

of this relates to light vehicle fuel efficiency, where ClimateWorks' research concludes that introducing best practice light vehicle CO₂ emission standards to bring Australia on a trajectory that follows best practice improvements targeted in Europe and the United States would reduce fuel costs for the average driver by \$850 per year within a decade, paying back any additional upfront costs within 3 years, and save \$7.9 billion per year across our economy through reduced fuel use. Without standards in place, Australia will fall further behind other developed nations, the majority of which have standards in place. This will reduce the competitiveness of Australian businesses, and increase cost of living pressures.

- There are a range of existing policies and programs which have effectively incentivised energy efficiency improvements, and additional policies and programs that could further incentivise energy efficiency improvements, as detailed in ClimateWorks' submission to the Issues Paper, and further research undertaken by ClimateWorks.
- The energy productivity targets and policies in effect or proposed for other countries, including the United States, the EU and China, can serve as a benchmark for Australian energy productivity measures. The US has pledged to double energy productivity by 2030, while the EU is aiming for a 20% improvement in energy efficiency by 2020 and a 27% improvement by 2030, and China is targeting 19% improvement in energy productivity by 2015 alone.
- ClimateWorks has assessed the potential to improve energy efficiency across Australia's economy to 2050, and finds that a near doubling in primary energy productivity is possible by 2030 (compared to 2010 levels) through implementation of these opportunities. This does not include other opportunities to improve energy productivity, including through technologies that are not yet technically proven but may become so before 2030 and through accelerated structural changes in the economy towards less energy intensive activities such as services. More detail is provided in Appendix A.

ClimateWorks is currently developing a report consolidating recent research on energy efficiency opportunities in Australia, and steps that could be taken to help capture these opportunities, and have offered to brief relevant Government stakeholders on this work.

Develop a better 'outlook' capacity

Since its submission to the Issues Paper, the global *Pathways to Deep Decarbonisation* report and more detailed Australian country report have been published.⁴ These reports reinforce the comments made in ClimateWorks' previous submission, that energy planning requires a long-term outlook in the context of domestic and global trends, including the international commitment to limit global warming to 2 degrees, and that taking steps to prepare for a likely international agreement in the coming years, including through the policy framework provided in the Energy White Paper, is prudent.

The Green Paper notes that the post-2020 greenhouse gas emission reduction commitments currently being negotiated by countries through the United Nations Framework Convention on Climate Change "could have implications for the composition of the global energy mix". The global *Pathways to Deep Decarbonisation* report shows that to meet the internationally agreed goal of limiting global warming to 2 degrees, all countries including Australia will need to almost completely decarbonise by 2050. For all countries deep decarbonisation of energy system relies on three pillars:

1. Energy efficiency: Greatly improved energy efficiency in all energy end-use sectors including passenger and goods transportation, through improved vehicle technologies, smart urban design, and optimized value chains; residential and commercial buildings, through improved end-use equipment, architectural design, building practices, and construction materials; and industry, through improved equipment, material efficiency and production processes, for example re-use of waste heat.

2. Low carbon electricity: Decarbonisation of electricity generation through the replacement of existing fossil fuel based generation with renewable energy (e.g. hydro, wind, solar, and geothermal), nuclear power, and/or fossil fuels (coal, gas) with carbon capture and storage (CCS).

3. Electrification and fuel switching: Switching end-use energy supplies from highly carbon-intensive fossil fuels in transportation, buildings, and industry to lower carbon fuels, including low carbon electricity, other low carbon energy carriers synthesized from electricity generation (such as hydrogen), sustainable biomass, or lower carbon fossil fuels.

This will have significant implications for the composition of the global energy mix, for Australia's energy exports, and for the energy mix in Australia. Three illustrative energy generation mix scenarios were modelled for Australia as part of the DDPP, which are

⁴ See www.climateworksaustralia.org/project/current-project/pathways-deep-decarbonisation-2050-how-australia-can-prosper-low-carbon.

presented in Figure 1 along with the energy scenarios modelled by the other participating country teams.

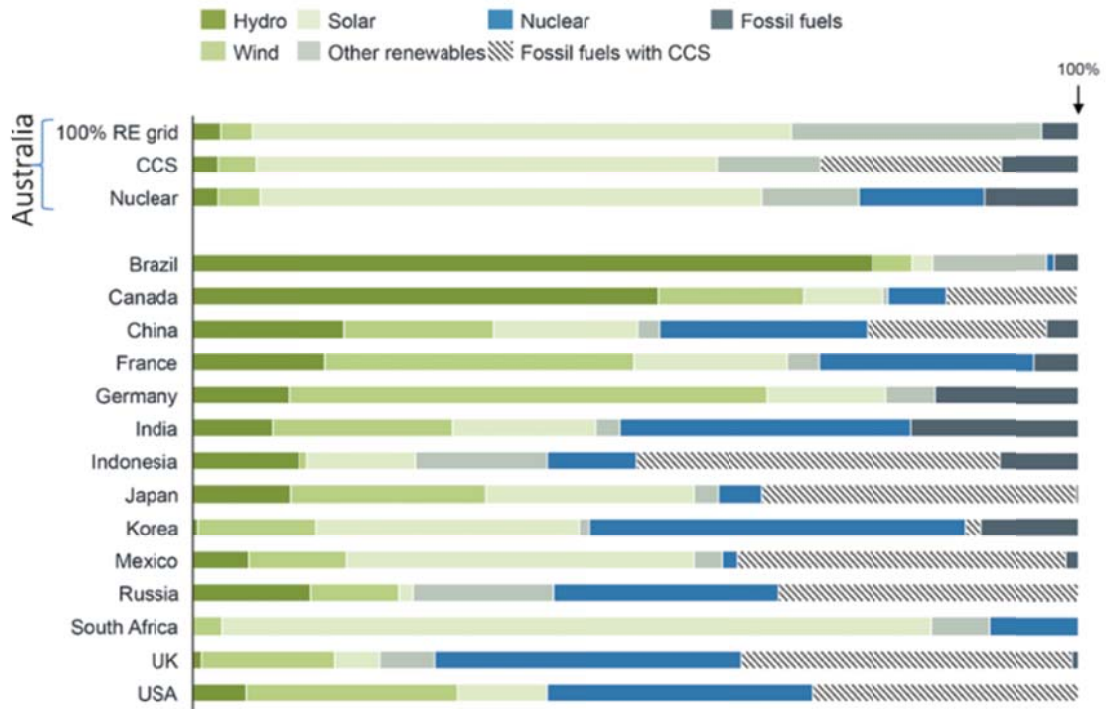
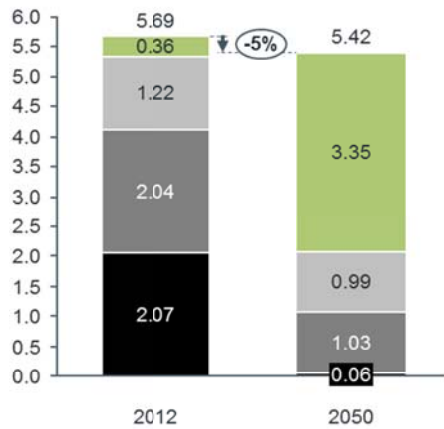


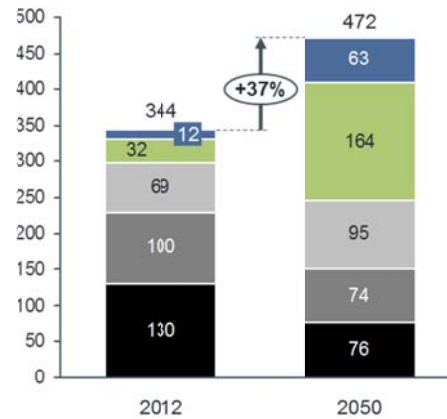
Figure 1: Energy generation mix in 2050 for the 15 DDPs

Preliminary analysis indicates that these changes to the energy system within Australia result in a decrease in total primary energy use by 5 per cent from 2012 to 2050 (see Figure 2) while GDP increases by about 150 percent. There are significant changes in the fuel mix, with coal use almost entirely phased out (the only remaining use is for coking coal in iron and steel) and an increase in renewables and biomass. At a global level, preliminary analysis again shows that primary energy use increases by 19% between 2010 and 2050 across the 15 DDP developed by other participating country teams. The use of coal and oil decreases by 40% and 30% respectively. The use of gas increases by 15% while renewable energy more than triples.

Australian primary energy use results from DDPP, EJ



Global primary energy use results from DDPP, EJ



■ Nuclear ■ Renewables & Biomass ■ Gas ■ Oil ■ Coal

Figure 2: Primary energy use in modelled Australian pathway and global primary energy use in 15 DDPs⁵

Preparing for future energy sources

The Energy White Paper is an opportunity for Australia to begin planning for this transition. The DDPP process has highlighted that in order to achieve this transition a number of actions are required:

- Accelerate action to reduce emissions now:** Many emissions reductions opportunities are already profitable today, such as energy efficiency improvements. Implementing those opportunities now will mean that less emissions reductions are required in the future to meet the carbon budget. This will provide greater flexibility, and will also reduce the cost of action.
- Avoid lock in of emissions intensive technologies:** It will be crucial to provide clear signals about Australia’s likely long-term emissions pathways to inform investment decisions. The majority of assets built today that affect emissions (for example buildings, manufacturing facilities or power plants) will still be in operation by the middle of the century. Long-term signals will ensure that new assets are compatible with the long-term emissions reduction pathway, either by implementing low carbon technologies upfront, or by ensuring that they can be retrofitted at a later date.

⁵ Note that this analysis is based on preliminary results from the 15 DDPs, including Australia’s, with further analysis planned.

- **Invest in R&D:** Large investments in R&D are needed to fill the technology and knowledge gap, as well as bring down the cost of low carbon technologies.
- **Create skills and supply chains:** Australia will need to build the supply chains which support low carbon technologies as well as develop local skills and capabilities in these new technologies and processes (e.g. to manage natural refrigerant gases, or implement deep energy efficiency).
- **Explore pathways:** Finally, it will be important to develop and continually refine country, sector and region pathways to inform investment decisions and to help make the transition smoothly.

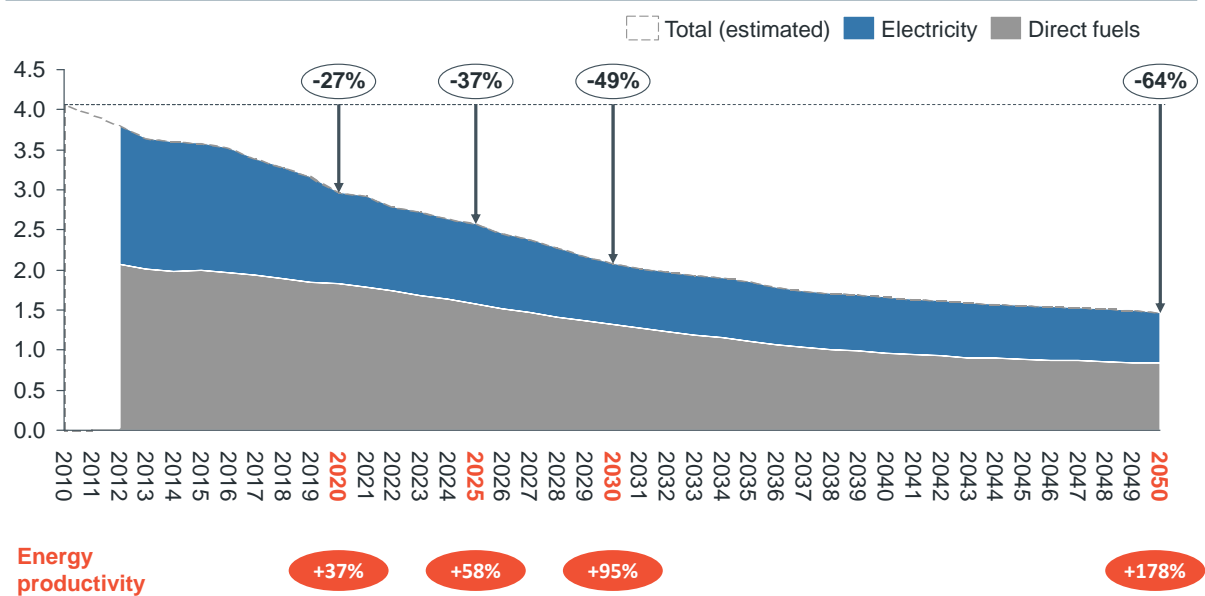
International collaboration

Through the global Deep Decarbonization Pathways Project, ClimateWorks, and our partner, Australian National University (ANU), are collaborating internationally on research which aims to understand and show how countries can transition to a very low-carbon economy, and the implications for the domestic and global energy sector. The project comprises 15 countries representing over 70% of global greenhouse gas emissions and is convened under the auspices of the Sustainable Development Solutions Network (SDSN), and the Institute for Sustainable Development and International Relations (IDDRI). ClimateWorks and ANU will continue to brief and engage with relevant stakeholders from government, business and the research community within Australia on this project to enhance international collaboration.

Appendix A - Improvements in energy productivity based on Pathways to deep decarbonization's Australian illustrative scenario

The graph below illustrates the improvements in energy productivity delivered by the illustrative pathway modelled for the *Pathways to deep decarbonization* project. In this submission, energy intensity is defined as primary energy use divided by GDP, and energy productivity is the inverse, GDP divided by primary energy use. The scope of the analysis is limited to domestic energy use, so doesn't include international transport.

Primary energy intensity of the economy*, TJ primary energy use/\$m GDP



* Primary energy consumption was estimated based on final energy consumption results, using conversion losses estimates from BREE's energy statistics. Rates of improvement in energy productivity between 2010 and 2012 were also extracted from BREE's energy statistics.