



Australian Government

Department of the Environment and Energy

Review of climate change policies

Discussion Paper



March 2017

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Making a submission

The Government invites written submissions on the Discussion Paper.

Submissions are due by 5:00pm AEST, Friday, 5 May 2017. Any submissions received after this date will be considered at the Government's discretion.

Submission instructions

Where possible, submissions should be sent electronically, preferably in Microsoft Word or other text-based formats, to the email address listed below. Submissions may be sent to the postal address below.

All submissions must include a cover sheet, available at:

<http://www.environment.gov.au/climate-change/review-climate-change-policies>

Submissions can be forwarded to:

Email: climatechangereview@environment.gov.au (preferred)

Postal: Climate Change Policies Review – Discussion Paper submissions
2017 Review Branch
Department of the Environment and Energy
GPO Box 787
CANBERRA ACT 2601

For further information, please call 1800 057 590.

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If a submission contains the personal information of any third party individuals, please indicate in the submission whether they have provided consent to the publication of their information.

Any request made under the *Freedom of Information Act 1982* for access to a submission marked confidential will be determined in accordance with that Act.

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List of abbreviations

ACCU	Australian carbon credit units
ARC	Australian Research Council
ARENA	Australian Renewable Energy Agency
CEFC	Clean Energy Finance Corporation
COAG	Council of Australian Governments
CSIRO	Commonwealth Scientific and Industrial Research Organisation
E3	Equipment Energy Efficiency
GWh	Gigawatt hours
HFCs	Hydrofluorocarbons
Mt CO ₂ -e	Million tonnes of carbon dioxide equivalence
NEM	National Electricity Market
NEPP	National Energy Productivity Plan
RET	Renewable Energy Target
SME	Small to medium enterprise
UNFCCC	United Nations Framework Convention on Climate Change

Introduction

The Australian Government is committed to addressing climate change while at that same time ensuring we maintain energy security and affordability. The Government recognises that in reducing emissions and meeting our international commitments there are economic impacts to be balanced. Through effective policies, ambitious and responsible targets, and careful management, Australia is playing its role in global efforts to reduce emissions, while maintaining a strong economy and realising the benefits of the transition to a lower emissions future.

Climate change is a global issue that requires international action. The Government has ratified the Paris Agreement and set a target of reducing emissions by 26 to 28 per cent below 2005 levels by 2030. This target amounts to a halving of per capita emissions and a two thirds reduction in emissions intensity of economic activity. It is among the strongest targets of major economies on that basis.

In announcing Australia's 2030 target, the Government committed to review its climate change policies during 2017. The review aims to ensure policies remain effective in achieving Australia's 2030 target and Paris Agreement commitments. Terms of reference for the review are at **Appendix A**.

The Government will consult with business and the community throughout the review. Submissions are invited in response to this Discussion Paper. To guide input, questions are posed at the end of each section of the Discussion Paper.

Australia's emissions reduction policies

The Government has a suite of policies in place to reduce emissions. These are summarised in Table 1, with further detail provided in relevant sections of this paper.

Table 1: Australian Government emissions reduction policies

<p>Emissions Reduction Fund</p>	<p>The Emissions Reduction Fund provides incentives for emissions reduction activities across the Australian economy. Under the Fund, a range of activities are eligible to earn Australian carbon credit units. Projects must comply with an approved method that measures verifiable reductions in emissions and sets out the rules for activities which can earn carbon credits.</p> <p>The Government purchases credits through a reverse auction system.</p> <p>The first four Emissions Reduction Fund auctions have contracted 178 million tonnes of emissions reductions at an average price of \$11.83 per tonne.</p> <p>https://www.environment.gov.au/climate-change/emissions-reduction-fund</p>
<p>Safeguard Mechanism</p>	<p>The Safeguard Mechanism is part of the Emissions Reduction Fund. It is designed to ensure emissions reductions purchased by the Government are not offset by significant increases in emissions above business-as-usual levels elsewhere in the economy.</p> <p>The Safeguard Mechanism puts limits (baselines) on the emissions of facilities that emit more than 100,000 tonnes of emissions a year. These baselines cover around half of Australia's emissions, including facilities in the manufacturing, electricity, mining, oil and gas, transport and waste sectors. A single sectoral baseline applies to grid-connected electricity generators.</p> <p>https://www.environment.gov.au/climate-change/emissions-reduction-fund/about/safeguard-mechanism</p>
<p>Renewable Energy Target</p>	<p>The Renewable Energy Target scheme aims to encourage additional generation of electricity from renewable sources and reduce emissions in the electricity sector. The scheme provides a financial incentive for investment in new renewable energy projects. It aims to grow the share of renewable energy to around 23 per cent of electricity supply by 2020.</p> <p>The RET has two components. The Large-scale Renewable Energy Target of 33,000 GWh by 2020 encourages investment in large-scale projects. The Small-scale Renewable Energy Scheme helps home-owners and small businesses to install eligible small-scale renewable energy systems and solar hot water systems.</p> <p>https://www.environment.gov.au/climate-change/renewable-energy-target-scheme</p>

<p>National Energy Productivity Plan</p>	<p>The NEPP provides a framework and an initial economy-wide work plan designed to accelerate delivery of a 40 per cent improvement in Australia’s energy productivity by 2030. The NEPP aims to boost competitiveness and growth, help families and businesses manage their energy costs and reduce emissions. The NEPP is driving change and accelerating energy productivity improvement through measures which support:</p> <ul style="list-style-type: none"> • smarter energy choices (by providing more efficient incentives, empowering consumers and promoting business action) • better energy services (by driving greater innovation, more competitive and modern markets and updating consumer protections and standards). <p>https://www.environment.gov.au/energy/national-energy-productivity-plan</p>
<p>Clean energy innovation support</p>	<p>The Government supports clean energy innovation across the spectrum of research and development, demonstration and deployment. Research and development grants are provided by the Australian Renewable Energy Agency, the Australian Research Council, CSIRO and others. Seed funding for emerging technology is provided by the Clean Energy Innovation Fund and ARENA. Projects near commercial deployment can access debt and equity from the Clean Energy Finance Corporation.</p> <p>https://arena.gov.au/about-arena/ http://www.arc.gov.au/welcome-australian-research-council-website https://www.csiro.au/en/Research/Environment https://www.environment.gov.au/news/2016/03/23/clean-energy-innovation-fund http://www.cleanenergyfinancecorp.com.au/</p>
<p>National Carbon Offset Standard</p>	<p>The National Carbon Offset Standards provide benchmarks for organisations seeking to make their operations, products, services, buildings, precincts or events carbon neutral. The Carbon Neutral Program provides a framework for certifying carbon neutrality against the National Carbon Offset Standards.</p> <p>http://www.environment.gov.au/climate-change/carbon-neutral</p>
<p>Solar communities</p>	<p>The Solar Communities program will support local responses to climate change and deliver lower electricity costs for community organisations. It will provide \$5 million in funding for community groups in selected regions to install rooftop solar panels, solar hot water and solar-connected battery systems for community-owned buildings.</p> <p>https://www.environment.gov.au/climate-change/renewable-energy/solar-communities</p>
<p>Australia’s international climate policies</p>	<p>Australia plays a leading role in global efforts to reduce emissions, including through the Asia Pacific Rainforest Partnership and the International Partnership for Blue Carbon.</p> <p>Australia supports the building of climate resilience in our region through the aid program. Australia shares expertise to support developing countries through capacity building programs on measurement, reporting and verification, particularly national inventories and in the forests and land sector. This work improves transparency and confidence in global mitigation efforts, including through international cooperation.</p> <p>https://www.environment.gov.au/climate-change/rainforest-recovery http://bluecarbonpartnership.org/</p>

The Government's policies are working to reduce Australia's emissions. The latest official emissions projections show Australia is on track to beat its 2020 target by 224 Mt CO₂-e. This includes Australia's overachievement against the first Kyoto Protocol first commitment period of 128 Mt CO₂-e.¹

In terms of Australia's 2030 target, the latest emissions projections show that Australia has made significant progress since the previous 2014–15 emissions projections. The estimated abatement task over 2021 to 2030 has reduced by more than 1,100 million tonnes of emissions — more than halving from 2,104 Mt CO₂-e to 990 Mt CO₂-e for the 26 per cent below 2005 target. This estimate does not include abatement from policies being considered in the context of this review, including work underway through the Ministerial Forum on Vehicle Emissions, the phase-down of hydrofluorocarbons and the NEPP. It also does not include any use of international units in meeting Australia's 2030 emissions target, or assume that the current estimated overachievement against the 2020 target is counted.

Full details of emissions projections are available in Australia's Emissions Projections 2016.

<https://www.environment.gov.au/climate-change/publications/emissions-projections-2016>

Australia's Paris target

More than 190 countries came together in December 2015 to form the Paris Agreement. In order for the Agreement to enter into force, 55 countries accounting for at least an estimated 55 per cent of global greenhouse gas emissions must ratify the agreement in accordance with their domestic processes. This has now happened, with the Agreement entering into force on 4 November 2016. So far more than 130 countries have ratified the Agreement, including Australia on 9 November 2016.

Business and community awareness of climate change has grown in recent years. The Paris Agreement was a strong signal to markets that the transition to a lower-emissions future is underway. Climate change is an increasingly important influence on the cost and availability of capital and companies are increasingly stress-testing their business models and portfolios against emission reduction and transition scenarios in the context of the Paris Agreement.ⁱ A flexible and scalable approach to policy is important — balanced against the importance of providing business and investors with policy stability and certainty.

Under the Agreement, Australia will continue to set its own emission reduction targets in contribution to the international effort to hold the increase in the global average temperature to well below 2 degrees above pre-industrial levels.

The Paris Agreement²

A new global climate agreement (the 'Paris Agreement') was agreed under the United Nations Framework Convention on Climate Change at the 21st Conference of the Parties in 2015.

The Paris Agreement sets in place a framework for all countries to take action on climate change, building on the Kyoto Protocol and other international efforts. Under the Agreement, all countries have committed to (among other things):

- an overarching goal to hold global average temperature increase to well below 2 degrees and pursue efforts to keep warming below 1.5 degrees above pre-industrial levels
- aim to reach global peaking of greenhouse gas emissions as soon as possible and to achieve a balance between emissions and removals of greenhouse gases in the second half of this century
- communicate a nationally determined contribution on ratification of the agreement and every five years from 2020 onwards, with each successive contribution representing a progression on the last
- report on national emissions and progress towards targets
- promote action to adapt and build resilience to climate impacts.

The Agreement makes provision for a framework for the international trade of emissions reductions and for providing financial, technological and capacity building support to help developing countries implement the Agreement.

Over 130 countries have ratified the Agreement, including Australia.³ The Agreement entered into force on 4 November 2016. Most of its provisions take practical effect from 2020.

Negotiations to finalise the detailed 'rule book' for the Agreement are ongoing, with key provisions to be agreed by the end of 2018.

ⁱ In December 2015, the G20 Financial Stability Board established an industry-led Task Force to "develop a set of voluntary ... recommendations for use by companies in providing information to investors, lenders and insurance underwriters about the financial risks companies face from climate change". <http://www.fsb.org/2015/12/fsb-to-establish-task-force-on-climate-related-financial-disclosures/> The Task Force released a draft report in December 2016.

In the lead-up to the 2015 climate change conference, Australia submitted its 2030 target of 26 to 28 per cent below 2005 levels as an 'Intended Nationally Determined Contribution' under the Paris Agreement.⁴ This became Australia's first Nationally Determined Contribution when it ratified the Agreement on 9 November 2016.

The full text of Australia's Nationally Determined Contribution is available on the UNFCCC website.
<http://www4.unfccc.int/Submissions/INDC>

Under the Paris Agreement, all countries are required to put forward Nationally Determined Contributions, including domestic mitigation measures, every five years, starting from 2020.⁵ Parties, like Australia, whose first NDC includes a 2030 commitment can re-communicate or update their current NDC in 2020 and communicate a new NDC in 2025.⁶ Each successive contribution is expected to represent a progression beyond an individual country's current contribution. This means that under the five-yearly reviews, Australia is required under the Paris Agreement to submit a further target by 2025.

The Paris Agreement aims to achieve a peak in global emissions as soon as possible and rapid reductions thereafter, achieving a balance in the second half of the century between emissions from human activities and removing emissions from the atmosphere through 'sinks' such as forests or blue carbon.

To chart a path, under the Paris Agreement, countries are encouraged to develop 'long-term low greenhouse gas emission development strategies' by 2020.⁷ Five major economies have already done so (United States, Canada, Mexico, France and Germany) and many others are expected to follow. These strategies include indicative long-term emissions reduction goals (in the range of 75 to 95 per cent below 1990 or 2005 levels by 2050 for developed countries) and set out broad pathways to guide shorter-term policy settings.

In Australia's submission to the Paris process in August 2015, Australia committed to consider a potential long-term emissions reduction goal for Australia beyond 2030.

Questions

Australia has committed to considering a potential long-term emissions reduction goal for Australia beyond 2030. What factors should be considered in this process?

What process could Australia use to implement its Paris commitment to review targets every five years?

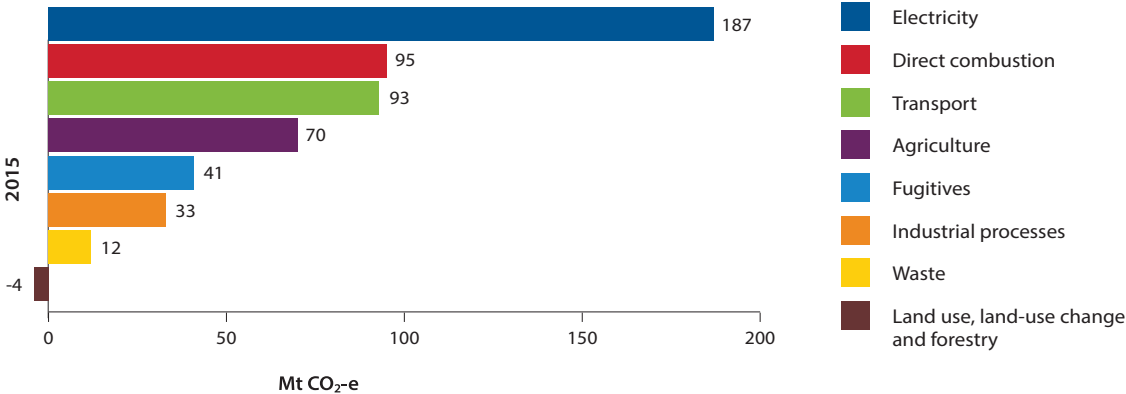
What are the issues in the transition to a lower emissions economy with respect to jobs, investment, trade competitiveness, households (including low income and vulnerable households) and regional Australia?

Sectoral analysis

Emissions are produced from a range of activities across different sectors of the Australian economy. Each sector has opportunities and challenges in reducing emissions. Australia's total emissions in 2015 were 527 Mt CO₂-e.⁸

The remainder of this paper outlines emissions and economic contribution for each sector and current policies in place. Each section concludes with a set of questions. Sectors have been defined to reflect how current policies apply across the economy. Emissions from each sector are covered in more detail in Australia's Emissions Projections 2016.⁹ The sectors used here aggregate some of Australia's emissions reporting sectors described in Figure 1.

Figure 1: Australia's estimated emissions by sector, 2015



Source: Australia's emissions projections 2016, Commonwealth of Australia 2016

Note: Emissions data in this document use the definition of reporting year used in the National Greenhouse Gas Inventory. Reporting years for all sectors except land use, land use change and forestry are reported for financial years as key data sources are published on this basis. For instance, '2030' refers to financial year 2029–30.

Electricity generation

Electricity supply contributed \$26.4 billion to Australia’s economy in 2015 and employed 65,100 people, many in regional areas.¹⁰ Secure, reliable and affordable electricity is critical for Australian businesses and an essential service for Australian households.

Electricity generation is Australia’s largest source of emissions. It accounted for 187 Mt CO₂-e in 2015, 35 per cent of Australia’s total emissions (including both on and off-grid generation).¹¹

The electricity sector is undergoing a transition. A number of aging coal-fired power stations have closed in recent years, electricity demand has fallen and is likely to remain relatively flat and renewable energy generation is growing. This is rapidly changing the way electricity is generated, distributed and supplied.

The Government's approach to energy policy is to take a technology neutral approach to deliver the trifecta of secure and affordable power as Australia transitions to a lower emissions future.

A blueprint to ensure energy security is being developed through an independent review led by Australia’s Chief Scientist, Dr Alan Finkel AO (the ‘Finkel Review’). The blueprint will outline national policy, legislative and rule changes required to maintain the security, reliability and affordability of the National Electricity Market in light of the transition taking place. Dr Finkel’s recommendations on climate change policies will be an important input into this review, as will submissions made to the Finkel Review.

The transition in the electricity sector (as with all sectors) requires careful consideration of its enabling conditions (such as the investment climate, security and reliability). Implications for electricity prices, jobs, regions, cost of living and international competitiveness need to be considered. A less emissions-intensive electricity sector can also support emissions reductions elsewhere by replacing other, more emissions-intensive, fuel sources — for example, in industrial facilities and through electric vehicle uptake.

Emissions reduction policies in the electricity sector

The major policies currently supporting emissions reductions in the electricity sector are set out in Table 2.

Table 2: Climate change policies in the electricity sector

Emissions Reduction Fund	<p>Under the Facilities Method electricity generators can earn carbon credits by reducing emissions per unit of output, for example, by switching to a low-emission fuel or installing high efficiency electricity generation equipment.</p> <p>https://www.environment.gov.au/climate-change/emissions-reduction-fund/methods/facilities</p>
Safeguard Mechanism	<p>The Safeguard Mechanism applies a single sectoral baseline to grid-connected generators. The baseline is set at 198 Mt CO₂-e. If this limit is breached, each generator will become responsible for keeping their emissions below a baseline unique to each generator. To date, the sector-wide baseline has not been breached and, based on current projections, this is not expected to occur in the period to 2030. The Safeguard Mechanism also applies to large off-grid electricity generators.</p> <p>http://www.cleanenergyregulator.gov.au/NGER/The-safeguard-mechanism/Baselines/Sectoral-baseline</p>

Renewable Energy Target	<p>Eligible large-scale renewable energy generators, like solar and wind farms, hydro-electric and biomass power stations, can create certificates under the Large-scale Renewable Energy Target. Electricity retailers are obligated to buy and surrender a certain amount of certificates to the Clean Energy Regulator each year. This operates as a subsidy to renewable energy generators. The Small-scale Renewable Energy Scheme provides upfront support to homeowners and small businesses for small-scale (less than 100 kilowatt capacity) wind, hydro and solar panel systems.</p> <p>https://www.environment.gov.au/climate-change/renewable-energy-target-scheme</p>
Clean Energy Finance Corporation and Australian Renewable Energy Agency	<p>The CEFC uses debt and equity funding to promote investment in clean energy technologies. Since its inception in 2013 to 30 June 2016, CEFC had invested \$840 million in projects to reduce emissions from energy and industrial processes, including wind farms, solar energy and energy storage.</p> <p>ARENA provides research, development and deployment funding to improve the affordability and supply of renewable energy in Australia. At 30 June 2016, ARENA had committed almost \$1 billion in funding to 272 projects.</p> <p>http://annualreport2016.cleanenergyfinancecorp.com.au/media/1243/cefc-annual-report-2015-16.pdf</p> <p>https://arena.gov.au/about-arena/corporate-publications/arena-annual-report-2015-16/</p>
National Energy Productivity Plan	<p>Measures under the NEPP reduce energy demand, support more and smarter energy choices, and support markets for new energy services and technologies. Measures include rollout of smart meters and cost-reflective pricing, minimum standards for appliances and buildings and improving awareness of cost-effective opportunities in business and industry.</p> <p>http://www.coenergyCouncil.gov.au/sites/prod.energyCouncil/files/publications/documents/NEPP%20Annual%20Report%202016.pdf</p>
State and territory policies	<p>State and territory governments have put in place or announced policies to encourage new renewable generation. The Australian Capital Territory Government has used contracts-for-difference, awarded through a reverse auction to meet the Territory's 100 per cent renewable energy target. Other states, including Victoria, Queensland and South Australia have announced renewable energy targets.</p> <p>http://www.environment.act.gov.au/energy/cleaner-energy/renewable-energy-target,-legislation-and-reporting</p> <p>http://www.delwp.vic.gov.au/energy/renewable-energy/victorias-renewable-energy-targets</p> <p>https://www.dews.qld.gov.au/electricity/solar/solar-future/expert-panel</p> <p>http://www.renewables.sa.gov.au/</p>

Questions

What are the opportunities and challenges of reducing emissions from the electricity sector?
Are there any implications for policy?

How can energy and climate policy be better integrated, including the impact of state-based policies on achieving an effective national approach?

Are there particular concerns or opportunities with respect to jobs, investment, trade competitiveness, households and regional Australia that should be considered when reducing emissions in the electricity sector?

Households, small to medium-sized enterprises and the built environment

Australia's households are responsible for around 12 per cent of Australia's emissionsⁱⁱ, and SMEs around 7 per centⁱⁱⁱ.

As the population and building stock continue to grow, emissions will rise in the absence of strong efficiency measures. In recent years, over 200,000 new homes have been built annually.¹² Similarly, the net number of SMEs has increased by around 1 per cent a year since 2013.¹³ Australia's approximately 2.1 million SMEs¹⁴ employ almost 70 per cent of the private-sector workforce.¹⁵

Households, SMEs and the built environment directly emit greenhouse gases through use of natural gas and other fuels and use of hydrofluorocarbons in refrigerators and air conditioners. They also indirectly contribute to emissions through electricity consumption. The majority of household-related emissions are associated with heating, ventilation and air conditioning, lighting and hot water systems.

Many households have reduced their electricity consumption over the past seven years due to the combination of more efficient appliances in homes and increased uptake of rooftop solar systems. A world-leading 15 per cent of households in Australia now have rooftop solar installed.¹⁶ Continuation of these trends is expected to keep total household energy demand steady over the next 20 years, despite the growing number of homes.¹⁷ However, these trends will most likely obscure unevenly distributed impacts, as some households have more capacity to purchase new appliances and benefit from reduced electricity consumption than do others.

While electricity and gas prices have risen strongly over the last decade, energy use in SMEs is less efficient in comparison with other parts of the economy.¹⁸ Across SMEs of all types, analysis suggests that cost-effective energy efficiency measures could reduce energy consumption by as much as 30 per cent.¹⁹

Barriers to realising this potential include constraints on capacity, lack of information, the upfront costs of making improvements and split incentives for renters and landlords to improve energy efficiency.

Policies to improve energy productivity and reduce emissions in households, SMEs and the built environment

Many analysts have suggested that improving household, SME and the built environment energy productivity is a large, low-cost potential source of future emissions reductions.^{20, 21, 22, 23} Energy productivity represents how much value investment in energy delivers. It is defined as national gross domestic product divided by petajoules of primary energy (a measure of the total energy supplied within the economy).²⁴ Activities to improve energy productivity can cost-effectively reduce energy costs as reported in many SME program evaluations.^{25, 26, 27, 28} For SMEs, improving energy productivity (which often includes modernising equipment) can also improve product quality and output, reduce business risk, increase profitability and competitiveness and create new business opportunities.

Current policies aimed at reducing emissions and improving household, SME and the built environment energy productivity are summarised in Table 3.

ii This excludes emissions from transport.

iii Commercial and construction sectors only.

Table 3: Energy productivity and emissions reduction policies for households, SMEs and the built environment

<p>National Energy Productivity Plan</p>	<p>The NEPP is a national framework and economy-wide work plan to improve energy productivity. It coordinates 34 measures across energy market reforms and energy efficiency, including:</p> <ul style="list-style-type: none"> • The Equipment Energy Efficiency program, which is implemented through the Commonwealth's <i>Greenhouse and Energy Minimum Standards Act 2012</i>, develops minimum performance standards and related labels for appliances and equipment to remove the worst-performing products from the market and help consumers choose efficient products. • Advancing National Construction Code energy efficiency requirements for new homes, commercial buildings and major renovations and improving compliance with energy efficiency requirements. • Expanding and improving disclosure of energy performance of homes and commercial buildings, through the Commercial Buildings Disclosure program, the National Australian Built Environment Rating Scheme and a national collaborative approach to residential building energy ratings and disclosure. • Improving wider consumer information and tools, such as Energy Made Easy, Your Energy Savings, Your Home and Energy Efficiency Exchange websites, which provide information and case studies on how households and businesses can reduce their energy use and costs. • Improving energy productivity in government. <p>http://www.coagenergycouncil.gov.au/publications/national-energy-productivity-plan-2015-2030</p>
<p>Energy market reforms</p>	<p>As a part of the NEPP, the COAG Energy Council will implement energy market reform to provide consumers with more decision-making tools and technology choices. Recent reforms give consumers more choice about who they buy electricity from and more information to help manage their electricity use. This makes it easier to adjust electricity use to save money. These reforms have also removed barriers to selling electricity from solar panels and batteries back to the grid.</p> <p>http://environment.gov.au/energy/markets</p>
<p>Emissions Reduction Fund</p>	<p>The Emissions Reduction Fund includes five methods that can support emissions reductions by small energy users, through projects such as more efficient lighting, draft-sealing, equipment controls, efficient refrigeration and fuel-switching. To date, 18 of these projects have been registered, with two projects contracted to deliver around 2.5 Mt CO₂-e of emission reductions.</p> <p>http://www.cleanenergyregulator.gov.au/ERF/Forms-and-resources/methods/resources-for-energy-efficiency-methods</p>

Hydro-fluorocarbon management	<p>The Government has committed to an 85 per cent phase-down of HFC imports by 2036, bans on specified new equipment and an information program to improve equipment maintenance. The phase-down is proposed to start in January 2018.</p> <p>https://www.environment.gov.au/protection/ozone/legislation/opsggm-review/hfc-phase-down-faqs</p>
Renewable Energy Target	<p>Homeowners and small businesses are eligible for upfront support through the Small-scale Renewable Energy Scheme when they install small-scale renewable energy systems (less than 100 kilowatt capacity). As of 1 December 2016, over 2.5 million installations have been made under the scheme.²⁹</p> <p>https://www.environment.gov.au/climate-change/renewable-energy-target-scheme http://www.cleanenergyregulator.gov.au/RET/Forms-and-resources/Postcode-data-for-small-scale-installations</p>
State and territory policies	<p>Some state and territory governments have relevant measures in place, including:</p> <ul style="list-style-type: none"> • Energy efficiency obligation schemes ('white certificate' schemes), which require energy retailers to meet annual energy savings or emissions reduction targets. Each scheme has a range of approved activities, for which accredited organisations receive certificates from scheme administrators. Retailers meet their targets by purchasing these certificates. These schemes exist in the Australian Capital Territory, New South Wales, South Australia and Victoria. • Tailored information to SMEs to help identify energy savings opportunities and options in New South Wales and Victoria. • Rebates to undertake energy audits and to implement energy saving projects in the Australian Capital Territory, New South Wales, Queensland, South Australia and Victoria. • Voluntary programs to reduce emissions from businesses, local government and households. <p>Links to energy efficiency obligation schemes:</p> <p>http://www.actsmart.act.gov.au/what-can-i-do/homes/energy-efficiency-improvement-scheme http://www.ess.nsw.gov.au/Home https://www.sa.gov.au/topics/energy-and-environment/using-saving-energy/retailer-energy-efficiency-scheme https://www.veet.vic.gov.au/Public/Public.aspx?id=Certificates(VEECs)</p> <p>Links to rebates for businesses:</p> <p>http://www.actsmart.act.gov.au/what-can-i-do/business/business-energy-and-water-program http://www.environment.nsw.gov.au/business/energy-saver.htm http://www.cciqecobiz.com.au/ http://www.zerowaste.sa.gov.au/industry/working-with-your-business/what-we-offer http://www.sustainability.vic.gov.au/services-and-advice/business/energy-and-materials-efficiency-for-business/boosting-productivity</p>

<p>Clean energy innovation support</p>	<p>The CEFC uses debt and equity funding to promote investment in clean energy technologies. The CEFC invests for a positive financial return.</p> <p>The CEFC has facilities in place with the Commonwealth, Westpac and National Australia banks to provide more than \$400 million in energy efficiency loans for small businesses, small-scale commercial property, manufacturers and the agricultural sector.</p> <p>To date, the CEFC has delivered over \$100 million in indirect finance to support more than 500 small projects and businesses.</p> <p>The CEFC also supported the ANZ bank in its first green bond issuance by providing a cornerstone commitment of up to \$75 million. The ANZ green bond supports investments in green buildings and renewable generation. As the bonds were fully subscribed by private sector investors, the CEFC's commitment was not called upon.</p> <p>http://www.cleanenergyfinancecorp.com.au/where-we-invest/new-sources-of-capital.aspx http://www.cleanenergyfinancecorp.com.au/about-us.aspx</p>
<p>Solar Communities and the Food Rescue Charity Program</p>	<p>The Solar Communities program will provide \$5 million in funding for community groups in selected regions to install rooftop solar panels, solar hot water and solar-connected battery systems for community-owned buildings.</p> <p>The \$1.2 million Food Rescue Charity Program will assist four charities to invest in solar, batteries and energy efficient refrigeration.</p> <p>https://www.environment.gov.au/climate-change/renewable-energy/solar-communities</p>
<p>National Carbon Offset Standard</p>	<p>The Australian Government is working with the property sector to develop voluntary carbon neutral standards for buildings and precincts. These are an expansion of the existing National Carbon Offset Standard already available for organisations, products and services. Carbon neutral certification against the standards is providing new opportunities for building owners and precinct operators to demonstrate climate leadership.</p> <p>https://www.environment.gov.au/climate-change/carbon-neutral/ncos</p>

The NEPP is a 15-year work program of existing and new measures. Existing measures include the roll out of smart meters and cost-reflective electricity pricing. Successful measures, such as commercial building disclosure, the E3 priority plan (see case study on page 18) and work on higher building standards, are being expanded.

Many of the NEPP activities underway are the first steps in developing potential NEPP policies and programs. Progressing further options in these and other new program areas will be necessary to meet the NEPP goal of a 40 per cent improvement in energy productivity between 2015 and 2030.

- Energy Consumers Australia is undertaking research to better understand consumer behaviour and how to improve market-led tools and services to make energy choices easier, in particular for vulnerable consumers.
- The Ministerial Forum on Vehicle Emissions is considering options to reduce emissions and improve energy productivity in vehicles, with a range of options currently in consultation.
- Extensive research and work with industry groups is underway on options to support and increase energy productivity in SMEs.
- The E3 Program is undertaking a study of potential benefits in covering new and emerging products and technologies that are not currently covered by Greenhouse and Energy Mandatory Standards.

- Reviews are underway on reducing barriers to, and ensuring protections for, consumers adopting emerging technologies like batteries, electric vehicles and smart appliances.
- Some states and territories have recently announced new strategies which complement the NEPP and may include further measures relevant to the NEPP in the future. These include the NSW Climate Change Strategic Plan and the Victorian Energy Efficiency and Productivity Strategy.

New NEPP measures will be developed in consultation with stakeholders and assessed against robust criteria, including: cost-effectiveness, clear and direct benefits for stakeholders and the wider economy and minimal market intervention and regulatory costs.

Each NEPP measure will be delivered by the most appropriate body, for example: collaboratively by COAG; by the Commonwealth; by one or more jurisdictional governments or voluntarily by industry or community bodies.

International experience shows efficiency improvements to new and existing buildings can reduce consumption even if the population is growing. For example, in the United Kingdom building energy consumption fell by 11 per cent from 2000 to 2012 despite population growth of over 6 per cent.³⁰ This has been achieved through a range of policies including disclosure and labelling, incentive schemes and building codes.

Case study: Green building investment in Australia

Australia is one of the strongest performers in sustainable real estate practices. The 2016 Global Real Estate Sustainability Benchmark, an assessment of USD \$2.3 trillion worth of property assets, scored Australia and New Zealand at 74, 14 points higher than the global average score of 60.³¹ This high performance is attributed to:

- annual disclosure of sustainability performance
- high uptake of green building certificates and energy ratings
- high uptake of best practice leases with sustainability clauses.

This performance makes Australia an attractive destination for pension and superannuation funds looking to invest in sustainable property. According to available estimates, at least USD \$2.6 billion is currently invested by funds in green building projects across Australia and New Zealand.³²

Case study: Equipment Energy Efficiency (E3) program

The COAG Energy Council's E3 program develops minimum energy performance standards and related labels for appliances and equipment.

The program has helped improve household energy productivity by almost 60 per cent over the last 15 years. For example, modern fridges are much bigger than in the 1990s, but they use less than half the power.

Implementation of the E3 Program's 2016 Prioritisation Plan program to accelerate the impact of this program is pursuing greater energy savings in six appliance groups: air conditioning, commercial refrigeration, lighting, pool pumps, fridges and freezers and non-domestic fans. These changes are estimated to save consumers up to hundreds of dollars a year and reduce emissions by up to 29 Mt CO₂-e to 2030.

Questions

What are the opportunities and challenges of reducing emissions for households, SMEs and the built environment? Are there any implications for policy?

Are there particular concerns or opportunities with respect to jobs, investment, trade competitiveness and regional Australia that should be considered for households, SMEs and the built environment?

Resources, manufacturing and waste

The industrial sectors are important contributors to the Australian economy and regional areas. Resources and manufacturing represent more than half of Australian exports.³³ In 2015, resources represented 8.7 per cent of GDP,³⁴ employed around 173,000 people³⁵ and had exports worth \$172 billion.³⁶ In 2015, manufacturing represented 6.2 per cent of GDP,³⁷ employed around 856,000 people and represented 14 per cent of exports.³⁸ The waste industry employed around 32,000 people in 2015.³⁹

Direct emissions from the resources, manufacturing and waste sectors account for 28 per cent of Australia's total emissions.⁴⁰ This excludes emissions from transport.

Case study: Simplot Australia

Simplot Australia produces some of Australia's best known food brands including Edgell, Chiko, Birds Eye, Harvest and Leggo's.

In 2008, its U.S. parent (J R Simplot Company) pledged to reduce its energy intensity (total energy per unit of output) by at least 25 per cent over 10 years.

Globally, 16 of Simplot's industrial factories have reduced their energy intensity more than 10 per cent. Two factories reduced their energy intensity by 25 per cent only three years into the pledge.

Simplot achieved these results by embedding a culture of energy efficiency into the organisation, as well as through capital projects. Targeting energy efficiency helps Simplot achieve environmental objectives and improve the economic sustainability of its business.

Simplot's emission reduction projects in Australia include:

- Simplot's Ulverstone plant in Tasmania produces potato products for the frozen and fast food industries, including frozen french fries and hash browns. The company converted its coal-fired boilers to natural gas, reducing emissions by an estimated 39,000 tonnes each year.
- At Simplot's Bathurst site, large amounts of water and energy are needed to create steam for blanching vegetables and cooking canned products. Efficient boiler operation saves energy and emissions. Simplot upgraded its boilers saving 8,400 GJ of natural gas and 433 tonnes of carbon emissions each year.
- Simplot improved refrigeration efficiency at three warehouses, reducing emissions by 3,300 tonnes a year.
- Simplot has worked with its logistics providers to reduce transport emissions through reduced mileage and lower emission vehicles, including alternative transport modes such as rail or ship.⁴¹

International competitiveness

Climate change is a global issue requiring a global response. The pace at which other countries move on their commitments under the Paris Agreement and the effect this has on Australian businesses is an important consideration. It is necessary to consider the potential impacts on trade competitiveness associated with policies to achieve the 2030 target given the risk of unduly penalising Australian industry if our actions to reduce emissions are out of step with Australia's trade competitors.

Emissions reduction policies in Australia’s industrial sectors

Current policies in the resources, manufacturing and waste sector are set out in Table 4.

Table 4: Emissions reduction policies in Australia’s industrial sectors

<p>Emissions Reduction Fund</p>	<p>There are currently eight methods available for the industrial, manufacturing and waste sectors. These support activities to reduce methane emissions from coal mines, oil and gas facilities and landfills, improve the energy efficiency of industrial operations and reduce the emissions intensity of facilities.</p> <p>To date, 174 projects have been registered, including:</p> <ul style="list-style-type: none"> • 22.2 Mt CO₂-e of emission reductions contracted from 91 projects in the waste sector • 5.2 Mt CO₂-e contracted from 10 projects to reduce fugitive emissions at coal mines • 1.9 Mt CO₂-e contracted from seven industrial energy efficiency projects • 66 projects registered under the Fund but not contracted to date. <p>https://www.environment.gov.au/climate-change/emissions-reduction-fund/methods http://www.cleanenergyregulator.gov.au/ERF/Forms-and-resources/methods</p>
<p>Safeguard Mechanism</p>	<p>The Safeguard Mechanism applies to around 110 businesses in the resources, manufacturing and waste sectors. It sets emissions limits (baselines) on facilities that emit more than 100,000 tonnes of emissions a year.</p> <p>Baselines were initially set at the high point of emissions between 2009 and 2014 to recognise past investments, but their relationship to current emissions varies significantly among facilities. Baselines can be increased in some circumstances where historical emissions are not representative of future emissions.</p> <p>From 2020, baselines for new investments will be set with reference to Australian best practice.</p> <p>http://www.cleanenergyregulator.gov.au/NGER/The-safeguard-mechanism/Baselines/Sectoral-baseline</p>
<p>Renewable Energy Target</p>	<p>The industrial and waste sectors are eligible to create large-scale generation certificates under the RET when they generate electricity from renewable energy sources. In 2015, 149 power stations were accredited for fuels such as landfill and sewage gas, bagasse, black liquor and other biomass-based components.⁴²</p> <p>Exemptions under the RET scheme apply in respect of electricity used in undertaking specific emissions-intensive, trade-exposed (EITE) activities. There are 53 eligible EITE activities within sectors including aluminium, steel, cement, glass, paper, plastics and chemicals.</p> <p>https://www.environment.gov.au/climate-change/renewable-energy-target-scheme</p>
<p>National Energy Productivity Plan</p>	<p>The NEPP committed to develop further measures to improve energy productivity in the industrial and resources sectors. Measures in early-stage development promote voluntary action and support research, for example, helping businesses self-manage energy costs through information, capacity building and improved services, recognising and promoting business leadership and best practice and voluntary commitment programs.</p> <p>https://www.environment.gov.au/energy/national-energy-productivity-plan</p>

Clean energy innovation support	<p>The CEFC is working with the private sector to deliver capital investment solutions to reduce emissions from industrial processes.</p> <p>ARENA can fund research and development to assist with reducing emissions from the industrial sectors from renewable energy.</p> <p>http://www.cleanenergyfinancecorp.com.au/ https://arena.gov.au/about-arena/</p>
Support for carbon capture and storage	<p>The Government and private sector are supporting a range of carbon capture and storage research, development and demonstration activities including:</p> <ul style="list-style-type: none"> • Chevron’s Gorgon project (Western Australia), Australia’s first commercial-scale carbon capture and storage project, expected to commence capturing CO₂ from its natural gas field in the second half of 2017. Each year 3 to 4 million tonnes of CO₂ will be injected into undersea storage, reducing emissions from the facility by 40 per cent • CarbonNet (Victoria), a Victorian Government project assessing the feasibility of full-scale carbon capture use and storage in the Latrobe valley, including the possibility of brown coal-to-hydrogen export • The CO2CRC Otway Project (Victoria) is a world-leading storage monitoring facility proving the feasibility of CO₂ underground storage. • The Callide Oxyfuel Project (Queensland), the first industrial-scale demonstration of how oxyfuel and carbon capture technology can be applied to existing power stations, successfully completed in collaboration with Japanese industry.
National Carbon Offset Standard	<p>A National Carbon Offset Standard is available for manufactured products to demonstrate climate leadership. Carbon neutral products can create brand differentiation and gain a competitive edge, for example through carbon-smart procurement chains.</p> <p>http://www.environment.gov.au/climate-change/carbon-neutral</p>
State and territory policies	<p>Some state and territory licence conditions for mining, oil and gas and waste projects require operators to manage their methane emissions. Some state-based energy efficiency schemes encourage energy efficiency (NSW, VIC) at industrial facilities. NSW supports large energy using companies through its Energy Saver and Sustainability Advantage funding programs.</p> <p>http://www.environment.nsw.gov.au/business/energy-saver.htm http://www.environment.nsw.gov.au/sustainabilityadvantage/</p>

Questions

What are the opportunities and challenges of reducing emissions from the resource, manufacturing and waste sectors? Are there any implications for policy?

Are there particular concerns or opportunities with respect to jobs, investment, trade competitiveness, households and regional Australia that should be considered when reducing emissions in the industrial sector?

Transport

Australia's transport system is large by world standards, with a per-capita road length twice that of Canada. Australia's rail system is the seventh largest in the world. The Australian population travels more than 1.15 billion kilometres a day, with the average Australian travelling a total of 49 kilometres daily. Nearly five million tonnes of freight are moved within Australia each day, with trucks responsible for around 70 per cent of the freight movement task.⁴³

The transport sector was responsible for 93 Mt CO₂-e of emissions in 2015, or 18 per cent of Australia's emissions. Most transport emissions are from cars and light commercial vehicles. Heavy vehicles contributed 20 Mt CO₂-e to Australia's emissions in 2015.

Emissions from non-road transport were 14 Mt CO₂-e in 2015. Of these, more than half are from domestic aviation, around 24 per cent are from rail transport and around 12 per cent are from domestic shipping.

Under the UNFCCC, emissions from international shipping and aviation are not counted as a part of any country's national emissions. International aviation emissions are dealt with separately by the International Civil Aviation Organization and international shipping emissions by the International Maritime Organization.

The International Civil Aviation Organization has adopted a scheme to offset growth in emissions from international flights after 2020 by purchasing offsets from crediting mechanisms.⁴⁴ In 2016, the International Maritime Organization agreed to develop a comprehensive strategy to address shipping emissions by 2018, to be revised by 2023. This will build on the mandatory technical and operational measures for international shipping (commenced in 2013) which will deliver up to 200 Mt CO₂-e of reductions a year by 2020, increasing to up to 420 Mt CO₂-e annually by 2030.⁴⁵

Emissions reduction policies in Australia's transport sector

The major policies currently supporting emissions reductions in the transport sector are set out in Table 5.

Table 5: Emissions reduction policies in the transport sector

Emissions Reduction Fund	<p>Two methods target abatement in the transport sector: the Land and Sea Transport Method and the Aviation Method. Eligible activities include replacing older inefficient vehicles with newer more efficient vehicles, efficiency upgrades to existing vehicles, switching to lower emissions fuels, and changes to operational practices. To date, seven projects have been registered under these methods, with three projects contracted to deliver around 1.2 Mt CO₂-e of emission reductions.</p> <p>https://www.environment.gov.au/climate-change/emissions-reduction-fund/methods http://www.cleanenergyregulator.gov.au/ERF/Forms-and-resources/methods/resources-for-transport-methods</p>
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Safeguard Mechanism	<p>The Safeguard Mechanism applies to much of the domestic aviation and rail freight industries. It sets emissions limits (baselines) on facilities that emit more than 100,000 tonnes of emissions a year.</p> <p>The Safeguard Mechanism applies to around 10 road and shipping facilities.</p> <p>https://www.environment.gov.au/climate-change/emissions-reduction-fund/publications/factsheet-safeguard-mechanism-transport-facilities</p> <p>http://www.cleanenergyregulator.gov.au/NGER/The-safeguard-mechanism/Coverage</p>
National Energy Productivity Plan	<p>The NEPP includes measures to improve energy productivity of transport, such as improving light vehicle efficiency, driving innovation in transport and infrastructure systems and improving fuel efficiency in the aviation and marine sectors.</p> <p>https://www.environment.gov.au/energy/national-energy-productivity-plan</p>
Information programs	<p>The Government has established a number of programs that help consumers choose more efficient vehicles. These include the Green Vehicle Guide, mandatory fuel efficiency and CO₂ labelling on new vehicles and the Truck Buyers Guide.</p> <p>https://www.greenvehicleguide.gov.au/</p> <p>https://infrastructure.gov.au/roads/environment/</p> <p>http://truckbuyersguide.gov.au/</p>
Clean energy innovation support	<p>The CEFC supports low-emissions vehicles programs. For example, the CEFC provides favourable loan interest rates to corporate, government and not-for-profit fleet buyers when they choose eligible low-emissions passenger and light commercial vehicles.</p> <p>http://www.cleanenergyfinancecorp.com.au/where-we-invest/a-better-built-environment.aspx</p>
Taxation measures	<p>To encourage the purchase of efficient vehicles, the Australian Government currently applies a higher threshold, currently \$75,375 (GST inclusive), for the luxury car tax to vehicles with fuel consumption less than 7L/100km. For other vehicles the luxury car tax of 33 per cent applies to vehicles valued over \$63,184 (GST inclusive).</p> <p>https://www.ato.gov.au/Business/Luxury-car-tax/</p>
State and territory measures	<p>The NSW Green Truck Partnership commissions independent testing of products to improve the environmental performance of heavy vehicles.</p> <p>Queensland introduced a biofuels mandate in 2015. It equates to a requirement that three out of every 10 tanks of regular petrol sold must be E10 (90 per cent petrol and 10 per cent ethanol). NSW introduced ethanol and biodiesel mandates in 2007.</p> <p>The ACT and Queensland governments apply lower rates of stamp duty to more efficient vehicles. The NSW and Victorian Governments offer a reduced registration charge for hybrid and electric vehicles.</p> <p>http://www.rms.nsw.gov.au/about/environment/air/green-truck-partnership/index.html</p> <p>http://www.fairtrading.nsw.gov.au/ftw/Businesses/Specific_industries_and_businesses/Service_stations.page</p> <p>https://www.dews.qld.gov.au/electricity/renewables/fuels/mandate</p> <p>https://www.vicroads.vic.gov.au/registration/registration-fees/concessions-and-discounts/hybrid-vehicle-registration-discount</p> <p>http://www.rms.nsw.gov.au/roads/registration/fees/</p>

More work is underway through the Ministerial Forum on Vehicle Emissions to examine ways to reduce the health and environmental impacts from motor vehicle emissions, including greenhouse gas emissions. In December 2016, the Forum released two regulation impact statements and a discussion paper on three potential measures to reduce vehicle emissions and improve fuel quality:

- new fuel efficiency standards for light vehicles, which could deliver between 25 to 65 Mt CO₂-e of emissions reductions by 2030, depending on the stringency of the standard chosen
- moving to the next most stringent standard for noxious emissions from light and heavy vehicles
- improved fuel quality standards.

The Ministerial Forum is considering other measures to encourage the uptake of lower-emissions vehicles and reduce transport emissions. These include the type of information provided to consumers when buying a car, support for emerging technologies and ways to reduce greenhouse gas emissions from heavy vehicles.

Copies of the papers and information on how to lodge a submission are available at www.infrastructure.gov.au/roads/environment/forum. This review of climate change policies will run in parallel to the work of the Ministerial Forum, and will not duplicate its work.

Case study: Improvements in electric vehicle battery technology

Advances in lithium battery technologies over the past five years have reduced the cost of lithium batteries per kilowatt hour from around US\$ 1000 to around US\$ 400. Further improvements already proceeding in battery energy density, production volumes and manufacturing processes will see the price premium for electric and hybrid vehicles decrease over time. For example, investment has been made to commercialise a lithium ion solid-state battery technology that may double the energy density and halve the costs of lithium batteries by 2020.⁴⁶ These changes will contribute to the changing makeup of the light vehicle sector over the coming decades.

Questions

What are the opportunities and challenges of reducing emissions in the transport sector?

Are there particular concerns or opportunities with respect to jobs, investment, trade competitiveness, households and regional Australia associated with policies to reduce emissions in the transport sector?

Land and agriculture

Agriculture, forestry and agricultural support services represented around 2 per cent of GDP⁴⁷ and employed around 300,000 people in 2015.⁴⁸ Agricultural exports comprised 16 per cent of Australia's exports in 2015.⁴⁹ Agriculture and land use, land use change and forestry ('the land sector'), accounted for 66 Mt CO₂-e, or 12 per cent of Australia's annual emissions in 2015.⁵⁰ Emissions from the land and agriculture sectors are highly variable, driven by seasonal, market and regulatory conditions.

Emissions reduction policies in land and agriculture sectors

The major policies currently supporting emissions reductions in the land and agriculture sectors are set out in Table 6.

Table 6: Emissions reduction policies in land and agriculture sectors

<p>Emissions Reduction Fund</p>	<p>There are currently 18 methods supporting emissions reductions in the land and agriculture sectors.</p> <p>To date, 471 projects have been registered under these methods, and 144.5 Mt CO₂-e of emissions reductions have been contracted from 284 projects. Of this, 113.4 Mt CO₂-e have been contracted from vegetation projects, 17.3 from agriculture and 13.8 Mt CO₂-e from savanna fire management projects. The land and agriculture sectors' contributions represent approximately 81 per cent of the total contracted emissions reductions.</p> <p>https://www.environment.gov.au/climate-change/emissions-reduction-fund/methods http://www.cleanenergyregulator.gov.au/ERF/Forms-and-resources/methods</p>
<p>National Energy Productivity Plan</p>	<p>The NEPP includes measures to improve energy productivity in the land and agriculture sectors. The Energy Efficiency Exchange website provides information and case studies on how agricultural businesses can reduce energy use.</p> <p>Measures in early-stage development promote voluntary action, for example, helping businesses self-manage energy costs through information, capacity building and improved services.</p> <p>https://www.environment.gov.au/energy/national-energy-productivity-plan https://www.eex.gov.au/sectors/agriculture</p>
<p>Clean energy innovation support</p>	<p>The CEFC works with financiers and energy service providers to increase investment in agribusiness activities that reduce emissions. These investments help agribusinesses save on energy costs, increase their competitiveness and boost their export potential.</p> <p>Up to \$1 billion of investment finance from the CEFC is available for clean energy projects and businesses that support delivery of the Government's Reef 2050 plan.</p> <p>http://www.cleanenergyfinancecorp.com.au/where-we-invest.aspx</p>

CSIRO found that Australia has the potential to provide additional future emissions reductions by increasing carbon storage in the land sector. CSIRO notes this would need to be carefully managed to balance outcomes for water use, land productivity and biodiversity.⁵¹

Farmers and others are increasingly recognising opportunities for agriculture in the transition to a lower-emissions economy. There are calls for further investment in innovation to find cost-effective emissions reduction technologies and practices that improve on-farm productivity, and to increase participation in the Emissions Reduction Fund.⁵² The Emissions Reduction Fund has provided an additional income stream for some farmers. The Australian Farm Institute estimates that abatement projects contracted under the Emissions Reduction Fund are now generating an estimated \$239 million in annual revenue for landholders.⁵³

Revenue generated through the Emissions Reduction Fund for land sector projects is distributed between farmers, landholders, and carbon service providers who aggregate small projects so they can participate in the Emissions Reduction Fund. Farmers participating in Emissions Reduction Fund projects get other important benefits, like improving management of weeds and feral animals.

Indigenous Australians are accessing the Emissions Reduction Fund to reduce emissions and deliver cultural, social, economic and environmental benefits, primarily through savanna burning projects. A number of these projects are underpinned by the skills and expertise fostered through the Indigenous Rangers – Working on Country Program.

Some farmers, Indigenous groups and others want to find ways to better realise these additional benefits. The Climate Change Authority is currently preparing a research report on this topic, which will inform this review.

Case Study: Beef cattle herd management changes delivers improved productivity and emissions reductions

Paraway Pastoral contracted an Emissions Reduction Fund project at the April 2016 auction to reduce emissions from beef production over seven years. The project is being conducted across 10 properties running approximately 110,000 cattle in Queensland and New South Wales.

The company is fast-tracking a number of land development projects such as sub-dividing paddocks and installing new water troughs to improve grazing efficiency. This will increase overall production efficiency of the herd, resulting in improved growth and reproduction rates. This increases the kilos of beef produced per grazing day.

“Our company is committed to sustainable land management and responsibly managing our herd to reduce its environmental impact and maximise profit over the long-term. The Emissions Reduction Fund gave us a way to bring forward production improvements by allowing us to earn Australian carbon credit units which we can sell.”

— Adrian Sykes, Paraway Pastoral, 2016⁵⁴

Questions

What are the opportunities and challenges of reducing emissions from the land and agriculture sectors?
Are there any implications for policy?

What can be done to realise further benefits from emissions reduction activities beyond carbon abatement?

Are there particular concerns or opportunities with respect to jobs, investment, trade competitiveness, households and regional Australia associated with policies to reduce emissions in the land and agriculture sectors?

Research, development, innovation and technology

Innovation is central to meeting the ambition of the Paris Agreement. An unprecedented transformation will be required world-wide, through deployment of low-emissions technologies like renewable energy with storage, energy efficiency, electric vehicles, solar fuels, carbon capture and storage and land sector activities.

Clean energy is a major global growth industry. Global investment reached a record US\$329 billion in 2015.⁵⁵ Australia has the opportunity to leverage this growing global momentum. Along with 22 other members, Australia has joined the Global Mission Innovation Initiative. All participants have pledged to double government expenditure on early-stage clean energy research and development and innovation expenditure between 2015 and 2020.

Current policy settings that support low-emissions innovation

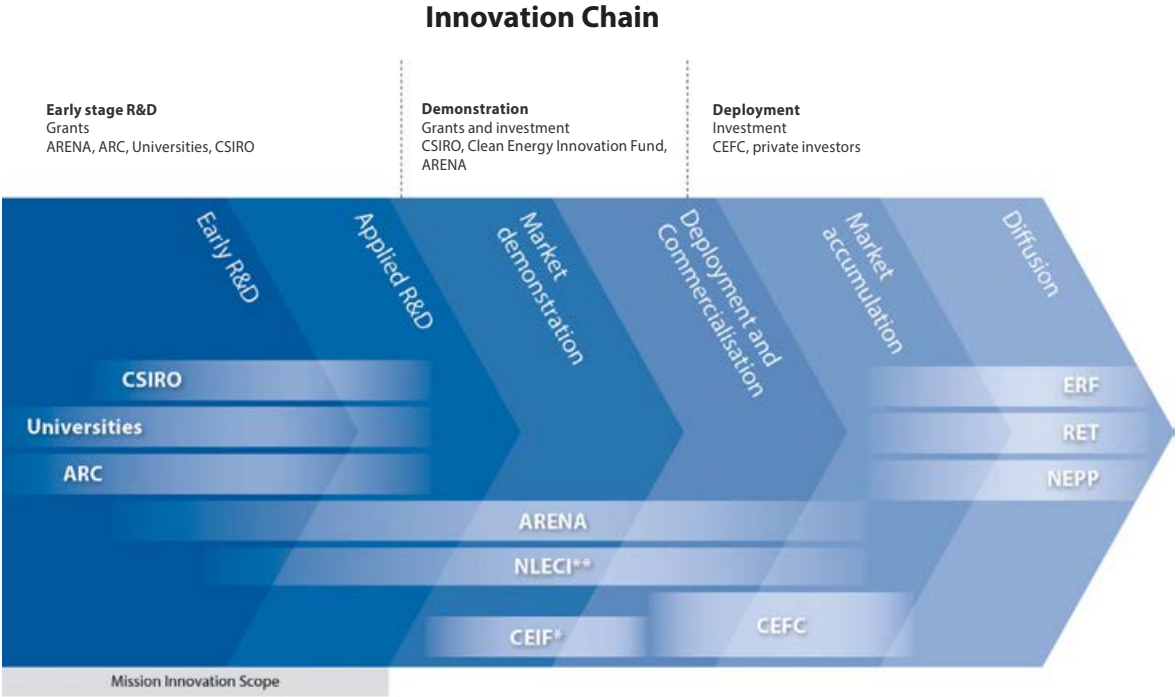
Table 7 and Figure 6 describe existing policies that support low-emissions innovation.

Table 7: Policies supporting low-emissions technology and innovation

National Innovation and Science Agenda	<p>The Agenda is a blueprint to transform Australia into a leading innovation nation. The Agenda includes new tax incentives for research and development, co-investment from the CSIRO Innovation Fund to commercialise new technologies and establishing Industry Growth Centres in key sectors of competitive advantage like oil, gas and energy resources.</p> <p>http://www.innovation.gov.au/page/agenda</p>
Commonwealth Scientific and Industrial Research Organisation	<p>CSIRO pioneers low-emissions technologies and provides knowledge which will help guide Australia towards a smart, secure energy future. CSIRO's current key research areas include low-emissions coal mining and energy production, energy storage, solar energy, electricity grid modelling and carbon capture and storage.</p> <p>https://www.csiro.au/en/Research/EF</p>
Australian Research Council	<p>The ARC provides Government support for research in Australia. It delivers policy and programs that advance Australian research and innovation globally and benefit the community.</p> <p>The National Competitive Grants Program, administered by the ARC, provides, on average, around \$800 million a year in research support across the economy including to projects that contribute to reducing emissions.</p> <p>http://www.arc.gov.au/welcome-australian-research-council-website</p>
National Climate Science Advisory Committee	<p>The Committee provides the strategic direction for Australian climate science research to address business needs and policy development.</p>

National Energy Productivity Plan	<p>Measures in the NEPP are providing consumers with a better range of more productive energy services by supporting innovation and commercialisation of new technologies and practices.</p> <p>https://www.environment.gov.au/energy/national-energy-productivity-plan</p>
Clean Energy Finance Corporation	<p>The CEFC uses financial products and structures to address the barriers inhibiting investment in clean energy technologies. The CEFC invests for a positive financial return.</p> <p>As at 30 June 2016, the CEFC had made cumulative commitments of almost \$2.3 billion. These projects and programs are catalysing a further \$5.7 billion in other investment. CEFC commitments include more than 60 direct investments.</p> <p>http://www.cleanenergyfinancecorp.com.au/</p>
Australian Renewable Energy Agency	<p>ARENA's objectives are to improve the competitiveness of renewable energy technologies and increase supply of renewable energy in Australia. As at October 2016, ARENA had provided \$1.1 billion in grant funding for more than 270 projects, drawing in a further \$1.6 billion in other investment. Investments have spanned the commercialisation pathway. ARENA has \$800 million of new funding available over the next five years.</p> <p>https://arena.gov.au/about-arena/</p>
Support for low-emissions technology and carbon capture and storage	<p>As at 31 December 2016, the Government is delivering \$590 million⁵⁶ of funding to low-emissions support programs and continues to encourage industry to reduce emissions through a range of low-emission technology measures. These are administered by the Department of Industry, Innovation and Science.</p> <p>The Government has contributed funding and support for an industry-led Carbon Capture and Storage Roadmap for Australia, released in February 2017.</p> <p>https://industry.gov.au/resource/LowEmissionsFossilFuelTech</p> <p>http://www.co2crc.com.au/comprehensive-support-carbon-capture-storage-australia/</p>

Figure 6: Australian Government investment across the innovation chain



* Clean Energy Innovation Fund (ARENA and CEFC)
 ** National Low Emissions Coal Initiative, 2008–2017

The Government commissioned CSIRO to undertake a technical assessment and development of a Low Emissions Technology Roadmap. It will provide insight into which technologies might best contribute to achieving deep decarbonisation in the second half of the century. The International Energy Agency has considered technology pathways associated with achieving the goals of the Paris Agreement. It emphasises a range of technologies will be required, including carbon capture and storage.⁵⁷

Case study: ARENA solar funding

ARENA conducted competitive funding rounds for large-scale solar farms in 2014 and 2016. These funding rounds create competitive tension within the market and have assisted in driving down the cost of deploying large-scale solar in Australia. In 2014, the grant funding requested for large-scale solar projects was \$1.60 per watt, by September 2016 this had dropped to 19 cents per watt. Additionally, total project costs reduced by around 40 per cent.

Questions

What is the role of research, development, innovation and technology in reducing Australia’s emissions?
 Are there any implications for policy?

Are there particular concerns or opportunities with respect to jobs, investment, trade competitiveness, households and regional Australia that should be considered in relation to research, development, innovation and technology?

International units

International trading of emissions units allows countries to count emissions reductions delivered in another country towards their own targets, minimising the global cost of achieving abatement. International trading could provide access to emissions reductions that may be lower cost than those available within Australia.

Current policy settings focus on reducing emissions in Australia. For example, the Emissions Reduction Fund purchases emissions reductions that occur in Australia. This supports the domestic market for emissions reductions; providing revenue to businesses, farmers and Indigenous communities. By encouraging Australian businesses to reduce their emissions, the Fund ensures they are well-placed to compete in the future. Reducing the emissions profile of the Australian economy can lower the cost of meeting future emissions targets.

The rules for trading international emissions reductions after 2020 are yet to be established. High-quality international units could contribute to lowering the costs of meeting our 2030 target. A balanced approach is needed to achieve this while retaining the benefits of domestic action.

Through the Emissions Reduction Fund, Australia has a robust system for creating credible carbon units. It is important that international units are of similar high quality, to promote confidence by potential purchasers. Some countries and jurisdictions, such as the European Union, have placed restrictions on the types of units that may be used within domestic compliance schemes to ensure they represent genuine emissions reductions.

How are international units being used?

International units for compliance: Entities covered by the European Union's Emissions Trading System can use certified international units to fulfil part of their compliance obligations to 2020. Quality restrictions have been progressively tightened over time to promote environmental integrity.

Government purchase to meet targets: The Norwegian Government purchased 30 Mt CO₂-e of international emissions reductions through the UNFCCC's Clean Development Mechanism. These purchases will go directly towards meeting Norway's 2020 target.

Support for broader policy objectives: Japan established its Joint Crediting Mechanism with 16 partner countries to support mitigation efforts and increase take-up of leading low-carbon technologies and services in developing countries.

Support voluntary action: Australian businesses and individuals can use a selection of high-quality international units eligible under the National Carbon Offset Standard to support voluntary abatement and achieve carbon neutral certification. Certification provides businesses, products and services with a credible stamp against their abatement action.

To ensure that mitigation activities under the Emissions Reduction Fund support Australia's emission reduction commitments, the export of ACCUs into international markets has not previously been permitted. Some businesses and business groups have raised the possibility of exporting Australian emissions reductions. This would mean allowing Australian businesses generating ACCUs to sell emissions reductions from their projects to overseas buyers. Any import and export of carbon units must be done under the rules that facilitate trade of international units, which will be determined under the Paris Agreement.

Questions

What is the potential role of credible international units in meeting Australia's emissions targets?

Are there any implications for policy?

How can the quality of international units be ensured?

Are there particular concerns or opportunities with respect to jobs, investment, trade competitiveness, households and regional Australia that should be considered in relation to international units?

Appendix A: Terms of reference

The Government is committed to addressing climate change. Through effective policies, ambitious and responsible targets, and careful management, Australia is playing its role in global efforts to reduce emissions, while maintaining a strong economy and realising the benefits of the transition to a lower emissions future.

The Government's policies are working to reduce Australia's emissions. They have Australia on track to surpass its 2020 emissions reduction target and provide a framework for the longer term.

In setting its 2030 target of reducing emissions to 26–28 per cent below 2005 levels, the Government committed to reviewing its policies during 2017. The review will ensure the Government's policies remain effective in achieving Australia's 2030 target and Paris Agreement commitments. The review will look at:

- the opportunities and challenges of reducing emissions on a sector-by-sector basis;
- the impact of policies on jobs, investment, trade competitiveness, households and regional Australia;
- the integration of climate change and energy policy, including the impact of state-based policies on achieving an effective national approach;
- the role and operation of the Emissions Reduction Fund and its Safeguard Mechanism;
- complementary policies, including the National Energy Productivity Plan;
- the role of research and development and innovation;
- the potential role of credible international units in meeting Australia's emissions targets; and
- a potential long-term emissions reduction goal post-2030.

The review will involve close engagement with business and the community, beginning with consultation on a discussion paper.

The review will monitor and be informed by developments in international climate policy, and include a focus on electricity prices for end users. The review will build on parallel processes, including the Finkel review of the reliability and security of the NEM, and the work of the Ministerial Forum on Vehicle Emissions.

The review will commence in February 2017 and conclude by the end of 2017.

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