Australian Government
Climate Change Authority

SPECIAL REVIEW
SECOND DRAFT REPORT

Australia's climate policy options

November 2015

The Climate Change Authority has released this draft report to assist individuals and organisations to prepare submissions to the Special Review. It outlines:

- the purpose and scope of the review
- a range of emissions reduction policy options, including various types of emissions trading schemes
- matters on which the Authority welcomes input.

Key dates for the Special Review

Draft and final report on targets	Draft report on policy options	Submissions close	Final report
April-July 2015	November 2015	19 February 2016	By 30 June 2016

How to make a submission

Submissions can be lodged online at www.climatechangeauthority.gov.au/submissions. Submissions must be lodged by **19 February 2016**.

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www.climatechangeauthority.gov.au

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CHAPTER 1. INTRODUCTION AND CONTEXT

1.1. Purpose

Climate change is a serious global challenge, and poses major risks to the Australian community, economy and environment. Climate change is already having effects in Australia and around the world: average temperatures are increasing; sea levels are rising; heatwaves are getting longer and more frequent; and the ocean is becoming more acidic, damaging marine ecosystems such as coral reefs.

The global scientific consensus is that greenhouse gas emissions from human activities (such as burning fossil fuels and clearing land) have been the dominant cause of warming since the mid-20th century, and will drive additional warming and more serious impacts and risks in the future. This is why the 195 countries that have ratified the United Nations Framework Convention on Climate Change (UNFCCC) have agreed that global emissions need to be reduced so that global average warming is kept below 2 degrees (relative to pre-industrial levels).

Emissions reduction targets and policies that allow Australia to play its part in the international response to climate change can be viewed as a prudent risk management strategy.

The Climate Change Authority provides independent, expert advice to the Australian Government and Parliament on policies and measures to reduce the risks of climate change. It is currently conducting a 'Special Review' of Australia's future emissions reduction goals and policy options.

The Authority's objective through this report and subsequent consultations is to help identify effective policies and measures that Australia can use to reduce its emissions and support an effective global response.

1.2. About the Special Review

The Minister for the Environment has asked the Authority to conduct a wide-ranging Special Review into Australia's climate change action. The Minister issued the terms of reference for this review in December 2014; a copy is at Appendix A.

The first stage of the review focused on Australia's emissions reduction targets for the period beyond 2020. Following consultations with stakeholders, the Authority recommended targets for 2025 and 2030 in its July 2015 report (CCA 2015b).

The second stage of the review focuses on Australia's policy options to meet its target. This paper describes and discusses options rather than offering recommendations. It provides a framework for evaluating policies as a basis for consultation with business, community organisations and other stakeholders. The Authority seeks feedback on the framework and policy options canvassed in this paper, to inform the recommendations in the Authority's final report of the Special Review in June 2016.

This paper comes at an important time. International negotiations on a framework to address climate change beyond 2020 are currently underway, and an agreement is anticipated in Paris in December 2015. The Government has announced a target to reduce Australia's emissions to 26 to 28 per cent below 2005 levels by 2030 as part of its planned contribution. Meeting this target will require substantial and sustained effort. The Government is already considering measures to achieve low-cost emissions

reductions, and will consider the overall policy framework to meet its 2030 target in detail in 2017-2018 (Australian Government 2015b).

The terms of reference for this Special Review require the Authority to consider whether Australia should introduce an emissions trading scheme (ETS), the experience other countries have had with similar policies, and in its final report to recommend what action Australia should take to implement the outcomes of the Paris conference. It also requires the Authority to consider the effects of an ETS on the international competitiveness of Australian businesses.

The Authority considers that the terms of reference for the Special Review are best met by considering emissions trading in context with a range of other policy tools, and considering their relative merits in reducing emissions across different sectors of the economy. In the past, the Authority has taken the view that there are advantages in using a toolbox of measures targeted to different sectors and emissions reduction opportunities.

The Authority is therefore using this paper to take a fresh look at Australia's climate policy options, and help identify a set of policies for Australia to meet its target and play its role in meeting the global challenge of climate change. In considering the options, and whether emissions trading should be part of that set, this paper seeks to:

- set out a framework of principles that can be used to assess policy options
- consider a wide range of policy options to reduce Australia's emissions
- draw on international experience and practice
- consider potential competitiveness impacts on Australian business and how these might best be addressed.

The Authority will consult widely on this paper, and invites submissions on its options and analysis. Stakeholders are encouraged to address the questions posed by the Authority, present evidence to inform the review, and comment on any other matters that they consider relevant to the terms of reference. Submissions are due by 19 February 2016.

1.3. International context

This draft report is released at the start of the 21st Conference of the Parties to the UNFCCC. It is anticipated that the global community will agree a framework for action to address climate change beyond 2020 at this conference (Box 1).

The global community, including the 195 Parties to the UNFCCC, has agreed that global average warming should be kept below 2 degrees to avoid dangerous climate change. The emissions of many countries began to decline in the 1990s, and international action has gathered pace in recent years, with countries setting progressively stronger emissions reduction targets and putting policies in place to achieve them.

Box 1 Paris climate conference

The United Nations Framework Convention on Climate Change (UNFCCC) is an international treaty that was agreed in 1992 and entered into force in 1994. It has almost universal membership: 195 countries (known as 'Parties') have agreed to be bound by its terms. Meetings of the Parties are the main forum for international negotiations on climate change and take the form of annual conferences.

In 1997, at the landmark conference in Kyoto, Parties agreed to a set of legally enforceable emissions reduction targets for developed countries. This agreement is known as the Kyoto Protocol. Australia ratified the Protocol in 2007 and has now met its target of keeping average annual emissions over the period 2008 to 2012 to 108 per cent of 1990 levels. Australia's target for the second commitment period of the Protocol is equivalent to 5 per cent below 2000 levels by 2020. Targets set under the Kyoto Protocol do not extend beyond 2020.

At the Paris conference in late 2015, it is anticipated that Parties will agree to the key elements of a post-2020 climate change framework. That is why the Paris conference is expected to be another landmark in the evolution of global climate action.

The agreement reached at Paris is expected to cover a number of issues, including reducing emissions, adapting to the impacts of climate change, providing financial support for action in developing countries, and tracking and reviewing national emissions and actions.

Emissions reduction targets are an important part of the negotiations at Paris. Australia and its major trading partners have put forward intended nationally determined contributions to global emissions reductions ahead of the conference. The intended contributions of nearly all major emitters include emissions reduction targets of some description.

In the Special Review, the Authority is focusing on how Australia should meet its emissions reduction commitments. Other elements of the expected Paris agreement, such as adaptation and financial assistance for developing countries to take action on climate change, will form an important part of Australia's response to climate change, but are beyond the scope of the review.

More than 170 countries have announced post-2020 emissions targets and other emissions reduction contributions to the Paris agreement. Collectively, these national contributions will slow global emissions growth, and—if the reductions are sustained—could limit warming to around 3 degrees by the end of this century (Climate Action Tracker 2015; IEA 2015b; UNEP 2015). This represents significant progress from previous action, although countries will need to strengthen their targets and actions further over time if the 2 degree goal is to be met.

There is a provision in the Paris agreement under negotiation that, if agreed, would require countries to review their targets (possibly every five years) and progressively strengthen their emissions reduction efforts. Accordingly, as well as needing policies to meet its 2030 target, Australia may also need policies that are capable of being scaled up.

The announced targets and main policies of major emitters are shown in Table 1. The table is not comprehensive, but demonstrates the diversity and breadth of action underway. It is important to keep in mind that the existence of a policy or measure does not reveal its effect on emissions; the same types of policies have varying degrees of ambition and effectiveness across countries.

Table 1 Targets and policies of selected countries and regions

Rank	Country (Share of global emissions)	Emissions per person (tCO_2-e)	Post-2020 emissions reduction targets	Main policies	Trade relationship to Australia
1	**China** (22.3%)	7.6	Carbon intensity 60-65% below 2005 levels by 2030 (carbon intensity is the amount of CO_2 produced per unit of GDP) Peak carbon emissions around 2030, and sooner if possible	Pilot ETSs in seven provinces and municipalities (these account for 27% of China's GDP); national scheme to start in 2017 Generates CDM offsets* Non-fossil fuel, renewable energy and energy intensity targets Regulated closure or performance benchmarks for some emissions intensive facilities Mandated action including cap on coal use and energy consumption Feed-in tariffs for renewables Vehicle standards	Australia's largest export market; largest for iron ore, gold and copper; second largest for coal Aluminium competitor
2	**United States** (13.4%)	19.7	26-28% below 2005 levels by 2025 Around 80% below 2005 levels by 2050	ETSs in California and nine north-eastern states National regulation (Clean Power Plan) to reduce power sector emissions State renewable energy targets with tradeable certificates National vehicle standards	Fourth largest export market; top five market for aluminium ores Coal, aluminium ore and aluminium competitor
3	**European Union (28 member states)** (9.3%)	8.5	At least 40% below 1990 levels by 2030 80-95% below 1990 levels by 2050	EU-wide ETS; allows limited CDM/JI offsets* Carbon taxes in several member countries Renewable energy targets and feed-in tariffs Energy efficiency targets Vehicle standards	If counted as a single entity, EU would be Australia's third largest export market; sixth largest export market for emissions intensive goods
4	**India** (5.1%)	1.9	Emissions intensity 33-35% below 2005 levels by 2030 (emissions intensity is the amount of greenhouse gases produced per unit of GDP)	Coal tax Renewable energy target with tradeable certificates; feed-in tariffs Generates CDM offsets* Energy efficiency trading scheme for power sector Emission standards for vehicles	Second-largest export market for gold, third largest for copper and wool, and fourth-largest for coal
5	**Russia** (4.8%)	15.5	25-30% below 1990 levels by 2030 50% below 1990 levels by 2050	Renewable energy plan Auctions for financial support to renewable energy Generates JI offsets*	Natural gas and coal competitor
6	**Indonesia** (4.5%)	8.4	29% below business-as-usual (BAU) emissions trend by 2030 (a BAU trend projects future emissions given current economic and emission patterns)	Renewable energy generation and capacity targets Feed-in tariffs, auctions and other incentives for specific renewable energy technologies Generates CDM offsets* Energy intensity target; tax exemptions for some energy-efficient goods	10^{th} largest export market, and top five export market for iron ore and copper. Coal, aluminium ore, nickel ore and copper ore competitor

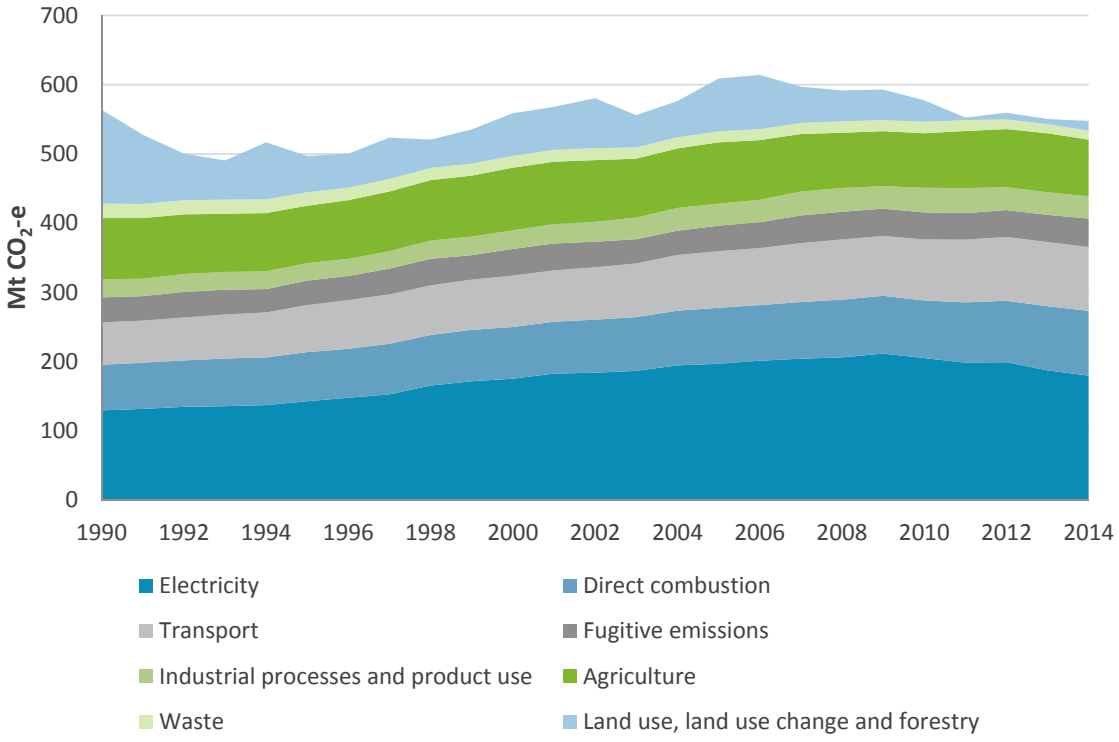
Rank	Country (Share of global emissions)	Emissions per person (tCO_2-e)	Post-2020 emissions reduction targets	Main policies	Trade relationship to Australia
7	**Brazil** (3.1%)	7.2	37% below 2005 levels by 2025 43% below 2005 levels by 2030	Renewable energy targets; financing and government purchase of renewable energy Generates CDM offsets* Energy efficiency target; mandatory energy savings scheme Vehicle standards	Iron ore and aluminium ore competitor
8	**Japan** (2.5%)	9.2	26% below 2013 levels by 2030 80% below 1990 levels by 2050	Carbon tax on fossil fuels City ETSs in Tokyo and Saitama Renewable energy target; feed-in tariffs Vehicle standards	Second largest export market; largest market for coal, aluminium & LNG; in top three for iron & copper ores
9	**Canada** (1.8%)	24.7	30% below 2005 levels by 2030	Federal standards for coal-fired electricity generation National and provincial renewable energy and efficiency incentives Provincial-level ETSs and carbon taxes National vehicle standards	21st largest export market Metal ores & aluminium competitor
10	**Mexico** (1.6%)	6.1	22% below BAU by 2030 50% below 2000 levels by 2050	Carbon tax on most fossil fuels Generates CDM offsets* Grants for renewable energy and energy efficiency Clean energy target Vehicle standards	Major export market for coal Base metal ores competitor
11	**Iran** (1.6%)	9.4	4% below BAU by 2030	Renewable energy target; power purchase agreements; feed in tariffs Energy efficiency targets and financial incentives	Minor export market
12	**Republic of Korea** (1.4%)	13.2	37% below BAU by 2030	ETS Renewable energy targets for electricity capacity and total energy consumption, with tradeable certificates Vehicle standards	Third largest market for total and emissions-intensive exports
13	**Australia** (1.3%)	26.6	26-28% below 2005 levels by 2030	Emissions Reduction Fund—purchasing and safeguards Renewable energy target with tradeable certificates State energy efficiency and renewable energy schemes	
70	**New Zealand** (0.1%)	12.0	30% below 2005 levels by 2030 50% below 1990 levels by 2050	ETS Renewable electricity generation target	7th largest export market

***** Clean Development Mechanism (CDM) and Joint Implementation (JI) offsets are accredited emissions reductions generated by projects. Industrialised countries can use these offsets to help meet their emissions reduction targets under the Kyoto Protocol.
Note: Emissions data is for 2011.
Sources: Emissions related data—WRI 2014. Targets—countries' INDC submissions to the UNFCCC(UNFCCC 2015b); national government websites. Policy—IEA 2015a; ICAP 2015; BNEF 2015; ICCT 2015. Trading information—DFAT 2015.

1.4. Domestic context

To meet the Government's 2030 target, Australia's emissions will need to decline more steeply in the coming years than they have in the past. Australia's total emissions remained fairly flat over the last 25 years, with emissions in 2014 being about 3 per cent below those in 1990 (Figure 1). Over this period emissions in electricity, transport and most other sectors increased, with these increases being slightly more than offset by decreases in the land use, land use change and forestry (LULUCF) sector.

Figure 1 Historical emissions from 1990 to 2014



Note: 'Direct combustion' emissions are the emissions released when fuels are combusted to generate heat, steam or pressure. 'Fugitive emissions' are gases that are leaked or vented during the extraction, production and distribution of fossil fuels such as coal, crude oil and natural gas. 'Waste' includes emissions from landfills, and waste water treatment.
Source: DoE 2015c

Australia has a range of emissions reduction policies in place, some at the federal level and others at the state and territory level (Table 2). As the Government has indicated, additional policies will be needed to reach its 2030 target (Australian Government 2015b).

Table 2 Australia's main emissions reduction policies

Policy	Application	Details	Estimates of emissions reductions
Emissions Reduction Fund (ERF) purchasing	National Covers all sectors	Voluntary emissions pricing scheme where the Government buys emissions reductions from eligible projects (Box 4)	93 Mt CO_2-e of future emissions reductions contracted in two auctions held in 2015. Contracts run for up to 10 years (CER 2015).
ERF safeguard mechanism	National Covers facilities emitting over 100,000 t CO_2-e per year	Regulation that requires covered facilities to stay below specified baseline emissions levels (Box 4)	Safeguard not yet operational; will start in July 2016
Renewable energy targets	National Covers electricity sector	Mandatory price-based scheme that requires liable entities to buy renewable energy certificates. The scheme supports large-scale and small-scale renewable energy generation (Box 5).	The Renewable Energy Target (RET) is projected to reduce emissions by about 200 Mt CO_2-e (cumulatively) between 2015 and 2030 (CCA calculation based on ACIL Allen Consulting 2014).
	State-based (ACT, South Australia, Queensland and Victoria) Covers electricity sector	Targets at state level for the use or production of renewable energy. Policy methods to achieve these targets vary. For example, the ACT scheme uses a feed-in tariff and long term contracts (awarded through auctions) to meet a 2020 target of 90% for electricity generated from renewable sources.	Not available
Energy efficiency target schemes	Schemes operate in NSW, Victoria, South Australia and the ACT Covers electricity sector	Mandatory price-based schemes that require electricity retailers or suppliers to meet an energy savings obligation, often by undertaking activities to improve energy efficiency or buying certificates that represent energy savings. Each scheme has an energy savings target.	NSW scheme is estimated to have reduced emissions by about 2.8 Mt CO_2-e between 2009 and 2013 (NSW Government 2015) Victorian scheme is estimated to have reduced emissions by about 8 Mt CO_2-e between 2009 and 2012 (DSDBI 2014) SA scheme is estimated to have reduced emissions by about 0.64 Mt CO_2-e between 2009 and 2011 (Pitt & Sherry 2013) ACT scheme is estimated to have reduced emissions by about 0.24 Mt CO_2-e in its first year (Jacobs 2013)
Energy efficiency regulations and standards	National Applies to electrical goods and building construction	Regulations setting: • minimum energy performance standards for appliances, lighting and electrical equipment • energy efficiency requirements for buildings in the National Construction Code	The Greenhouse and Energy Minimum Standards program (which encompasses standards and labelling requirements for appliances, lighting and electrical equipment) is projected to reduce emissions by 60 to 70 Mt CO_2-e between 2014 and 2020 (Databuild 2015) .
Energy efficiency labelling	National Applies to appliances	Information program requiring energy rating labels on appliances showing energy performance information	See above

Policy	Application	Details	Estimates of emissions reductions
Carbon Neutral Program	National	A voluntary scheme that certifies products, business operations and events as carbon neutral against the National Carbon Offset Standard	Estimated to offset about 1 Mt CO_2-e per year (Hunt 2015a)
Land clearing regulations	State-based Covers landholders	Regulations that restrict the clearing of vegetation. Details vary by state. The objectives of these regulations are generally to protect biodiversity and other environmental values, as well as to reduce carbon emissions.	Stronger land clearing regulations in NSW, Queensland and Western Australia, along with economic conditions, reduced clearing rates and contributed to an emissions decline. Emissions from deforestation* fell from 74 Mt CO_2-e in 1990 to 37 Mt CO2-e in 2013 (DoE 2015a).
Clean Energy Finance Corporation	National Covers renewable energy, low-emissions technologies and energy efficiency projects	Innovation support through Government corporation that co-finances and invests in clean energy and energy efficiency projects and technologies	Projects in the CEFC portfolio (as at 30 June 2015) are projected to achieve 77 Mt CO_2-e of emissions reductions over their lifetime (CEFC 2015). It is likely that the national RET is the main policy driver for most of these emissions reductions.
Australian Renewable Energy Agency	National Applies to renewable energy activities	Provides innovation support for renewable energy activities including research and development funding	Not available

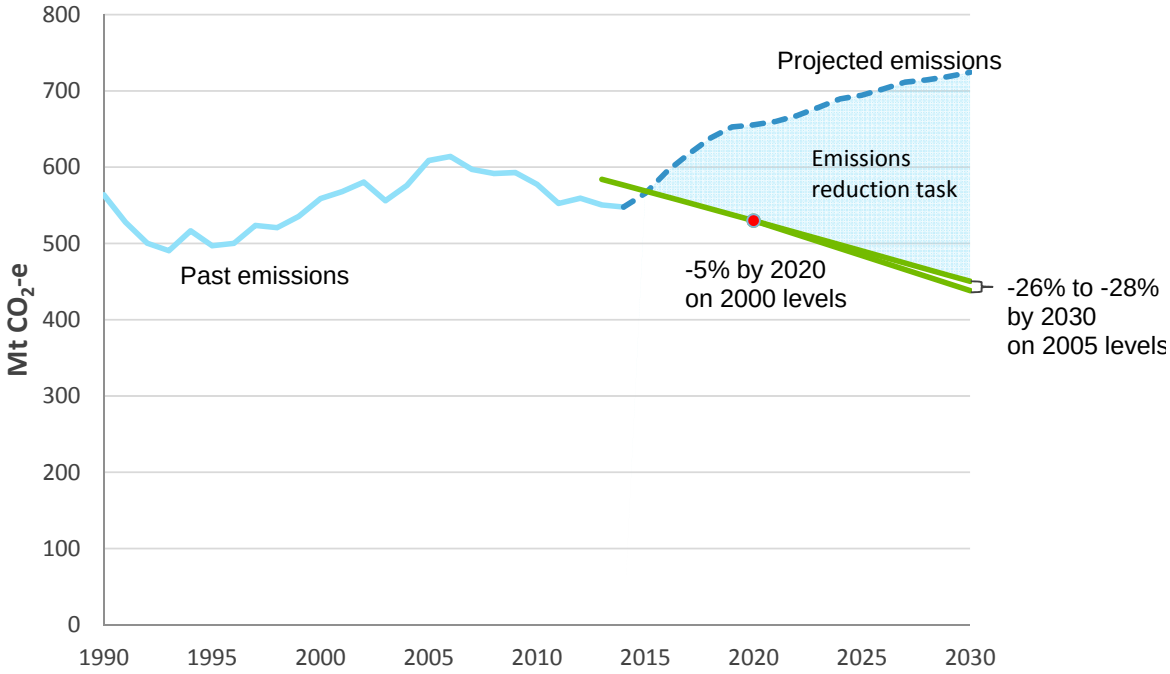
* Deforestation figures are emissions reported under the 'deforestation' Kyoto Protocol classification. This category only includes emissions from deforestation of land that was forested as at 31 December 1989.

The size of the future emissions reduction task is uncertain. Future emission levels depend on a range of factors, including economic growth, global trade and technology developments. The impact of all of these factors on emissions is uncertain, particularly over the time scales relevant to climate policy analysis.

The Government's March 2015 emissions projections showed Australia's emissions growing to more than 30 per cent above 2005 levels by 2030. The cumulative gap between the projections and the Government's target—that is, Australia's emissions reduction task—is shown in Figure 2. The scale of the task is likely to be revised down: forecast rates of forest harvesting and coal production have softened, and the Emissions Reduction Fund (ERF) and the Renewable Energy Target (RET) will contribute additional reductions to 2020 and beyond (DoE 2015b). These changes suggest Australia is now on track to meet its 2020 target. Meeting the Government's 2030 target, however, is likely to remain a substantial task.

The remainder of this paper explores the policy options, including various forms of emissions trading, which Australia could use to reduce emissions and meet its target.

Figure 2 Emissions reductions needed to meet Government's 2030 target (2014-15 projection)



Source: CCA based on DoE 2015c

CHAPTER 2. PRINCIPLES FOR ASSESSING POLICIES

For the purposes of this review, the Authority proposes using an evaluation framework to compare and assess Australia's policy options. This framework comprises three key principles:

1. Cost effectiveness: policies should help Australia meet its emissions reduction goals at least cost, taking account of:
   - the direct costs of reducing emissions
   - the costs of implementing and complying with the policy
   - indirect costs that arise as the effects of policies flow through the economy as a whole
   - the likely need to scale up national emissions reduction efforts over the longer term.
2. Environmental effectiveness: policies should achieve real emissions reductions, at the national and global level.
3. Equity: policy design should take account of—and support an equitable distribution of—impacts and risks across households, businesses and communities.

This framework is elaborated below. It is based on the principles set out in the *Climate Change Authority Act 2011* (Cth). The Authority proposes using this framework to assess individual policy options, and the policy toolkit as a whole. This would include considering how policies interact with each other and how these interactions affect their performance.

The terms of reference for the Special Review also require that the Authority consider potential impacts on the international competitiveness of Australian businesses. The Authority proposes using the same framework to assess different approaches to dealing with competitiveness issues.

2.1. Cost effectiveness

A cost effective policy toolkit is one that meets Australia's emissions reduction goals at least cost to the community.

The Australian Government has announced a target of reducing Australia's emissions to 26 to 28 per cent below 2005 levels by 2030. The Government has also indicated Australia will play its part in wider international efforts to keep global average warming below 2 degrees (Australian Government 2015a; Hunt 2015b). As discussed in chapter 1, the Paris agreement may establish a framework for countries to periodically review their targets, and make stronger emissions reductions over time, to sustain progress toward the 2 degree global goal.

Part of the challenge, therefore, is to put emissions reduction policies in place that can be scaled up to meet current and future targets at least cost to the community. Given that there is uncertainty about longer-term targets, managing risk and uncertainty is part of this challenge.

2.1.1. What does ‘least cost’ mean?

There are three main types of costs from emissions reduction policies:

- direct implementation costs for achieving emissions reductions (for example, the added cost of investing in a low-emissions electricity generation plant rather than a high-emissions one)
- ‘transaction’ costs to the government of setting up and administering policies and to individuals and firms of complying with them (for example, the costs of measuring emissions, checking that the requirements of the policy have been met and preparing policy-related paperwork)
- indirect costs that can occur as the effects of policies work their way through the economy (for example, price increases caused by a policy can have flow-on costs due to interactions with taxes).

Achieving an emissions reduction objective at least cost means keeping the total of these costs as low as is feasible over the long term. It is the total of these costs across the community that is important for cost effectiveness, rather than the costs incurred by particular groups. The distribution of costs is, however, important for equity as discussed later.

To keep total costs low over the long term, there needs to be a degree of flexibility as to the level of emissions in any given year. Insisting on a strict limit in each year would be likely to have higher costs than sticking to the same overall emissions budget over say five or ten years with some flexibility over annual emissions. This is because a more flexible approach can better accommodate fluctuations in economic activity and provide a more predictable investment environment. It can also allow for emerging low-emissions technologies and practices to be adopted over time.

To keep direct implementation costs low, policies need to cause the lowest-cost emissions reduction opportunities (typically measured in terms of cost per tonne of avoided emissions) to be identified and acted upon. Some low-cost opportunities involve investment in long-lived assets, like electricity generation plants. Policy stability and credibility are important so that investors have sufficient confidence to take up these opportunities. Policies that can be relatively easily scaled up over time to meet new targets and goals can contribute to stability, as they reduce the need for major reforms, and avoid the long lead times often associated with developing new measures.

Keeping costs of administration and compliance for firms and governments low by avoiding red tape (where possible) is also important. For example, while policies that place mandatory requirements on smaller emitters might encourage some additional, low-cost emissions reductions, this might also impose a high reporting burden on many individual firms.

In addition to their direct costs, policies often involve indirect costs, including due to interactions with the tax system. Taxes or price rises of all kinds—even those intended to address a policy problem like greenhouse gas emissions—dampen economic activity. These indirect costs are more important to the cost effectiveness of policies than has been generally recognised (Goulder 2013). There are different possible approaches to keeping indirect costs low (or possibly even turning them into a net benefit). One is to implement a policy that raises government revenue (such as a cap and trade ETS), and to use this revenue to fund a reduction in inefficient taxes. Another is to implement a policy that keeps indirect costs relatively low in the first instance by limiting increases in the price of emissions-intensive goods and services (such as an emissions intensity ETS).

2.2. Environmental effectiveness

To be environmentally effective, policies need to help close the gap between what emissions would have been in the absence of policies (often called 'business-as-usual emissions') and targets, and help achieve the global goal of limiting warming to below 2 degrees.

At any one time it is natural that some firms will be reducing their emissions (for example, by installing more energy-efficient equipment so as to save money), while others will be increasing them (for example, by increasing production). Policies will not help achieve Australia's targets if they reward emissions reductions that would have happened regardless. To be environmentally effective, policies need to drive new and 'additional' emissions reductions.

Given that climate change is a global problem, environmental effectiveness should be seen from a global perspective. There are two aspects to this. First, Australia is able to meet its targets through a combination of emissions reductions on Australian soil, and purchases of international emissions permits and credits. The UNFCCC rules currently allow countries to do this because the location of emissions makes no difference to the effect they have on the climate. Accordingly, consideration of Australia's policy options should extend to those that involve achieving genuine emissions reductions in other countries.

Second, the environmental effectiveness of Australia's policies can be eroded if they trigger increases in emissions in other countries (that is, they cause 'carbon leakage'). This could occur, for example, if a policy causes an Australian aluminium smelter to close and as a consequence a new smelter is built in a country that is not taking action to constrain its emissions. To ensure the environmental effectiveness of Australia's efforts to reduce emissions, policy needs to take account of the potential for carbon leakage (as discussed in chapter 5).

2.3. Equity

Judgements about what is equitable are difficult because there are different views. There are, however, two general propositions that have fairly widespread support. The first is that it is important to treat individuals or firms in similar situations the same (sometimes called 'horizontal equity'). The other is that costs should not be allowed to fall disproportionately on groups that are less able to bear them—for example, low-income households (vertical equity).

The first step in ensuring that policies are equitable is to work out how the costs, benefits and risks of different policy options are distributed across the community. This can be challenging as who pays in the end can be different from who pays initially. For example, the costs imposed by a policy on electricity generators will tend to be passed through to electricity consumers in the form of higher prices.

Once the distribution of costs is known, judgements can be made about whether this is equitable and, if not, what should be done to mitigate these effects. One approach is to design a suite of policies to be as cost effective as possible, and use compensation measures to address equity concerns; another is to build equity considerations into the choice of policies, provided this can be done without substantially increasing costs. The advantage of the former is that it can result in lower overall costs. The advantage of the latter is that it does not leave the equity of outcomes contingent on compensation payments, which those affected might regard as being uncertain.

Broader considerations of equity between countries are important in determining Australia's contribution to global emissions reduction efforts. These factors are particularly relevant to the selection of targets

rather than policies, and were discussed in the first report of this Special Review (CCA 2015a). While consideration of equity tends to focus on who bears what costs, processes that lead to policy decisions should also be equitable (sometimes termed 'procedural justice'). For example, policy development processes should consider the views of all affected stakeholders.

2.4. International competitiveness

The terms of reference for the Special Review require the Authority to consider the possible effects of an ETS or other policies on the international competitiveness of Australian businesses. The main issue of policy concern is that emissions reduction policies could place Australian firms at a competitive disadvantage relative to firms in countries that do not face comparable measures. This could be the case whether an ETS or alternative policy, such as regulation, is used. The Authority's intention is to examine the cost effectiveness, environmental effectiveness and equity consequences of different approaches to dealing with competitiveness issues (chapter 5).

Questions

Q.1. The Authority proposes assessing policies primarily on their cost effectiveness, environmental effectiveness and equity. Are these principles appropriate? Are there any other principles that should be applied, and if so, why?

CHAPTER 3. POLICY OPTIONS

In essence, climate policies seek to encourage businesses and households to invest in technologies and adopt practices that reduce emissions. Australia has many opportunities to do so, as documented in existing studies (CCA 2014c; ClimateWorks *et al.* 2014; Hatfield-Dodds *et al.* 2015).

In this context, stable climate policy settings are needed—otherwise investment in long-lived infrastructure and assets, including for electricity generation and transport, will be deferred, face higher costs due to policy risk, or may never go ahead.

To promote investment and other decisions that are consistent with meeting Australia's emissions reduction goals, it is necessary to change incentives so that taking up cost-effective opportunities to reduce emissions is a matter of self-interest. There are essentially four ways that policies can do this. They can make low-emissions activities more attractive by using:

- penalties to drive up costs for relatively high emissions activities
- subsidies to lower the private costs for relatively low emissions activities
- a combination of penalties and subsidies
- regulation to limit the range of emitting activities that are lawful.

As well as changing incentives, policies are needed to overcome other barriers, such as lack of information, that can prevent people taking up opportunities that are in their interests (for example, to buy more energy efficient appliances that cost more initially but are cheaper to run). A further role for policy is to support innovation to encourage the development of low-emissions technologies and practices that can reduce costs over the long term.

It is unlikely that any single policy would be able to do all of these things. In addition, circumstances differ across sectors in ways that can affect the performance of different policies. For example, a policy that works well in the electricity sector, which is dominated by a small number of large firms, may not work well for agriculture, which is made up of over a hundred thousand businesses, many of which are small family concerns. This suggests that a range or 'toolbox' of policies is likely to be best placed to reduce emissions across Australia's various sectors and abatement options. The fit between policies and sectors is discussed further in chapter 4.

Table 3 outlines the different types of policies that Australia could use to achieve its emissions reduction targets. Some are potential alternatives (for example, different types of carbon pricing), while others can play a complementary role (for example, energy efficiency standards alongside carbon pricing). While a suite of policies is likely to be necessary, it is not always the case that having more policies is better. Policies can interact in negative as well as positive ways. For example, policies that price emissions are often favoured because they can bring about least-cost emissions reductions, and adding regulatory policies to the same firms can, in some circumstances, impose higher costs without delivering further emissions reductions.

Table 3 Types of emissions reduction policies

Type	Policy	Examples
Market policies		
Mandatory carbon pricing	Cap and trade ETSs	European Union ETS, California ETS
	Baseline and credit ETSs	Alberta Specified Gas Emitters Regulation
	Emissions intensity ETSs	See AEMC (2015) submission to the ERF Safeguard Mechanism Consultation
	Carbon taxes	British Columbia Carbon Tax
Voluntary carbon pricing	Offset schemes	Clean Development Mechanism (an international scheme)
	Government purchase of emissions reductions	Emissions Reduction Fund purchasing
Other mandatory price-based policies	Renewable energy target schemes	Renewable Energy Target
	Energy efficiency target schemes	NSW Energy Savings Scheme
Non-market policies		
Regulation	Facility-level emission limits	ERF safeguard mechanism
	Appliance standards	Greenhouse and Energy Minimum Standards
	Building standards	Energy efficiency requirements in the National Construction Code (e.g. 6 star standard for new houses)
	Vehicle standards	The United States, Canada, the European Union, China, Japan, India, Korea and various other countries have vehicle efficiency and/or emission standards
Information programs	Energy labelling for appliances	E3 Program (Australia and New Zealand)
	Information and advice on energy efficiency	Your Energy Savings website
Innovation support	Grants for research & development	Grants provided by the Australian Renewable Energy Agency
	Public investment in commercialisation	Loans provided by the Clean Energy Finance Corporation

There is a spectrum of market policies that can be used to reduce emissions. While there are some differences between them, they also have similarities. First, they all create a financial incentive to reduce emissions—either by putting an explicit price on emissions, or an implicit price by paying for emissions reductions. Second, market policies leave it up to firms (and sometimes also individuals) to work out how emissions can be most easily and cheaply reduced—the advantage of leaving such decisions to firms is that they generally have better information about their emissions reduction opportunities than governments. With a financial incentive, firms will also explore innovative ways to reduce emissions. Through using incentives and harnessing information, market policies can cause the lowest cost emissions reduction opportunities to be taken up.

Market policies, however, are not always better than non-market policies. While they will, if well-designed, tend to minimise direct implementation costs, they can sometimes have high transaction costs or indirect costs. Also, there are some non-price barriers to reducing emissions (such as lack of information) that may be more effectively addressed through non-market policies, such as regulation

and information programs (including communication programs). The various types of market and non-market policies are discussed below.

3.1. Mandatory carbon pricing

Mandatory carbon pricing policies use markets to change the relative price of high and low emission activities. They do this in a variety of ways: making high emission activities more expensive; making low emission activities cheaper; or some combination of both. The key thing they have in common is that, by pricing emissions, they create an incentive for firms and households to find the lowest-cost ways to reduce emissions. As a result, mandatory pricing policies can make firms consider emissions costs as part of their normal business practice. The family of policies that place a mandatory price on emissions include the various types of emissions trading schemes (ETS) and carbon taxes.

Emissions pricing can create consistent incentives for achieving emissions reductions at least direct cost to the community. Emissions pricing is technology neutral because it targets emissions directly, rather than prescribing or limiting particular technologies or practices. This can improve cost effectiveness relative to other mandatory price-based policies (section 3.3) and regulation (section 3.4).

In addition, the costs from emissions pricing are often passed through to consumers, making high-emissions products more expensive relative to low-emissions ones. This can alter purchasing decisions, bringing about cost-effective emissions reductions by consumers. For example, emissions pricing can increase the price of electricity, prompting consumers to install heating and cooling systems that use less energy, such as heat pumps. In general, higher prices are not seen as an advantage by those who have to pay them, and it is possible to design an ETS specifically to dampen price increases.

Mandatory pricing can have indirect effects on the broader economy due to interactions with the existing tax system (section 2.1.1). While these costs can be offset to some extent by using revenue generated by a pricing scheme to reduce inefficient taxes, in some cases a significant indirect cost will remain. Sections 3.1.2 and 3.1.3 explore types of ETSs that may have lower indirect costs.

Mandatory pricing places reporting and other requirements on firms (known as liable entities) that have compliance obligations under the measure, which imposes transaction costs. This is unlikely to be a substantial issue where liable entities are firms that emit large quantities of greenhouse gases, but it could make mandatory pricing a less attractive option in sectors that have many small emitters or where accurate measurement of emissions is costly (chapter 4).

3.1.1. Cap and trade ETSs

The aim of a cap and trade ETS is to put a firm limit on emissions (through the cap) and drive least-cost emissions reductions (through trade). A cap and trade ETS changes incentives by imposing a penalty on emissions, making activities that generate emissions more expensive.

Under a cap and trade ETS, the government sets an annual cap (or limit) on emissions, which can be calibrated to its national emissions reduction target. It then creates permits to emit that, in total, add up to the limit set by the cap. Liable parties are required to relinquish one permit to the government for each tonne they emit, with penalties for non-compliance. With the cap set below what emissions would otherwise be, permits are scarce, so firms will be prepared to pay for them and a price can be set through trade. Trade is allowed so that permits end up in the hands of those that value them the most (that is, those prepared to pay the prevailing price), with firms that can reduce emissions within their own operations more cheaply opting to do so. Box 2 outlines the mechanics of a cap and trade ETS.

Box 2 Mechanics of a cap and trade emissions trading scheme

Step 1: The government issues a fixed number of permits to emit each year so that emissions in covered sectors are 'capped'.

Step 2: Significant emitters of greenhouse gases need to acquire a permit for every tonne of greenhouse gas that they emit.

Step 3: The quantity of emissions produced by firms is monitored and audited.

Step 4: Firms compete to purchase the number of permits that they require. Firms that value permits most highly will be prepared to pay most for them, either at auction, or on a secondary trading market. For other firms it will be cheaper to reduce emissions than to buy permits.

Step 5: At the end of each year, each liable firm surrenders a permit for every tonne of emissions that it produced in that year.

Certain categories of firms might receive some permits for free as a transitional assistance measure.

There are various design choices that must be made in developing a cap and trade scheme; many of these also arise with other price-based policies. The main choices for a cap and trade scheme include:

- which source of emissions should be covered by the scheme (for example, a narrow scheme could just cover the electricity sector; a broader scheme could cover more sectors, such as direct combustion, industrial processes, transport, waste and fugitive emissions from mining)
- whether to auction permits, give them out for free, or some combination of each (if auctioning is used there is a choice of what to do with the revenue; if free allocation is used the basis for determining allocations needs to be decided)
- whether to allow permit prices to fluctuate in line with supply and demand, or to use price controls of some sort to reduce volatility (effectively turning the scheme into a hybrid of an ETS and a carbon tax)
- whether to cover emissions-intensive trade-exposed industries (whose international competitiveness could be affected), and if so whether to shield them from some or all of the impacts of the scheme (chapter 5)
- whether to also introduce a domestic offset scheme in sectors not covered by the cap and trade scheme, and allow liable parties to acquit offset credits in place of permits (section 3.2.1)
- whether to link to international ETSs and/or offset schemes (which could have major implications for emissions prices and competitiveness effects)
- whether, to what extent and how to assist households, sectors, industries or regions adversely affected by the ETS on equity grounds or to avoid unwanted competitive distortions.

Cap and trade schemes in place around the world reflect a variety of design choices (Table 4) and work alongside other emissions reduction policies (Table 1).

Table 4 Emissions trading schemes in other countries

Scheme	Type	Coverage: % of total emissions (sectors)	Permit allocation	Price & supply controls	Linkages and offsets
European Union	Cap and trade	About 45% (electricity, industry, aviation)	Average of 57% of permits to be auctioned (2013-20) Electricity: 100% auction (for most countries)	From 2019: market reserve*	EU 28 plus Norway, Iceland, Liechtenstein International offsets
China (7 pilot schemes in provinces and municipalities that contribute 27% of China's GDP)	Cap and trade	35-60% in pilot scheme areas (electricity, industry, buildings, aviation, transport)	Mainly free based on benchmarking or historic emissions	Varies: includes floor prices, temporary trading suspension, holding limits, market reserve*	Will expand to national scheme in 2017 Domestic offsets
Republic of Korea	Cap and trade	66% (electricity, industry, buildings, transport, waste, aviation)	100% free allocation based on historic emissions or benchmarking Some auctioning begins 2018	Options include market reserve, temporary price floor or ceiling, changes to offset limits	Domestic offsets
USA: California	Cap and trade	85% (electricity, industry, transport)	Around half of permits auctioned, free allocation based on various methods	Rising auction floor price, market reserve*	Linked to Quebec Domestic and international offsets
USA: RGGI (nine north-eastern states)	Cap and trade	About 20% (electricity)	Over 90% of permits auctioned	Auction floor price, market reserve	9 linked states Domestic offsets
Kazakhstan	Cap and trade	55% (electricity, industry)	100% free based on historic emissions	None	No linkages Domestic offsets
Canada: Alberta	Baseline and credit	50% (electricity, industry)	Credits issued for emissions below facility baselines	Effective price ceiling	No linkages Domestic offsets
Canada: Quebec	Cap and trade	85% (electricity, industry, transport, waste)	100% of permits auctioned except for EITEs	Rising auction floor price, market reserve	Linked to California Domestic offsets
New Zealand	Cap and trade	About 50% (electricity, industry, transport, waste, some forestry)	Credits allocated to forestry. Partial free allocation to EITEs. No allocation to other covered sectors.	Price ceiling, non-forestry entities surrender 1 unit for 2 tCO_2-e	No linkages Domestic offsets
Japan: Tokyo and Saitama	Baseline and credit	20-26% (industry, buildings)	Credits issued for emissions below cap	Option to increase credit supply	2 cities linked Domestic offsets
Switzerland	Cap and trade	About 10% (electricity, industry)	Similar to EU		Link to EU in negotiation International offsets

***** A market reserve is a supply of permits held in reserve to manage price. Permits can be released from the reserve to increase supply in the case of high carbon prices, or held back from the market to increase scarcity in the case of low carbon prices.
Note: EITE refers to emissions-intensive trade-exposed industries/firms.
Sources: Scheme details: ICAP 2015, EDF *et al.* 2015, government websites.

The costs of a cap and trade scheme and their distribution throughout the economy depend on the design choices made, including the method of allocating permits. Where permits are allocated:

- **by auction**, firms incur the direct cost of purchasing permits. Firms will seek to pass these costs through to consumers. The resulting price increases can particularly affect low-income households, who spend a greater proportion of their income on electricity and other emission-intensive goods. Some auction revenue could be used to provide compensation to households.
- **for free, based on historical emission levels**, firms do not incur direct costs, but face an 'opportunity' cost because they could sell the permits received. As a result, firms will seek to pass the costs through to consumers anyway.
- **for free, based on emissions intensity and production levels**, firms above the specified intensity level incur some direct costs of purchasing permits. In this case, firms face lower overall costs, and so any cost pass through to consumers will be less than with auctioning or historical allocation (section 3.1.3).

In all three cases, however, a cap and trade ETS will limit emissions (due to the cap) and change the relative price of high and low emitting activities (due to trading). The cost to the economy as a whole will depend, in part, on how any auction revenue is used, the extent of cost pass-through, and tax interaction effects.

3.1.2. Baseline and credit ETSs

The aim of a baseline and credit ETS is to drive least-cost emissions reductions (through trade), at lower direct costs to firms (compared to a cap and trade ETS with auctioning). A wide range of baseline and credit schemes exist.

The simplest version provides a subsidy to low-emitting producers, which makes low-emissions activities cheaper. In this type of scheme, firms create credits where their emissions are below a specified baseline. Liable entities are required to buy credits; the resulting trade establishes a price on emissions and ensures that the lowest-cost crediting opportunities are taken up.

More complex baseline and credit schemes use a combination of subsidies and penalties, making low-emissions activities cheaper and high-emissions activities more expensive. Firms create credits where their emissions are below a specified baseline; firms that emit at the level of their baseline do not have to pay anything; and firms that emit above their baseline must buy credits (or pay a penalty). Trade in credits establishes a price on emissions and ensures that emissions are reduced where it is cheapest to do so, in a similar way to both cap and trade and emission intensity schemes.

Baseline and credit ETSs involve many of the same design choices as cap and trade, for example which sectors in the economy and which firms in those sectors are covered by the scheme, and the role of offsets.

Baseline and credit schemes do not allocate permits; instead, they need to set baselines. As with cap and trade, the approach taken affects the costs of the scheme, and the distribution of those costs throughout the economy.

3.1.3. Emissions intensity ETSs

The aim of an emissions intensity ETS is to drive least-cost emissions reductions (through trade), with lower direct costs to firms and lower indirect costs to the economy (compared to a cap and trade ETS with auctioning). It uses a mix of penalties and subsidies to change incentives.

In its simplest form, the government sets a baseline emissions intensity target. All liable firms receive the same free allocation of permits per unit of production (effectively a production subsidy, which is equal for all producers). Lower-emitting firms receive extra permits that they can sell; higher-emitting firms need to purchase permits for emissions above the baseline. Trade establishes a price on emissions, changing relative prices and ensuring that emissions are reduced where it is cheapest to do so, in a similar way to a cap and trade scheme.

The baseline could be set to achieve the desired level of emissions, based on projected output, and could decline over time to help achieve the economy-wide target. If the baseline was reduced to zero, the scheme would become equivalent to a cap and trade scheme.

An emissions intensity ETS was proposed during the development of an Australian cap and trade scheme (Frontier Economics 2009). Under this proposal the electricity sector would receive free permits based on benchmark baselines.

Relative to a cap and trade ETS with auctioning, an emissions intensity ETS would have less impact on prices. As a result, it would create less need to provide assistance to emissions-intensive trade-exposed firms and low-income households, and have smaller indirect (tax-related) effects on the economy. It would also drive fewer demand-side emissions reductions.

3.1.4. Carbon taxes

The aim of a carbon tax is to drive least-cost emissions reductions by directly pricing emissions. It changes incentives by imposing a penalty on emissions, making high emissions activities more expensive.

With a carbon tax, the government explicitly sets an emissions price that liable firms are required to pay through the tax system. Firms would respond to a carbon tax in much the same way as they would to the permit price under an ETS. That is, they would look to take up opportunities to reduce emissions where this was cheaper than paying the emissions price.

Eighteen countries and one province in Canada have legislated a carbon tax. Several European countries including Finland, Poland, Norway and Slovenia introduced them in the 1990s. The Canadian province of British Columbia introduced a carbon tax in 2008 and taxes commenced within the last year in France, Mexico and Portugal (Kossoy *et al.* 2015).

Carbon taxes involve many of the same design choices as ETSs, including which sectors to cover, whether to allow domestic or international offsets, and whether to exempt or provide concessions for emissions-intensive trade-exposed industries.

When a carbon tax is introduced, it cannot be known precisely what quantity of emissions reductions will occur. Accordingly, tracking towards a target becomes an iterative process, with the tax level adjusted over time to achieve the desired emissions outcome. Alternatively the government could accept a degree of uncertainty in the response to the tax and implement other measures to be more confident of reaching the target.

Questions

Q.2. What lessons can be learned from Australia and overseas on the effectiveness of mandatory carbon pricing, and its interaction with other climate policies?

Q.3. How does mandatory carbon pricing perform against the principles of cost effectiveness, environmental effectiveness and equity? Which type of pricing scheme is likely to be more effective, and why?

3.2. Voluntary carbon pricing

The aim of voluntary carbon pricing is to encourage least-cost emissions reductions. It changes incentives by subsidising activities that reduce emissions, whether those activities occur onshore (for example, as with ERF purchasing) or offshore (for example, as with the Clean Development Mechanism (CDM)).

Voluntary carbon pricing policies enable firms to be paid for reducing emissions below what they would otherwise be (that is, below business-as-usual). It involves firms implementing projects to reduce emissions that conform to agreed rules and standards. These policies can provide an incentive for firms to identify and bring forward low-cost emissions reduction opportunities. This market-based assessment of opportunities can provide some of the same benefits as mandatory pricing policies, but with lower indirect costs.

A complexity with these policies is the risk that emissions reductions that would have occurred without the scheme are credited (this is sometimes called the 'additionality' risk). Voluntary pricing schemes use rules and procedures to manage this risk. Stringent additionality rules can be costly and exclude projects that would have been additional; a more relaxed approach can impair the effectiveness of the scheme as non-additional projects do not help close the gap between business-as-usual emissions and the target. Additionality rules therefore need to strike a reasonable balance.

Unlike mandatory carbon pricing schemes, firms can choose not to participate in voluntary schemes, so some low-cost emissions reduction opportunities can be missed. Firms with prospective opportunities might choose not to participate either because they are deterred by the time and costs of complying with the rules of the policies, or because they are not aware that participating would be worthwhile for them.

3.2.1. Offset schemes

Offset schemes are not a standalone policy, and need to be coupled with a source of demand for offset credits. This can occur if firms are permitted to use offset credits to meet their obligations under a mandatory policy, such as an ETS, tax or regulation. Alternatively credits can be sold into a voluntary market, or the Government can purchase them, including through a competitive auction (see section 3.2.2).

Under an offset scheme, a regulatory authority issues credits to projects that reduce emissions below what they would have been otherwise (that is, below business-as-usual). For example, credits could be issued to a farmer for planting trees which remove carbon dioxide from the atmosphere as they grow. These schemes generally entail the development of methods that determine what sort of projects are eligible, and rules for undertaking and monitoring them. Once credits are issued, participants are able to sell them to firms that have liabilities under a mandatory policy. These firms then acquit these credits

rather than, for example, acquitting ETS permits, paying a carbon tax, or incurring the penalties prescribed by a regulation.

Prior to the repeal of the Carbon Pricing Mechanism, Australia had an offset scheme called the Carbon Farming Initiative, which has now been incorporated into the ERF. The Carbon Farming Initiative accepted projects in uncovered sectors such as agriculture, forestry and legacy waste (CCA 2014a). The crediting element of the ERF generates offset credits in this way, across all sectors of the economy (Box 4). As detailed in Table 4, many existing ETSs are coupled with a domestic offset scheme. In addition, the CDM is an international offset scheme designed to drive emissions reductions in developing countries (Box 3). When an ETS is linked to an offsets scheme, the environmental effectiveness of the ETS will depend in part on the how well the additionality risk is managed in the offset scheme.

Box 3 Clean Development Mechanism

The Clean Development Mechanism (CDM) is a global offset scheme used to credit emissions reduction projects. It is established under the Kyoto Protocol and has operated since the beginning of 2005. Projects that reduce or avoid emissions, or store emissions in vegetation, are undertaken in developing countries to generate credits. Projects are issued Certified Emissions Reductions (CERs), for each tonne of CO_2-e. CERs can be purchased by developed countries to meet their Kyoto targets.

As of 31 October 2015, there were 7,677 registered CDM projects, which had collectively been issued 1.63 billion CERs (UNFCCC 2015a). This represents emissions reductions equivalent to around three times Australia's annual emissions. Most registered projects are in the industrial and energy sectors, including renewable energy (mainly hydro and wind), energy efficiency improvements, and the destruction of synthetic greenhouse gases, waste coal mine and landfill gas. Most sources of emissions reductions are eligible—notable exceptions are nuclear and forestry-based projects (other than afforestation and reforestation).

The CDM Executive Board must approve project plans and methodologies before CERs can be issued. The board must be satisfied the emissions reductions are 'additional' to what would have occurred without the project and that the project would not have occurred without the financial incentive provided by the CDM. The project must also be validated by an independent auditor to ensure the reductions are genuine, measurable and verifiable.

By far the largest source of demand for CERs has been liable entities within the EU ETS. These entities acquitted almost 700 million CERs in Phase II of the EU ETS (2008-12). Qualitative and quantitative limits on use of CERs in the EU ETS have been tightened over time. In Phase III (2013-2020), new CDM projects are only eligible if they are in least developed countries. The EU is not planning to allow CERs in its ETS from 2020. Until recently, the New Zealand ETS also allowed the use of some CERs.

3.2.2. Government purchase of emissions reductions

Schemes for government purchase of emissions reductions can provide a market for credits from offset projects. They involve the crediting of emissions reductions below business-as-usual in the same way as for offsets. The main difference is that demand for credits comes from the government, rather than from firms that have obligations under another policy.

Australia's current ERF purchasing scheme was the result of an expansion and reconfiguring of the pre-existing Carbon Farming Initiative. The scheme now has methods that allow for projects of various

types across all sectors in the economy. The Government has held two ERF auctions and contracted to purchase 93 Mt CO_2-e of emissions reductions from vegetation, waste, agriculture, savanna burning, energy efficiency, transport and coal mine gas projects. ERF purchasing is one of the three elements of the ERF (Box 4).

Box 4 Emissions Reduction Fund

The Emissions Reduction Fund (ERF) is the centrepiece of the Government's Direct Action Plan to reduce Australia's greenhouse gas emissions. It has three interrelated elements: crediting, purchasing and safeguards.

ERF crediting involves businesses, community organisations, local councils and others undertaking eligible activities that reduce emissions, and receiving 'credits' for the reductions. To be eligible, the activity must conform to the requirements of an emissions reduction 'method'. Methods have been established for upgrading commercial buildings, improving the energy efficiency of industrial facilities and houses, capturing landfill gas, reforesting and revegetating land, managing fires in savanna grasslands and a range of other activities.

Methods set out the rules for determining and verifying the quantity of credits that can be issued. Credits are issued once emissions reductions occur, so some projects (for example, those involving reforesting) could potentially earn credits each year over 20 years or more.

ERF purchasing currently provides the main source of demand for ERF credits. The Government uses a competitive process to purchase credits at the lowest available cost. The Government has committed $2.55 billion for purchasing credits, with further funding to be considered in future budgets (DoE 2015c).

Participants register their project, and can then bid into auctions run by the Clean Energy Regulator. The Government enters into contracts of up to 10 years duration with successful bidders. Contracts give participants certainty for up to 10 years over the price they will receive for their credits. If a project does not earn sufficient credits to meet the contractual obligations, the project proponent may need to 'make good' by buying credits from someone else.

The ERF safeguard is a regulatory measure that requires large emitters to keep their net emissions below a baseline level. It will start on 1 July 2016 and will apply to around 140 large businesses that have facilities with direct emissions of more than 100,000 t CO_2-e per year. Baselines for existing facilities will reflect the highest level of reported emissions over the five years ending in 2013-14. Baselines can be increased to accommodate economic growth, natural resource availability and other circumstances. Baselines will also be set for new investments. For new investments that are operational after 2020, baselines will be set with reference to best practice (DoE 2015e).

Firms will have a number of options for meeting obligations under the safeguard mechanism. For example, they could:

- keep their emissions below the baseline
- exceed the baseline in one year, provided average emissions over two or three years are below the baseline (in certain circumstances)
- exceed the baseline emissions level and purchase emissions credits so that their net emissions are below the baseline (this option potentially creates another source of demand for ERF credits).

Questions

Q.4. What lessons can be learned from Australia and overseas on the effectiveness of voluntary carbon pricing, and its interaction with other climate policies?

Q.5. How does voluntary carbon pricing perform against the principles of cost effectiveness, environmental effectiveness and equity?

3.3. Other mandatory price-based policies

Some policies create a price for activities that reduce emissions, such as deploying renewable energy and improving energy efficiency, rather than create a price for emissions directly. These policies set targets for the activity, place mandatory obligations on energy retailers (or other liable entities) to meet the targets, and use certificates that are traded, creating a market and setting prices. These policies change incentives by subsidising activities that reduce emissions.

3.3.1. Renewable energy target schemes

Renewable energy target schemes typically place an obligation on energy retailers to purchase a certain amount of their energy from eligible renewable sources. Suppliers are issued with a certificate for each unit of renewable energy they produce, and retailers buy these certificates. At the end of the year retailers must surrender sufficient certificates to the government to meet their obligation or pay a penalty. Renewable energy target schemes drive emissions reductions because they cause electricity generated from burning fossil fuels to be replaced by renewable energy (for example from wind or solar).

Provided that the target for renewable energy is set higher than what would otherwise be supplied, certificates will have a value. This means that suppliers of renewable energy get paid for the certificates as well as for electricity, and this enables them to gain extra market share. These schemes create competition between different sources of renewable energy, which encourages supply from those technologies that have the lowest costs. Like ETSs, renewable energy target schemes are a type of trading scheme and set a market price.

Renewable energy target schemes have been introduced in a wide range of countries, including in Europe, China, India, South Africa and Brazil (Table 1). Australia has had a national renewable energy trading scheme since 1999 (Box 5).

Renewable energy facilities tend to have relatively high capital costs and low operating costs relative to fossil fuels. For example, wind and solar facilities are relatively expensive to build but the energy sources they use are free. This means that renewable facilities tend to run at their maximum output at any time regardless of the price of electricity or certificates. Accordingly, as renewable energy targets rise, they tend to drive new renewable investment rather than simply increase production from existing facilities. The Australian scheme has rules aimed at ensuring that the target is met through new investment.

In general, renewable energy target schemes increase the overall cost of the electricity system, including by displacing lower-cost fossil generation with higher-cost renewables. The distribution of these costs varies across schemes, and depends in large part on the design and conditions of the electricity market. In Australia, the large-scale renewable energy target tends to depress the wholesale electricity price, reducing returns to existing generators. The cost of certificates is passed on to

consumers through the retail electricity price, but the net effect on consumers is minimal, as the certificate cost is roughly offset by the lower wholesale price (Expert Panel 2014; CCA 2014d).

To date, successive Australian governments have maintained separate carbon pricing policies and renewable energy targets. As discussed earlier, it is important to have stability in climate change policy, so rapid and unexpected changes are best avoided. Consequently, in considering alternative carbon pricing options, it is important to take into account implications for existing and prospective investors in Australia's RET.

Box 5 Australia's Renewable Energy Target

The Renewable Energy Target (RET) aims to ensure that at least 20 per cent of Australia's electricity generation comes from renewable resources by 2020. It works by creating a market for additional renewable electricity that supports investment in new renewable generation capacity.

The RET places a legal obligation on entities that purchase wholesale electricity (mainly electricity retailers) to surrender a certain number of certificates each year. These certificates are generated by accredited renewable power stations and eligible small-scale technologies. Each certificate represents one megawatt hour (MWh) of renewable generation.

Since 2011, the RET has operated as two schemes—the Large-scale Renewable Energy Target (LRET) and the Small-scale Renewable Energy Scheme (SRES).

The LRET supports large-scale renewable energy projects, such as wind and large-scale solar generators, by helping to bridge the cost between renewable and fossil-fuel generation. It sets annual targets for the amount of large-scale renewable energy; these targets rise to 33,000 GWh in 2020 and stay constant at that level until the scheme ends in 2030. These annual targets are allocated among liable parties in proportion to their purchases of wholesale electricity.

The SRES helps households, small businesses and community groups with the upfront cost of installing small-scale renewable systems, such as rooftop solar photovoltaic (PV) systems and solar hot water heaters. The SRES has no fixed annual targets; rather, liable entities are obliged to purchase all of the certificates generated from the installation of eligible small-scale systems. The scheme will phase out gradually (from 2017 or 2022 depending on the technology) until it ends in 2030.

3.3.2. Energy efficiency target schemes

The mechanics of energy efficiency target schemes (sometimes called 'white certificate' schemes) are similar to those for renewable energy target schemes, in that a mandatory obligation is placed on energy retailers and tradeable certificates are used to achieve a target at least cost. The difference is that the obligation is for a certain quantity of energy savings, rather than of renewable energy. Certificates are issued to firms that undertake certain specified activities that save energy. Such activities could include the installation of energy efficient heating and cooling appliances, lighting, and other technologies.

Energy efficiency target schemes currently operate in India, the United States (in some states), Sweden and in some European countries (Table 1) (Kieffer & Couture 2015). In Australia, state and territory governments have introduced schemes in Victoria (Victorian Energy Efficiency Target), New South Wales (Energy Savings Scheme), South Australia (Retailer Energy Efficiency Scheme) and the Australian Capital Territory (Energy Efficiency Improvement Scheme).

There are many opportunities to improve energy efficiency that pay for themselves through lower electricity bills, but which are overlooked for various reasons (Box 6). This suggests that there is potential for energy efficiency target schemes to achieve low-cost emissions reductions and deliver savings to households and firms. That said, these schemes sometimes involve small-scale activities (such as changing a small number of light bulbs in a single residence), which can result in relatively high transaction costs per tonne of emissions reductions (and per unit of energy savings). They can also be susceptible to measurement and additionality problems (that is, certificates being generated for energy savings that would have occurred without the scheme), which can reduce their effectiveness (DSDBI 2014).

Box 6 Cost-effective energy efficiency opportunities

A range of studies have found that substantial emissions reductions could be achieved at low cost or provide savings through energy efficiency. For example, in 2011 ClimateWorks Australia identified that improved energy efficiency could deliver around 41 Mt CO_2-e of negative cost emissions reductions in Australia in 2020 (ClimateWorks 2011).

In general, the savings identified for many energy efficiency actions do not take into account transaction costs associated with implementing them, such as management time (ClimateWorks 2010). These costs are difficult to quantify but may mean that the scope for truly negative cost actions is lower than implied by high-level analysis of this type. Also, when energy efficiency is improved, the resulting energy savings (and emissions reductions) may be reduced somewhat by the 'rebound effect'. When energy efficiency is increased the benefits from energy use effectively become cheaper, and people tend to respond by using more energy. For example, after a family insulates their house they may set the thermostat to a higher temperature. That is, rather than taking all of the benefits of insulation in the form of lower energy bills, they take some of it in the form of greater comfort.

Energy efficiency opportunities exist for both business and households, and include improving lighting, insulation and appliance efficiency in residential and commercial buildings, adoption of more efficient vehicles, and improved operational controls in the mining sector.

While energy efficiency actions that provide savings will 'pay for themselves', there are many reasons why households and businesses might not take them up. These reasons include:

- a lack of information on the costs and benefits of energy efficiency or of the skills to take up energy efficiency opportunities
- split incentives where the entity that pays for capital equipment does not pay for the energy it uses (such as between landlords and tenants)
- behavioural and cultural factors that lead to organisations missing opportunities to improve energy efficiency including that future savings are not given sufficient weight when investment decisions are made (Australian Government 2010).

As discussed elsewhere in this paper, Australia has implemented a range of policies to improve energy efficiency, including 'white certificate' trading schemes, regulated minimum energy efficiency standards for building and appliances, and information programs. Nevertheless, there may be further scope for policies to cost-effectively reduce emissions through energy efficiency, such as through the introduction of light vehicle emissions standards. The Government has set a target to improve national energy productivity by 40 per cent by 2030, and is working with states and territories to develop a national energy productivity plan to help reduce energy bills and reduce emissions.

The costs of energy efficiency target schemes fall initially on energy retailers (as they need to buy certificates), but are likely to be passed through to customers in the form of higher electricity prices, at least in the short to medium term. Over time, households and firms benefit from lower electricity bills as the new appliances or lighting reduce their energy consumption. Participants can also benefit by receiving products that improve energy efficiency at no charge. In the long term, additional system-wide benefits can arise because lower electricity demand means new investment in transmission and generation infrastructure can be deferred or may not be needed.

Questions

Q.6. What lessons can be learned from Australia and overseas on the effectiveness of renewable energy targets and energy efficiency targets, and their interaction with other climate policies?

Q.7. How do renewable energy targets and energy efficiency targets perform against the principles of cost effectiveness, environmental effectiveness and equity?

Table 5 Market policies: key characteristics

	Environmental effectiveness	Cost effectiveness	Equity
Cap and trade ETS (with most permits auctioned)	• caps emissions in covered sectors • potential for carbon leakage depends on assistance to emissions-intensive trade-exposed (EITE) firms	• can realise least-cost emissions reductions in covered sectors • transaction costs can be high in sectors with many small emitters • indirect costs from tax interactions may be high, but could be offset to some extent by recycling auction revenue • can reduce costs by linking to schemes in other countries • can scale up by adjusting caps	• price increases for electricity and other emissions-intensive products disproportionately affect low-income households—can use scheme revenue to compensate • potential for high costs in some regions or industries—can use scheme revenue to provide assistance
Baseline and credit ETS (historical or intensity baselines)	• emissions in covered sectors may be capped or may vary with production levels • carbon leakage more likely if historical baselines used	• can realise least-cost emissions reductions in covered sectors • transaction costs can be high in sectors with many small emitters • indirect costs from tax interactions tend to be lower (depending on type of baseline) • linking to schemes in other countries is possible but less straightforward • can scale up by adjusting baselines	• price impacts depend on type of baseline; no scheme revenue available for compensation • historical baselines may provide windfall gains to liable firms • difficulties in setting baselines can lead to inequities between firms and industries
Emissions intensity ETS (with a cap)	• gives relative certainty over emissions in covered sectors • relatively low potential for carbon leakage	• can realise least-cost emissions reductions in covered sectors (especially on the supply-side) • transaction costs can be high in sectors with many small emitters • indirect costs from tax interactions relatively low • can reduce costs by linking to schemes in other countries • can scale up by adjusting caps (and baselines)	• lower price increases relative to cap and trade and some baseline and credit schemes • reduced need to compensate households or assist EITE firms—but no scheme revenue to use for these purposes

	Environmental effectiveness	Cost effectiveness	Equity
Carbon tax	• uncertain emissions reductions in response to level of tax, though level can be adjusted over time to achieve targets • potential for carbon leakage depends on assistance to EITE firms	• can realise least-cost emissions reductions in covered sectors • certainty over the emissions price in the short to medium term can reduce costs by creating greater certainty for investors • transaction costs somewhat lower than for an ETS • indirect costs from tax interactions may be high, but could be offset to some extent by recycling tax revenue • can scale up by increasing the tax	• price increase for electricity and other emissions-intensive products disproportionately affect low-income households—can use scheme revenue to compensate • potential for high costs in some regions or industries—can use tax revenue to provide assistance
Offset scheme	• need a source of demand to drive emissions reductions • if additionality is not achieved, will increase overall emissions; can flow through to regulatory or pricing schemes that allow offsets	• can reduce costs of other policies by allowing access to low-cost emissions reductions in more sectors • can have lower transaction costs than mandatory pricing policies for sectors with many small emitters	• potential to lower costs for all groups
Government purchase of emissions reductions	• reduces emissions provided purchased reductions are additional • participation rates can affect emissions reductions achieved • unlikely to cause carbon leakage	• can realise least-cost emissions reductions across eligible projects and activities (eligibility limits and low participation would reduce cost effectiveness) • indirect costs likely to be relatively low • can have lower overall transaction costs than mandatory pricing policies • can scale up by increasing government funding, but fiscal cost could become unsustainable	• costs borne by taxpayers—distribution of costs depends on the taxes used
Renewable energy target scheme	• reduces emissions from electricity generation • potential for carbon leakage depends on scheme design and assistance arrangements	• can realise least-cost emissions reductions across eligible projects (but not from the sector as a whole) • can scale up by increasing target	• distribution of costs depends on how policy interacts with energy market
Energy efficiency target scheme	• reduces emissions from energy sector provided certificates are only issued for additional energy savings	• can realise least-cost emissions reductions across eligible activities (but not from the sector as a whole) • can have lower transaction costs than mandatory pricing for sectors with many small emitters • can scale up by increasing target	• can improve access to efficient technologies and reduce energy bills

3.4. Regulation

Regulatory policies could be used specifically to address non-price barriers to emissions reductions (alongside pricing policies), or they could play a more central role.

A common complementary role for regulation is the use of energy efficiency standards. These address non-price barriers to emissions reductions opportunities that are in the interests of households and firms to take up, even without factoring in climate-related benefits (sometimes termed 'no regrets' measures). For example, standards can prohibit the sale of appliances that are so energy inefficient as to make it unlikely that people would choose to buy them if they fully understood their running costs. They can also counter the incentive for landlords to buy cheap energy-inefficient appliances because tenants pay the running costs.

Over the last twenty years or so, Australia has introduced many regulations along these lines, including mandatory energy efficiency standards for appliances, equipment and buildings (these types of policies are also common internationally). An untapped opportunity is to introduce mandatory emissions standards for light vehicles (CCA 2014b). The Government recently established a Ministerial Forum to examine vehicle emissions standards in Australia (Frydenberg 2015).

Regulations can go beyond addressing non-price barriers to play a more central role in reducing emissions. For example, the United States and Canada both recently introduced emissions performance standards for new power plants. The US regulations set limits on emissions per output for new coal- and natural gas-fired power plants. Canada's performance standards apply to new and ageing coal-fired plants, and are stringent enough to ensure no new coal plants will be built unless fitted with carbon capture and storage technology.

The main arguments against using regulation as a more central measure are that they tend to be more costly than pricing policies because:

- governments do not have sufficient information to design regulations in a way that captures most low-cost opportunities and avoids mandating some high-cost ones
- regulations sometimes limit compliance options for firms in ways that prevent them from developing innovative ways to reduce emissions.

In some specific situations, however, well-designed regulation may be the best option. For example, in some sectors pricing approaches might be problematic, and the information requirements for developing reasonably efficient regulations might be manageable. These issues are discussed further in chapter 4.

The ERF safeguard mechanism is an example of an Australian regulatory policy that could play an important role. This role is likely to be fairly small, at least initially, given the regulated baselines that have been set, together with the scheme rules and flexible compliance mechanisms.

Questions

Q.8. What lessons can be learned from Australia and overseas on the effectiveness of regulation, and its interaction with other climate policies?

Q.9. How could various types of regulation perform against the principles of cost effectiveness, environmental effectiveness and equity?

3.5. Information programs

Information provision can take the form of media campaigns that provide tips on using less energy, energy efficiency 'star' ratings on appliances, and information programs for firms on low-emissions technologies. Australia has a range of such policies at present. These approaches may be effective

where people are doing things that are not in their own best interest, such as buying appliances that are slightly cheaper, but much more costly to run than five-star rated alternatives.

Most of the time, however, emissions come about from decisions that are in people's own interests or as a result of embedded social practices. Absent government policy, for example, the cheapest way to produce electricity in Australia usually involves burning coal. Providing information will not alter such decisions because lack of information is not the problem. Accordingly, information programs can have a useful, but limited role in efforts to meet emissions reduction targets.

3.6. Innovation support

Government support for innovation in the form of grants, tax concessions or concessional loans can result in in new or lower-cost technologies becoming available. In some cases these technologies may be commercially viable without any further incentives from other climate change policies. However, the main role of such policies is not to directly bring about emissions reductions, but to expand the range and reduce the cost of emissions reduction opportunities over time. As such, government support for research and development may be best viewed as a complement, rather than alternative, to policies that can achieve targets.

Questions

Q.10. What lessons can be learned from Australia and overseas on the effectiveness of information programs and innovation support, and their interaction with other climate policies?

Q.11. How do information programs and innovation support perform against the principles of cost effectiveness, environmental effectiveness and equity?

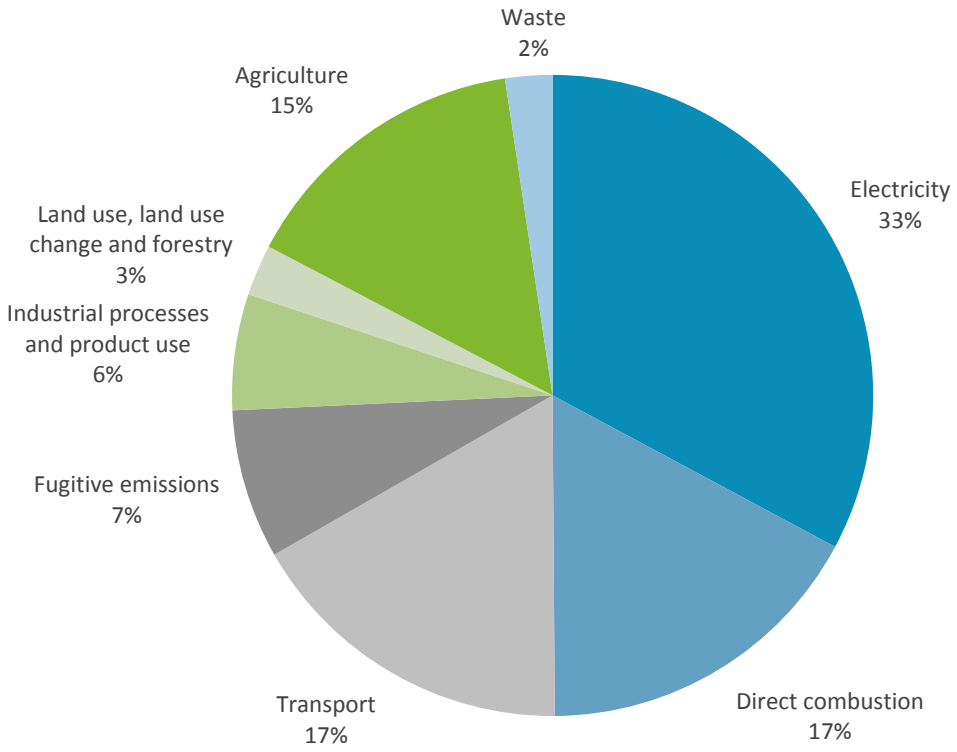
Table 6 Non-market policies: key characteristics

	Environmental effectiveness	Cost effectiveness	Equity
Regulation	• reduces emissions from regulated activities; overall outcome depends on coverage and policy design	• likely to vary depending on policy design and availability of information on emissions reduction opportunities • can reduce cost of meeting targets by addressing non-price barriers (e.g. split incentives where tenant pays bills but landlord makes purchasing decisions) • may be relatively high cost when they mandate particular technologies or practices rather than an outcome (e.g. a specified level of emissions intensity)	• may increase availability of and access to low emission technologies (e.g. regulations may prompt suppliers to offer a greater range of energy efficient appliances) • likely to vary depending on policy design
Information programs	• may reduce emissions by increasing uptake of low-emission technologies and practices	• can reduce cost of meeting targets by unlocking cost-effective emissions reductions	• helps consumers select goods and services that better meet their needs
Innovation support	• may not contribute to meeting short or medium term targets, but may bring forward more effective technologies over time	• can reduce cost of meeting future targets by reducing the cost and increasing the options for future emissions reductions	

CHAPTER 4. FINDING THE RIGHT FIT BETWEEN SECTORS AND POLICIES

Australia's emissions arise from a wide range of activities across all sectors of the economy. Electricity was the biggest single source in 2014, accounting for 33 per cent of the total, reflecting Australia's heavy reliance on coal and gas-fired generators (Figure 3). Direct combustion (for example, burning fossil fuels to produce heat and steam at industrial facilities) and transport each accounted for a further 17 per cent. Agriculture was the largest source of non-energy emissions, producing 15 per cent of total emissions, mainly from livestock and fertiliser application.

Figure 3 Australia's emissions sources in 2014



Note: 'Direct combustion' emissions are the emissions released when fuels are combusted to generate heat, steam or pressure. 'Fugitive emissions' are gases that are leaked or vented during the extraction, production and distribution of fossil fuels such as coal, crude oil and natural gas. 'Waste' includes emissions from landfills, and waste water treatment.
Source: DoE 2015c

While the land use, land use change and forestry sector only accounted for 3 per cent of emissions, it could be of greater significance to Australia's emissions reduction efforts than this figure suggests. This sector is both a source of emissions (from the clearing and harvesting of vegetation) and also stores carbon in forests and other vegetation, sometimes known as a carbon sink. Consequently, it might be possible for the sector to change from being a source of emissions to a net sink over time.

When measured in terms of its contribution to global warming, carbon dioxide makes up 73 per cent of Australia's emissions, methane 20 per cent, nitrous oxide 4 per cent, and other gases 3 per cent (DoE 2015d).

In designing a suite of policies to achieve Australia's emissions reduction objectives, consideration could usefully be given to whether certain policies are best applied to individual sectors (or specific emissions reduction opportunities) because of the nature of the sector or opportunity in question. Where a policy is well suited to being implemented across multiple sectors, it can deliver consistent incentives to reduce emissions, which can enhance cost effectiveness. Another advantage is that consistent incentives can avoid competitive distortions within the Australian economy. For example, by imposing the same cost of emitting across all modes of transport, a broadly-applied policy can avoid one mode gaining an unfair competitive advantage over another. (The related issue of potential competitive distortions across countries is considered in chapter 5.)

There are, however, important differences across sectors that are likely to warrant the use of different policies. Some of the main factors are outlined in Table 7. The challenge is to cater for these differences, while ensuring that the suite of policies operates in a cohesive way to keep costs low and minimise competitive distortions.

Table 7 Sector characteristics and policy choice

Characteristic	How this might influence the choice of policies
Size of emitters	Sectors dominated by firms that emit large quantities of greenhouse gases (such as electricity) may be more suited to mandatory pricing policies than sectors with many small emitters (such as agriculture). This is because the administrative cost of measuring and reporting on emissions are likely to be high for small emitters. A sector with many small emitters might be more suited to voluntary pricing, because administrative costs would then only be incurred where there is an identified opportunity to reduce emissions. In other cases, small emitters may be well suited to regulation, such as minimum performance standards for vehicles and buildings. It may be feasible, however, to cover a sector that has many small emitters by a mandatory pricing policy if liability can be applied upstream or downstream of where emissions occur. For example, individual cars are very small emitters, but petrol and diesel could be covered upstream by placing the liability on refineries and fuel importers.
Ease of measuring emissions	In some cases emissions can be difficult and costly to measure, for example, agriculture emissions related to fertiliser application and changes in soil carbon. For similar reasons to those outlined above, this can make voluntary pricing more suitable than mandatory pricing. Where the emissions reduction benefits of a particular activity or technology are well understood but difficult to measure at the individual level, regulation may also be a good approach.
Scope for emissions reductions	The greater the potential to achieve emissions reductions at a reasonable cost in a sector, the more important it is to have policies in place to capture that potential. For sectors that have few opportunities for emissions reductions in the short term it may be best to concentrate on voluntary measures such as offset schemes, and on research and development of low-emissions technologies.
Ease of setting baselines	Some types of policies, such as baseline and credit schemes, offset schemes and government purchases of emissions reductions, rely on setting baseline emissions for activities or projects. If baselines are not well calibrated, the effectiveness of the policy could be undermined and inequities between firms or sectors could be created. These types of policies may be better suited to sectors where baselines are relatively easy to set (for example, sectors that have a uniform product or production process, such as electricity, rather than sectors where products or processes vary widely).

Characteristic	How this might influence the choice of policies
Existence of non-price barriers	In sectors such as electricity and transport, where there are significant non-price barriers to reducing emissions in consumption (such as information barriers and split incentives, as discussed in chapter 3), there is likely to be a role for regulation and/or information programs that can address these barriers. Such policies could be used either alongside or instead of pricing policies.
Co-benefits and existing policies	In some sectors there are policies in place to address objectives that are related to reducing emissions. Examples include: • In the waste sector, regulatory policies often require the capture and flaring of methane to reduce odour, the risk of explosions and health impacts. Because methane is a greenhouse gas these regulations also reduce emissions. • In the land sector, regulatory policies are often used to control the clearing of native vegetation so as to conserve biodiversity and other environmental values. Reduced clearing also prevents carbon stored in vegetation from being released as carbon dioxide. • Australia has used regulation to phase out certain synthetic greenhouse gases that are used in refrigerators, air-conditioners and other products to meet obligations under the Montreal Protocol (an international treaty to phase out ozone depleting substances). This approach could potentially be expanded to achieve reductions in emissions of other synthetic greenhouse gases that have high global warming potential. In these types of situations it is worth considering whether it is best to rely on (or modify) the existing policy rather than overlay it with a policy specifically targeted at emissions reductions.
Availability of information on emissions reduction opportunities and costs	Where the government has access to reliable information on the cost of emissions reduction opportunities it may be able to design regulations that are reasonably cost effective. Information provision may also be a suitable approach if opportunities are already cost effective for households and firms. Where the government does not have sufficient information on costs, pricing approaches may perform better.
Diversity of emissions reduction opportunities	If emissions reduction opportunities are fairly generic this tends to make regulation a more viable option (for example, capturing and flaring methane at landfills). Where opportunities are diverse or there is scope to innovate to develop new opportunities, pricing approaches may be better (for example, deploying low-emissions energy).
International competition in supply of goods and services	If a good or service is sensitive to price-based competition from countries without binding emissions constraints, the risk of carbon leakage could be mitigated by assisting emitters in in those sectors (for example, free allocation of permits under an ETS), or by using policies that do not impose significant costs (for example, voluntary pricing). International competitiveness is considered in more detail in chapter 5.

Questions

Q.12. What policies do you consider are best suited to which sectors and why?

Q.13. Are there sectors that are better suited to voluntary pricing in the short term and mandatory policies in the longer term and why?

CHAPTER 5. ADDRESSING INTERNATIONAL COMPETITIVENESS CONCERNS

The terms of reference for the Special Review require the Authority to consider possible effects of emissions reduction policies on the international competitiveness of Australian businesses. As discussed in chapter 4, emissions reduction policies can also change firms' and sectors' competitiveness in the domestic economy, and the policy toolkit should seek to minimise unwanted competitive distortions.

5.1. Competitiveness and emissions reduction policies

The main issue of concern is that emissions reduction policies could place Australia (and Australian firms) at a competitive disadvantage relative to other countries that do not face comparable obligations. This concern can arise for any policy that imposes significant costs—an ETS, regulation or other measure.

In the medium- to long-run, as more countries take stronger action to reduce emissions, differences in costs are likely to narrow. In the short-run, however, international efforts will remain uneven. Policy design therefore needs to take account of Australia's position relative to other countries.

Debate on the potential impact of uneven international emissions reduction policies has tended to focus on competitiveness issues arising at the firm- or sectoral-level. These concerns are most relevant for businesses that are both 'emissions-intensive' and 'trade-exposed', because they compete internationally (so policy differences across countries are relevant), and policy costs are large relative to the value of the business's output (so the cost is material). This debate, and policy responses, therefore tends to focus on impacts on emissions-intensive trade-exposed firms and sectors.

Where policies are designed to minimise costs for some firms (for example, in emissions-intensive trade-exposed sectors), they may increase costs for other firms, and for the broader Australian economy. Policy design therefore needs to consider the benefits and costs of measures to address competitiveness concerns.

International competitiveness effects—and policy responses to address them—can also be considered at the economy-wide level. Where emissions reduction policies increase costs for firms (for example, through higher energy costs, or higher taxes), they may make new investment in Australia less attractive. On the other hand, policy uncertainty and instability increases risks for investors, and can hamper Australia's competitiveness. Policy reforms that improve the cost-effectiveness and credibility of Australia's climate response might improve rather than worsen Australia's overall position.

In practice, firm- and national-level competitiveness is a function of multiple factors. The OECD and World Bank identify that national competitiveness is likely to be driven by structural factors such as the broad business environment, education and the availability of skilled labour, labour market regulation, innovative capacity and institutional quality (Arlinghaus 2015; PMR 2015). Industry location is also influenced by access to resources and the quality of infrastructure. In addition, global action to reduce emissions will affect Australia's trade position, regardless of Australia's domestic policy choices

(McKibbin 2015). As a result, the competitiveness effects of uneven emissions reduction policies may not always be material.

5.2. Carbon leakage

Policy-induced changes in international competitiveness can also raise concerns of 'carbon leakage'. If policies result in Australian firms losing market share to international competitors, this reduces output (and the associated emissions) in Australia, and increases output (and associated emissions) in other countries. If those countries do not have binding emissions constraints, then the emissions increase erodes the environmental effectiveness of Australia's policy.

Measures to address competitiveness effects in Australia could therefore be justified on the grounds of minimising carbon leakage. However, countries representing more than 90 per cent of global emissions and population have made emissions reduction pledges in the lead up to the Paris conference, and the vast majority of these involve specific economy-wide targets (Climate Action Tracker 2015). Many of Australia's trading partners now have binding emissions targets. Binding targets eliminate the risk of leakage, as any emissions increase associated with new production would need to be offset by reductions elsewhere if the country is to meet its target.

Experience to date suggests that, in general, countries take their targets seriously and implement policies to meet them. Almost all countries with targets under the Kyoto Protocol first commitment period met them and while it is too early to say whether all countries will meet their future goals, all the major emitters now have policies and measures in place to support their 2020 targets (CCA 2014c).

Such broad international commitment to climate action greatly reduces the risk of carbon leakage. That said, even where there is a low risk of carbon leakage, Australian firms could face higher policy-related costs than those of their international competitors, putting them at a disadvantage.

Questions

Q.14. Which international competitiveness impacts are most important to designing Australia's climate policy toolkit, and why?

Q.15. What is the current risk of carbon leakage, in light of the Paris climate conference and associated national commitments?

5.3. Policy design and competitiveness

In assessing policy options to address competitiveness impacts and carbon leakage concerns, the Authority proposes considering:

- the overall cost effectiveness, environmental effectiveness and equity of the policy options
- the scale and likelihood of potential competitiveness impacts (including by assessing the policies in place in key competitors)
- the risk of competitiveness concerns associated with different policy options and how these might be addressed.

A policy that is cost effective at the national level may well change the competitive position of individual firms or businesses. Policy responses that offset or ameliorate these effects may, in turn, reduce the emissions reductions achieved, shift costs to other firms, or increase total costs. Trade-offs between

competitiveness and leakage concerns, economic costs and the distribution of costs are matters of judgement; the policy task is to find an acceptable balance.

For example, some policies, such as government purchase of emissions reductions and emissions intensity ETSs, are likely to have relatively low impacts on the international competitiveness of firms. This advantage needs to be weighed up against other considerations, such as overall cost effectiveness.

Mandatory carbon pricing policies such as ETSs use a range of policy design features to address competitiveness concerns. ETSs are often linked across countries (such as the link between the European Union and Norway), and to domestic and international offset schemes (such as the CDM). This reduces competitiveness concerns by equalising mitigation costs across markets, and providing access to a wider set of cost-effective emissions reduction opportunities.

ETSs also tend to include a mix of free allocations, rebates or exemptions to emissions-intensive trade-exposed firms and sectors; these soften competitiveness impacts, but in some cases can increase the overall economic cost of achieving emissions reductions, and therefore impose costs on the broader community. Because of this, judgements must be made about the appropriate level of assistance. Where assistance is provided to emissions-intensive trade-exposed firms, there is an advantage in doing this in a way that retains the incentive for them to reduce the emissions intensity of their operations.

Other price-based policies can also be adjusted to address competitiveness and leakage concerns. Renewable energy target schemes, for example, can impose costs on electricity consumers. These schemes often exempt specific industries: for example, large emissions-intensive trade-exposed firms are exempted from costs under Australia's RET.

Voluntary carbon pricing policies, such as government purchase of emissions reductions, will tend to have a minimal direct impact on competitiveness, as firms would only choose to participate in these schemes if it was beneficial for them to do so. These policies may, however, have broader indirect impacts on competitiveness through the need to raise taxes to fund the purchases.

Questions

Q.16. Which sectors are most likely to face adverse impacts on their international competitiveness from climate policy and why?

Q.17. How do you think these impacts should be addressed?

CHAPTER 6. NEXT STEPS

As discussed in chapter 1, the Authority encourages interested parties to make submissions on this options paper, including on the proposed framework for policy evaluation and the relative merits of the various policy options canvassed, including the various forms of ETSs. The due date for submissions is 19 February 2016.

These submissions will inform the Authority's deliberations ahead of it releasing the final report of the Special Review by 30 June 2016. As required by the terms of reference, the Authority will also be examining the operation of ETSs and equivalent schemes in selected countries. The final report will recommend what action Australia should take to implement the outcomes flowing from the Paris climate conference, including whether Australia should introduce an ETS as part of its suite of emissions reduction policies.

APPENDIX A TERMS OF REFERENCE

15 DEC 2014

COMMONWEALTH OF AUSTRALIA

SPECIAL REVIEW BY THE CLIMATE CHANGE AUTHORITY

By this written instrument I, Greg Hunt, Minister for the Environment, request that the Climate Change Authority conduct a review under section 59 of the *Climate Change Authority Act 2011*, as below:

- Assess whether Australia should have an Emission Trading Scheme in the future and what conditions should trigger the introduction of such a scheme.
- This review must consider:
  - whether the USA, China, Japan, Republic of Korea and the EU have established ETSs or equivalent schemes that have similar effect;
  - Australia's international commitments and undertakings under the United Nation's Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol to which Australia is a party;
  - whether Australia should introduce an ETS that does not harm Australian businesses international competitiveness; and
  - what future emissions reduction targets Australia should commit to as part of an effective and equitable global effort to achieve the objective of the UNFCCC (Article 2) or subsequent agreement to which Australia is a party.

Timing

- The Authority should issue a draft report on what future emissions reduction targets Australia should agree to for public consultation by 30 June 2015.
- The Authority should issue a draft report on an Emissions Trading scheme for public consultation by 30 November 2015.
- The Authority should issue a final report by 30 June 2016 recommending what action Australia should take to implement outcomes flowing from the Paris conference.

Dated 10 December 2014

Greg Hunt

Minister for the Environment

GLOSSARY

additionality	The extra emissions reductions that result from the introduction of policy or funding. Reductions that would have happened without the intervention are considered non-additional.
business-as-usual emissions	Emissions projected in the future given current economic and emission patterns, without any policy intervention (or any additional policy intervention).
cap	The year-by-year limit on emissions from sources covered by emissions trading schemes.
carbon dioxide equivalent (CO_2-e)	A measure that quantifies different greenhouse gases in terms of the amount of carbon dioxide that would deliver the same global warming.
carbon intensity	A measure of the amount of carbon dioxide associated with a unit of output. When referring to a national target it measures carbon dioxide per unit of GDP.
carbon leakage	The shift of production of goods or services and their associated greenhouse gas emissions to another country that does not have a binding constraint on emissions. This can erode the environmental effectiveness of a country's emissions reduction efforts.
Clean Development Mechanism (CDM)	An international offset scheme under the Kyoto Protocol that credits projects in developing countries for reducing emissions. These credits can be traded, and developed countries can use them to help meet their emissions reduction targets under the Protocol.
climate change	A long-term change in global or regional climate patterns resulting from human activity.
co-benefits	The other benefits that arise from the introduction of a policy in addition to its main intention. An example is the health benefits from emissions standards for power plants.
covered emissions	Emissions from firms covered by a pricing policy.
emissions budget	The cumulative amount of emissions allowed over a given period of time.
emissions intensity	A measure of the amount of greenhouse gas emissions associated with a unit of output. When referring to a national target it measures emissions per unit of GDP; for a facility it measures emissions per unit of production.

emissions-intensive, trade-exposed (EITE) firms	Firms that are involved in activities that produce a high level of emissions for a unit of output (for example cement production) and are either focused on the export market or subject to import competition.
global warming	A warming of global average temperatures caused by increased atmospheric concentrations of greenhouse gases. This warming results in changes to the climate system.
global warming potential	An index measuring the radiative forcing of a well-mixed greenhouse gas in the atmosphere, relative to carbon dioxide, in order to compare its equivalent contribution to global warming.
greenhouse gas	Any gas (natural or produced by human activities) that absorbs infrared radiation in the atmosphere. Key greenhouse gases include carbon dioxide, water vapour, nitrous oxide, methane and ozone.
gross domestic product (GDP)	A measure of the value of economic production in the economy.
Kyoto Protocol	An international agreement adopted under the United Nations Framework Convention on Climate Change in 1997. It includes binding national targets for developed countries and flexible mechanisms including the Clean Development Mechanism (CDM).
non-price barriers	Barriers which prevent people taking up emissions reduction opportunities that are pay for themselves, even without factoring in the benefits from reduced climate change impacts. Examples of non-price barriers include a lack of information and split incentives (where the person bearing the cost is not the person who benefits from the change).
uncovered emissions	Emissions from sources not covered by a pricing policy such as emissions trading.
United Nations Framework Convention on Climate Change (UNFCCC)	An international treaty that commits signatory countries (known as Parties) to stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous human-induced interference with the climate system.

ABBREVIATIONS AND ACRONYMS

BAU	business-as-usual
CO_2	carbon dioxide, a greenhouse gas
CO_2-e	carbon dioxide equivalent
CCS	carbon capture and storage
CDM	Clean Development Mechanism of the Kyoto Protocol
CER	Certified Emission Reduction unit, created under the Clean Development Mechanism
DoE	Department of the Environment
EITE	emissions-intensive trade-exposed
ERF	Emissions Reduction Fund
ETS	emissions trading scheme
EU	European Union
GDP	gross domestic product
ICAP	International Carbon Action Partnership
IEA	International Energy Agency
INDC	Intended Nationally Determined Contribution under the UNFCCC
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation Mechanism of the Kyoto Protocol
LULUCF	land use, land use change and forestry
OECD	Organisation for Economic Cooperation and Development
RET	Renewable Energy Target
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

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