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Post Paris: Australia's climate policy options

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Overview

Australia has begun to address climate change. The Commonwealth Government has committed to reducing greenhouse gas emissions by 26–28 per cent below 2005 levels by 2030. But we do not have a comprehensive, credible domestic policy framework to achieve this target. We do not even have bipartisan support for the central planks of such a framework, which is essential for such an important public policy issue.

The government has a suite of policies in place to meet its current target of reducing emissions by five per cent below 2000 levels by 2020. These will need to be re-engineered, if not redesigned, to meet the 2030 target and any additional targets the government may commit to in future. The Labor Party is consulting on a target of reducing emissions by 45 per cent below the 2005 baseline by 2030. It has also committed to a cap on emissions of unspecified coverage, an associated emissions trading scheme and an aspiration to generate 50 per cent of Australia's electricity from renewables by 2030.

While an economy-wide, market-based scheme is the most effective and efficient means to reduce Australia's emissions, the adoption of market-based schemes, such as cap and trade schemes, has been inconsistent and politically fraught, both in Australia and overseas. If these issues cannot be overcome, policymakers in Australia will need to look at alternative options that can achieve the current 2030 target — and, potentially, more ambitious future targets — without straying too far from the efficient ideal.

Bipartisan support is essential for whatever mechanisms are adopted. Firms are unlikely to make long-term investments to reduce their emissions unless they are confident that policies are stable. Despite political agreement on targets, Australia has lacked political consensus on climate change policy since 2008.

In this working paper we assess a range of policy options that could reduce emissions, including cap and trade emissions trading, carbon taxation, intensity baseline emissions trading, emissions purchasing, regulation and tradeable green certificates. We assess each policy for:

- credibility: ability to meet the volume of emissions reductions required by current and future targets;
- political viability: capacity to evolve from current policy settings and achieve bipartisan support;
- flexibility: ability to adjust to changes in targets, political developments and technological change;
- adaptability: potential to move towards an economy-wide, market-based scheme over time;
- public acceptability: ability to be understood and accepted by the community; and
- low cost.

None of the plausible policies fulfils all of the criteria. The task is to find solutions to the limitations of an individual policy, or to combine policies so that collectively they satisfy the criteria.

This working paper will be followed in early 2016 by a report that recommends an overall set of policies that Australia should implement to meet its current and future emissions reduction targets. The report will define a path that, if followed, could meet Australia's future targets and secure bipartisan support.

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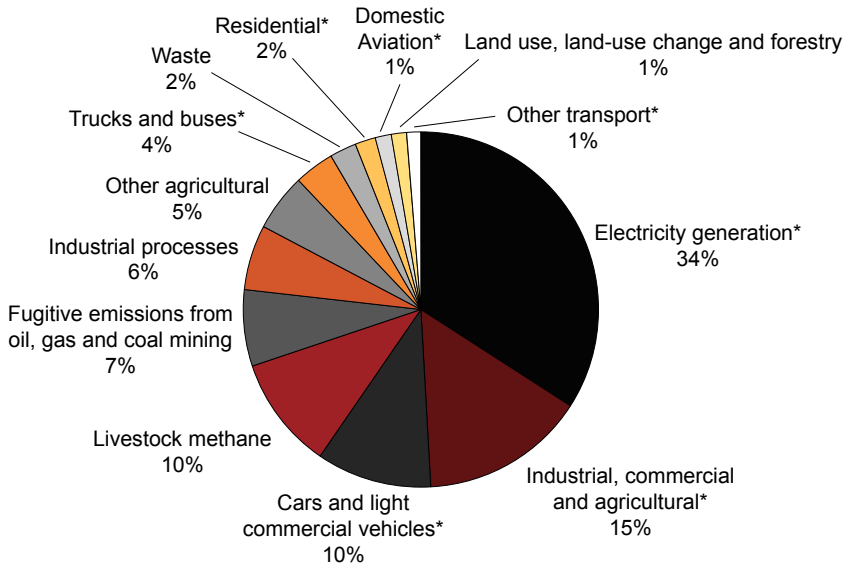
1 Background

The global climate is warming and it is extremely likely that greenhouse gases produced by human activity since the middle of last century are the main cause.[1]

The international community is committed to avoiding the dangerous consequences of climate change. To that end, the world's governments have agreed to limit the increase in global temperature to 2.0 degrees above the pre-industrial average. Current estimates suggest that to achieve this target the net amount of annual greenhouse gas emissions must be reduced to zero before the end of the century.[2]

This will not be easy. Carbon dioxide and other gases with a greenhouse effect (typically quantified as carbon dioxide equivalent, CO_2-e, and collectively referred to as 'carbon' emissions) have gone hand-in-hand with economic development over the past two hundred years: they have been a by-product of many of the developed world's essential goods, services and activities. The burning of fossil fuels, particularly coal, to generate electricity is by far the largest single contributor to Australia's (and the world's) emissions (Figure 1.1). This explains the ongoing focus and debate on zero-emissions, renewable energy alternatives such as solar power. Yet electricity generation is still only a fraction of the problem. If we are to achieve zero net emissions, the way we manufacture goods, produce food, and power vehicles will all need to change dramatically over the course of this century. Moreover, this diversity in the required changes creates challenges for designing a comprehensive policy.

Figure 1.1: Australia's emissions come from a range of sources
Per cent of total greenhouse gas emissions, 2012-13

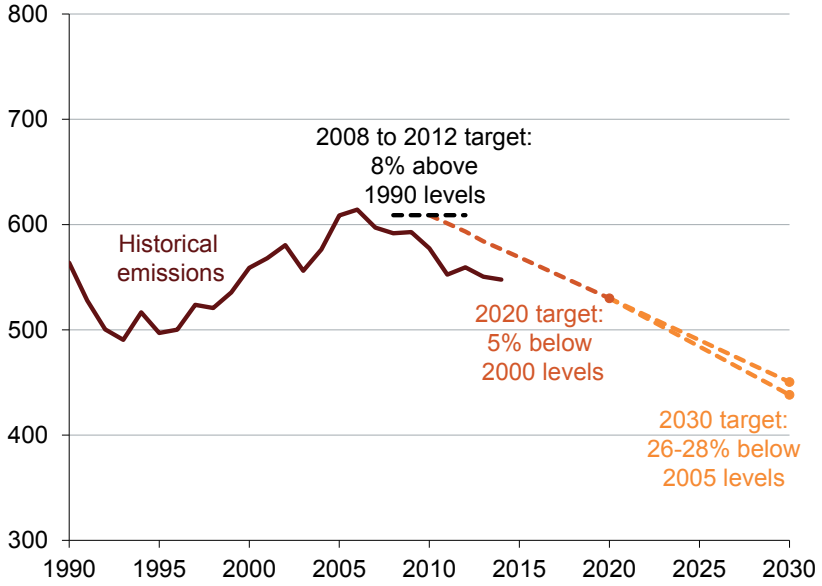


*Notes: *Emissions from direct combustion of fuels. Does not sum to 100 per cent because of rounding. Sectoral breakdown differs to that typically shown in Australian Government reports.*
Source: Department of the Environment (2013); Grattan analysis

Individual countries are proceeding on the basis of medium-term targets for emissions reduction. Australia's current targets are to reduce national emissions to 5 per cent below 2000 levels by 2020, and 26 to 28 per cent below 2005 levels by 2030 (see Figure 1.2).

[1] IPCC (2014)
[2] Ibid.

Figure 1.2: Australia's emissions targets
Mt CO_2-e



Source: CCA (2015); Grattan analysis

However, collectively these national commitments are unlikely to be enough to limit global warming to 2 degrees.[3] The recent Paris conference agreed to a process under which countries' pledges will be reviewed and would be expected to be strengthened.

The volume of emissions that needs to be avoided or mitigated in order to meet an emissions reduction target is often referred to as the 'abatement task'. Australia's abatement task between 2013 and 2020 can be estimated by taking the difference between:

- projected emissions over the period if Australia carries on 'business as usual'; and
- emissions over the period if they follow a straight-line trajectory to the target of 5 per cent below 2000 levels in 2020.

Estimates of the abatement task can change if there are changes in either projected emissions or the trajectory to the target. Indeed, estimates of the 2013-2020 abatement task have fallen dramatically since the first estimate was published in the Australian Government's 2008 report, 'Australia's Low Pollution Future: the Economics of Climate Change Mitigation' (Figure 1.3). The government's most recent estimate, released in November, indicates that Australia's emissions between 2013 and 2020 will be 28 million tonnes lower than the level of emissions required to meet to the 2020 target. This means that Australia is on track to meet its 2020 target.

Several factors have contributed to closing this gap. These include an increased penetration of renewables in the electricity sector, a carry-over of emissions reduction credits from exceeding our first Kyoto Protocol target between 2008 and 2012,[4] fewer 'fugitive' emissions due to a downturn in the coal industry and less deforestation. The government's Emissions Reduction Fund (ERF) is also expected to purchase 92 million tonnes of emissions reduction by 2020.

Meeting Australia's 2030 target will be harder. Current estimates suggest an abatement task of around 900 million tonnes between 2020 and 2030.[5] The government has stated that "Australia's 2030 target is achievable using Direct Action approaches",[6] though policies to meet this target are not yet fully formed.

[3] UNFCCC (2015)

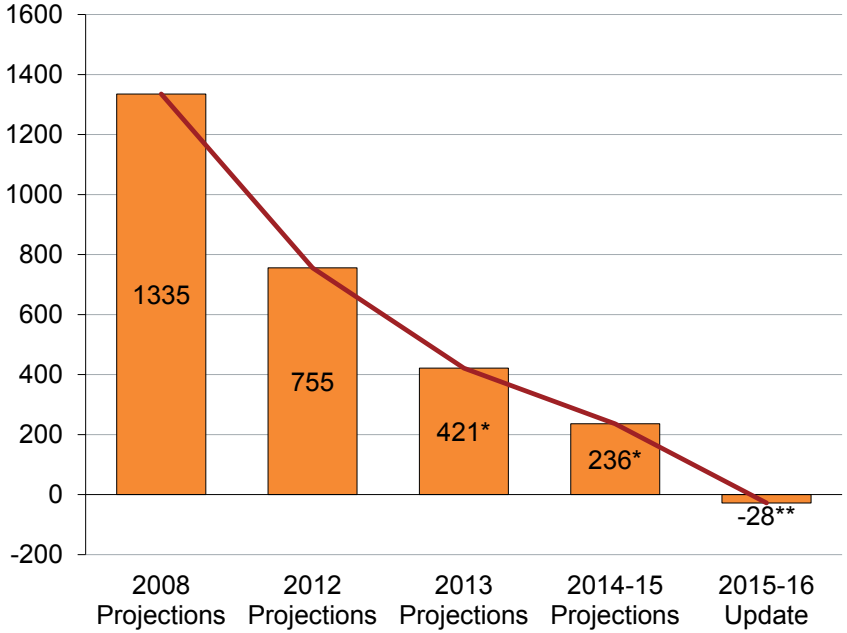
[4] The Kyoto Protocol is an international agreement that seeks to create binding emissions reduction targets for individual countries. Under the protocol's accounting rules, a country can receive credits for exceeding its target in a given period and use these credits against targets in future periods.

[5] Department of the Environment (2015a)

[6] Ibid.

Figure 1.3: Estimates of Australia's 2013 to 2020 abatement task have fallen over time

Mt CO_2-e



*Notes: *Inclusive of Kyoto carryover and voluntary action. Voluntary action is additional to the abatement task. **Inclusive of Kyoto carryover, Emissions Reduction Fund abatement, waste protocol international units and voluntary action. Source: Department of the Environment (2015a)*

The Coalition and Labor continue to disagree over the best policy mechanisms for reducing emissions. The Abbott Government rejected and dismantled its predecessor's carbon price scheme. Labor has vowed to scrap the current government's Direct Action policy.[7] This persistent disagreement means companies are reluctant to invest in the low-emissions technologies needed.

[7] Shorten (2015)

A brief history of Australia's climate change policy

Emissions reduction policy hasn't always been dogged by bipartisan disagreement. In the late 2000s both major parties supported a form of emissions trading scheme.

Policies aimed at reducing greenhouse gas emissions have been on the Australian Government's agenda for over 25 years. For much of the 1990s progress was minimal as a result of a reluctance to adopt policies that would impose significant costs on the Australian economy.[8] In the early 2000s the first market-based approaches for reducing emissions in Australia were introduced: the Commonwealth's Mandatory Renewable Energy Target in 2001 and New South Wales' Greenhouse Gas Reduction Scheme (GGAS) in 2003.

Support on both sides of politics for a broad-based emissions trading scheme grew in the mid 2000s. In 2006, the then Prime Minister John Howard commissioned a task group on emissions trading, which recommended Australia adopt a cap and trade emissions trading scheme.[9] In 2007, the Garnaut Climate Change Review was commissioned by the then leader of the Labor opposition, Kevin Rudd.[10] It also recommended a cap and trade scheme to the new Labor Government in 2008.

Following its election, the Rudd Labor Government began work on a cap and trade scheme. The government's 2008 white paper detailed the final design of the 'Carbon Pollution Reduction Scheme' (CPRS), and announced an emissions reduction target of 5 per cent below 2000 levels by 2020.[11]

[8] For example, see Kelly and Kerin (1990).
[9] Department of the Prime Minister and Cabinet (2007)
[10] Garnaut (2008)
[11] Department of Climate Change (2008)

The CPRS failed to become legislation on three occasions during 2009 and 2010. The Coalition had initially offered to back an emissions trading scheme, but after Tony Abbott replaced Malcolm Turnbull as leader of the Liberal Party, the Coalition withdrew its support. The Coalition subsequently announced its alternative Direct Action policy, centred around a fund for purchasing emissions reductions.

In February 2011, having negotiated with the Greens and independents via a 'Climate Change Committee', the Labor Government, now led by Julia Gillard, announced plans for a new cap and trade scheme.[12] Under the scheme, a fixed price on carbon, initially $23 per tonne, came into force in July 2012. This approach was a compromise designed to provide initial price certainty. The fixed price would remain for a period of three to five years from July 2012, before moving to a floating price determined by the market.

The Abbott-led Coalition opposed the introduction of the fixed price on carbon ('the carbon tax') and promised to repeal the legislation if elected. When elected in September 2013, the Abbott Government followed through on this promise and set about implementing its Direct Action plan, which remains Australia's core policy to reduce emissions.

Future climate change policy

The International Monetary Fund, Organisation for Economic Co-operation and Development and the World Bank all consider putting a price on carbon "essential" to keeping the global temperature increase under two degrees.[13] Yet, as Australian and international experience has shown, implementing such a price via a tax or trading scheme poses challenges. If these issues cannot be overcome, policymakers in Australia will need to look at alternative options for achieving reduction targets.

Governments have a number of policy options that might form part of an emissions reduction policy framework. Policies that reduce emissions may be a single mechanism to reduce emissions across the Australian economy, or a suite of policies, each targeting different sectors.

Grattan Institute is developing a report due for release in early 2016 that will propose a way forward for Australia's overall emissions reduction strategy.[14] This working paper outlines the different policy options and looks at how Australian policymakers might use them.[15] The individual policies are assessed against a range of criteria, including credibility, political viability, flexibility, adaptability, public acceptability and cost.

Chapter 2 sets out six policy options: a cap and trade emissions trading scheme; a carbon tax; an intensity baseline and credit emissions trading scheme; an emissions purchasing scheme; regulation; and a tradeable green certificate scheme. We explain the theory behind each option, and review relevant Australian and international experience with the policy. Chapter 2 also assesses the strengths and weaknesses of each policy and discusses how a transition from Australia's current position might be achieved.

Chapter 3 assesses how each of the individual policies performs against the criteria.

[12] Department of Climate Change and Energy Efficiency (2011)
[13] Carbon Pricing Panel (2015)

[14] A number of organisations, including the Climate Change Authority, are undertaking quantitative assessments of alternative policy options. The results of this modelling will inform Grattan's final report.
[15] The Australian response to climate change will also include adaptation measures, but this paper focuses only on policies for reducing emissions.

2 Policy options

Emissions reduction policies fall into two categories:

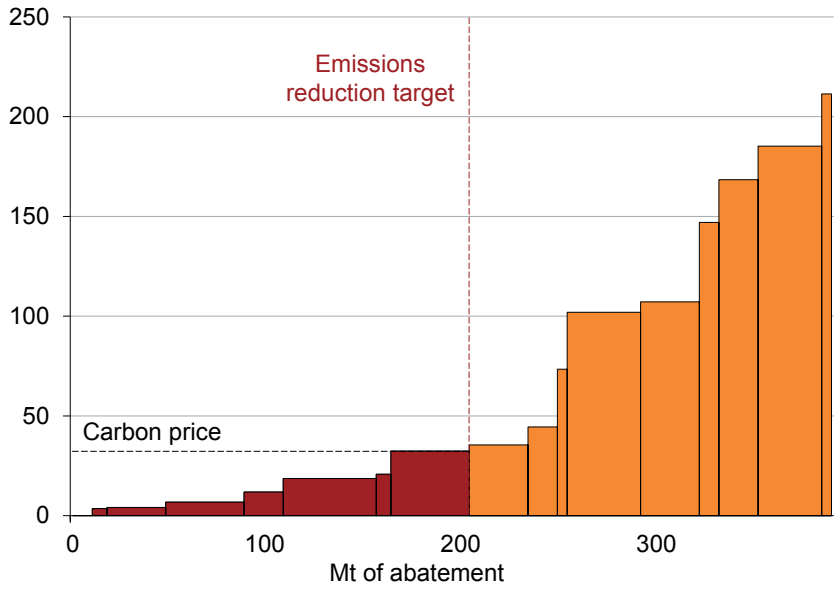
- **Explicit carbon price policies** require emitters to pay for their emissions. The carbon price is set either by government as a fixed price (i.e. tax), or by the market through the introduction of an emissions trading scheme (e.g. cap and trade or intensity baseline and credit).
- **Implicit carbon price policies** involve other measures that either require or provide incentives for emissions reductions. These policies effectively place an implicit price on carbon, and typically focus on specific opportunities to reduce emissions. They include government regulation and market-based mechanisms to reduce emissions through a specific activity, or in a specific economic sector, such as emissions purchasing schemes or tradeable green certificate schemes.

The impact of these two categories of policies can be compared using the marginal abatement cost curve (MACC). The MACC shows the cost and volume of emissions reductions that can be achieved by specific actions. Figure 2.1 shows a hypothetical MACC and what happens when an explicit carbon price is introduced. Each block represents an emissions reduction opportunity. The *width* of the block indicates the volume of emissions in tonnes that can be reduced by that opportunity; the *height* represents the cost per tonne. With perfect knowledge, an optimal policy would result in taking action, beginning at the left side of the chart and following the curve to the right in volume and upwards in cost until the emissions reduction target is met.

When there is an explicit price on carbon, the market will tend to find the lowest cost opportunities to reduce emissions. Emitters will, in the long run, take any action to reduce emissions that is cheaper than paying the emissions price. The price on emissions is equivalent to the marginal cost of reducing emissions, not the *actual* cost of all emissions reduced. As shown by Figure 2.1, the cost of some emissions reductions will be lower than the explicit price on carbon. As the price rises to meet the target, the next cheapest actions to reduce emissions will be taken.

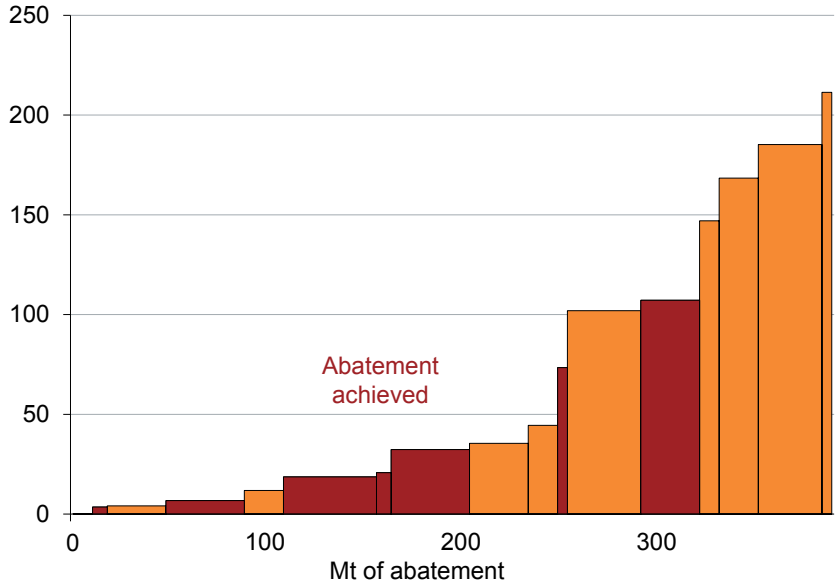
Figure 2.1: An explicit carbon price targets the cheapest ways to reduce emissions

Cost per tonne to reduce emissions ($)



Notes: Hypothetical marginal abatement cost curve.

Figure 2.2: An implicit carbon price policy may not target the cheapest ways to reduce emissions
Cost per tonne to reduce emissions ($)



Notes: Hypothetical marginal abatement cost curve.

Polices that put an implicit price on carbon typically target individual sectors of the economy. These policies could target a number of the emissions reduction opportunities available. If they are well designed, and applied with accurate foresight, they can target the cheapest ways to reduce emissions. But in practice such precise targeting requires detailed knowledge of costs that is not readily available to governments. As a result, actions to reduce emissions will occur more broadly across the MACC and will be more expensive overall (Figure 2.2).

The two approaches are not mutually exclusive. Individual sectors or emissions reduction opportunities can be targeted through tailored policies. The remainder of the economy can then be targeted by a broad policy with an explicit carbon price. Alternatively, a government's policy to reduce emissions could consist solely of an economy-wide price on carbon, or a set of sectoral approaches. This paper describes the factors likely to influence a government's preference for some options over others.

In all such schemes, the direct cost to the economy is the total cost of domestic actions taken to reduce emissions, international credits purchased from sources not covered by the scheme and the costs of administering and complying with the scheme. Government revenue raised by carbon pricing is *not* part of the net economic cost of the policy to reduce emissions. The revenue has not been lost to the economy, but has been collected by the government.

Schemes can also have indirect costs. In particular, where explicit carbon pricing policies lead to increases in the prices of goods and services, these can have negative flow-on effects for the economy.[16] Inefficient use of scheme revenue by the government is potentially another form of indirect cost.

The remainder of this chapter assesses six individual policy approaches. Three involve an *explicit* carbon price: a cap and trade scheme, a carbon tax, and an intensity baseline scheme. The other three involve an *implicit* carbon price: an emissions purchasing scheme, regulation, and a tradable green certificate scheme.

[16] Economic theory suggests that price increases might amplify distortions caused by existing taxes. See Frontier Economics (2010).

2.1 Cap and trade

Cap and trade schemes are widely considered the most cost-effective way to reduce emissions. They explicitly focus on the objective of reducing emissions to meet an agreed target and use markets to encourage actions that reduce emissions at the lowest cost. Yet experience with cap and trade schemes indicates they are complicated to design. They can also be politically difficult to implement and hard to explain to the public.

2.1.1 What are cap and trade schemes?

Under a cap and trade scheme, the government places a cap on the maximum level of CO_2-e emissions for a specific period of time and creates permits, each one of which represents the right to emit one tonne of this cap. The government then auctions or freely distributes permits to businesses (or other entities liable under the scheme). Businesses are free to trade the permits among themselves. At the end of the period, businesses must surrender permits equal to their actual emissions. Failure to do so incurs a penalty.

The price of permits is determined by supply and demand in the market. The lower the cap, the fewer the permits, and the higher the market price.

Businesses must choose between buying permits or reducing their emissions. A business will choose to reduce its emissions if the cost of doing so is cheaper than the cost of buying a permit. The result is that the scheme encourages businesses to seek out the lowest-cost ways of reducing emissions.

The most important aspect of cap and trade schemes, like other market mechanisms, is that they allow businesses and individuals to determine how and when they will reduce emissions. In doing so, they enlist not just economic self-interest but also local expertise and specialised knowledge. A government is unlikely to improve on devolved decision-making where interests and information are well-aligned.

Design questions that will affect a cap and trade scheme's outcomes include:

- what sectors are covered: the broader the scheme, the more it contributes to meeting the overall target and the greater the access to low-cost reductions.
- are permits auctioned or given away: this has consequences for the distribution of wealth, as explained below.
- are price 'floors' or 'ceilings' applied: these place minimum or maximum limits on the size of the incentive provided by the scheme.
- does the scheme recognise permits from similar schemes in other countries or allow offsets from domestic sources outside the scheme: allowing such permits can lower the cost of meeting the target without compromising the environmental outcome. The use of international permits is discussed in Box 2.1.
- how will future caps be set and permits released: predictability is essential to encouraging long-term investments to reduce emissions.

Businesses incur costs through the obligation to purchase permits or reduce emissions. In most cases, businesses will recover these costs by passing them on to their customers in the form of higher prices. This may cause those customers to switch to an alternative product that requires less emissions to make or supply. Governments may seek to compensate some households and businesses for these price rises using revenue received through the auctioning of permits (see Box 2.2).

Box 2.1: International permits

The climate is a shared global system. Reducing one tonne of emissions in Australia has the same value to the climate as reducing one tonne of emissions in any other country. To meet its emissions target, Australia could choose to purchase verifiable reductions from anywhere in the world, particularly if the cost was lower than in Australia.

International permits have long been recognised as a legitimate way for countries to reduce their emissions. The Clean Development Mechanism established under the Kyoto Protocol allows developing countries to generate permits through actions taken to reduce emissions. Developed countries can then buy these permits to help meet their emissions reduction targets. Developing countries benefit from the investment, and no constraint is placed on them to reduce their own emissions.

Australia's emissions trading scheme was intended to be linked to the European Union's scheme in 2015.[a] This would allow liable entities in Australia to purchase European credits to meet their obligations.

International permits can reduce the cost of meeting targets. For example, if Australia had adopted a market-priced trading scheme in 2012 and linked to the European scheme, Australia's price would have certainly been lower than the fixed price adopted.

But some have argued against the use of international permits in Australia's emissions reduction strategy on the grounds that:

- The integrity of international permits is questionable: the emissions reductions Australia would pay for may not actually occur. This would undermine the credibility of Australia's scheme and cast doubt over the reality of its environmental achievements.
- Reliance on international permits will delay Australia's transition to a low-emissions economy. Delay will only telescope the period over which this transition will need to occur, making it more painful. In 2014, the Climate Change Authority recommended using international permits as part of a balanced approach to reducing Australia's emissions, but not as the only policy.[b]

International permits can also alter the way different emissions reduction policies work. In a cap and trade, or baseline and credit scheme, the use of international permits means that the carbon price is set internationally. The ability of governments to alter the cap or baseline to influence the price of permits is removed. This could be seen to mean that the government has lost control of the policy.

[a] In June 2013, the government announced a plan to move to a floating price on 1 July 2014, a year ahead of schedule.
[b] CCA (2014)

Box 2.2: Using revenue from carbon pricing schemes for assistance and compensation

A carbon tax, the auctioning of cap and trade permits, and non-compliance penalties all create revenue for the government. Governments can use this revenue to assist groups impacted by carbon pricing or climate change in a range of ways. Specific options include:

- Direct compensation to households and businesses — a government can reduce taxes or increase benefits to assist those disproportionately impacted by the scheme.
- Protection for emissions-intensive, trade-exposed (EITE) industries — costs can effectively be returned to affected businesses to help them maintain their international competitiveness (see Box 2.3).
- Structural adjustment funding — revenue is used to assist regions most affected by the transition to a less emissions-intensive economy.
- Research and Development — revenue can fund the development of new, low-emission technologies.
- Climate change relief fund — revenue can be set aside to combat the negative impacts of climate change as and when they occur, such as drought or floods.

Whether permits are initially auctioned or freely distributed will not affect the price increases faced by households and businesses. Once the government sets a cap on emissions, the permits that make up the cap will have a given value. This value will reflect how much it costs businesses to reduce emissions, and will increase if there are fewer permits (i.e. the cap is lower). Whether a business buys a permit in an auction or is granted it for free, the permit has the same value. Either way, the business can sell the permit to another business. If the business chooses to use rather than sell a permit, it will forego income. Therefore, the business will recover the foregone income of every permit it does not sell through an increase in the prices it charges its customers.

The method chosen for issuing permits will, however, have implications for wealth distribution. Where permits are auctioned, the government raises additional revenue. Where permits are freely distributed, the recipients, usually emitting businesses, realise a windfall gain, unless they are unable to pass on the foregone income of unsold permits by increasing prices.

An absolute baseline and credit scheme has the same outcomes as a cap and trade scheme with free permits. Under an absolute baseline and credit scheme, emissions baselines are set for individual businesses.[17] The sum of businesses' baselines has the same effect as the cap does under a cap and trade scheme; and the setting of baselines has the same effect as giving businesses the equivalent amount of free permits under a cap and trade scheme. Businesses that emit above that baseline must surrender permits equal to the excess emissions, while businesses that emit under their baseline generate permits (known in this context as 'credits'). Because businesses can sell the credits they generate, this scheme creates incentives to reduce emissions in the same way a cap and trade scheme does.

Because the outcomes of an absolute baseline and credit scheme are the same as a cap and trade scheme with free permits, it is not discussed separately in this paper.

[17] 'Intensity' baseline and credit schemes operate differently, and are discussed in Section 2.3.

2.1.2 Australian experience

The CPRS was first proposed in 2008 under the Rudd Labor Government. Key features of the CPRS included:

- Coverage of facilities that emitted more than 25,000 tonnes of CO_2-e emissions per year.
- Auction of the majority of permits, moving to 100 per cent over time.
- A price cap of $40 per tonne, rising 5 per cent each year for the first five years of the scheme.
- Use of international offsets and permits created under the Kyoto Protocol.
- Assistance for low- and middle-income households to mitigate the cost-of-living increases created by the scheme. This included cuts in fuel tax to offset increases in fuel prices for the first three years of the scheme.
- Free permits for the most emissions-intensive, trade-exposed businesses, with independent five-yearly reviews.
- Free permits for the most emissions-intensive coal-fired electricity generators, to be distributed over the first five years of the scheme, with a review after three years.

There was considerable opposition to various aspects of the scheme and the CPRS was never legislated. Finally, in November 2011, under the Gillard-led Government, legislation was passed to allow an alternative cap and trade scheme, which commenced in July 2012. But the scheme began with a fixed price on carbon (to last for three years), which meant there was no trading of permits. In June 2013, the government announced a plan to move to a floating price on 1 July 2014, a year ahead of schedule. The Coalition then won government in September 2013 and moved immediately to repeal the legislation. The cap and trade scheme ended in July 2014, before a floating price had come into effect.

2.1.3 International experience

A number of cap and trade schemes operate in jurisdictions overseas.[18] These vary in size and design, although none has been implemented as a single, economy-wide policy. Two of the most prominent schemes are those operating in the European Union and California.

European Union

The European Union's Emissions Trading System (ETS) is the world's largest and longest-running cap and trade scheme. It began operation in 2005 and now covers around 45 per cent of the EU's emissions. To date, the vast majority of permits have been freely distributed. Businesses can also offset a limited amount of their emissions obligations using credits created under approved, international emissions-reductions programs.

A transition to more auctioning of permits is under way. It is anticipated that up to half of the permits allocated between 2013 and 2020 will be auctioned.[19] At least half of the revenue raised through permit auctions must be used by EU member states for climate- and energy-related purposes.

Compliance with the ETS has been high, and emissions reduction targets set by the scheme have generally been met. However, the market price of permits has fallen markedly. This has raised

[18] Cap and trade schemes, or closely related schemes, operate in the EU, California, the north-eastern states of the USA, Quebec, seven cities and provinces of China, Tokyo, Korea, Kazakhstan, New Zealand and Switzerland.
[19] European Commission (2015)

concerns that more stringent targets should have been adopted when the scheme was established. Between 2005 and 2009, permits regularly traded above €20, but by 2013 the price had fallen below €5. The falling price reflects a large accumulation of surplus permits. In turn, the surplus reflects emissions caps that did not envisage the production downturn caused by the global financial crisis. The EU is currently making structural reforms to the ETS to avoid a future accumulation of surplus permits.

California

The California Air Resources Board Emissions Trading Program began in 2013. The program covers around 450 entities that together are responsible for 85 per cent of the state's emissions. The majority of permits are freely distributed, but there is a planned transition to greater auctioning in the future. Permits have a reserve price at auction, and over the past two years the market price has fluctuated around US$11-13 per tonne.[20] Businesses can offset a limited amount of their emissions obligation using credits generated through other US emissions-reduction projects. The program is also designed to be linked with similar schemes elsewhere, and currently recognises permits from Quebec's cap and trade scheme.

2.1.4 Strengths

Cap and trade schemes can deliver lowest-cost abatement by giving a wide range of businesses the incentive to identify and deliver opportunities for reducing emissions where they are cheapest. Importantly, they allow governments to directly align emissions reduction targets with incentives, which means the market does the work. Markets are usually better than governments at identifying the cheapest ways of reducing emissions.

This advantage is widely recognised. The Garnaut Climate Change Review in 2008, for instance, identified cap and trade schemes as the best way to reduce emissions.[21] More recently, Martin Parkinson, recently appointed as Secretary to the Department of Prime Minister and Cabinet, said it was "indisputable that putting a price on carbon was the least cost way to reduce emissions, and that an ETS was the best way to deal with the uncertainty around the needed reductions".[22]

Auctioning cap and trade scheme permits will also create revenue that the government can use to assist or compensate groups impacted by carbon pricing or climate change (see Box 2.2).

A cap and trade scheme, or a variant of one, could be built on Australia's current policy framework. The government's Emissions Reduction Fund (ERF) already contains some elements consistent with an absolute baseline and credit scheme (which, as noted above, is an alternate form of a cap and trade scheme). The ERF Safeguard Mechanism will set absolute baselines for businesses and industry. It is feasible that these baselines could be adopted under an absolute baseline and credit scheme (or even combined to create a national cap). The scheme could then be augmented to involve tradeable credits (permits).

There are advantages to building such a scheme on the current policy framework. From the government's perspective it would mean continuing with its preferred policy, and it would create the capacity to meet more challenging future emissions reduction targets by lowering baselines. From Labor's perspective, the scheme would be an emissions trading scheme, which aligns with its preferred approach to tackling climate change. An Australian cap and trade scheme might also be linked with similar schemes overseas, promoting a globally consistent response to emissions reduction.

[20] California Air Resources Board (2015)

[21] Garnaut (2008)

[22] Pers comm Parkinson, M. (2015)

2.1.5 Weaknesses

While a cap and trade approach can be broad-based, it doesn't work equally well in all sectors of the economy. In industries made up of a small number high-emissions businesses, it's relatively simple to impose a cap and trade scheme. Even in sectors such as gas supply and transport, which include a very large number of homes, businesses and vehicles, the liability can be imposed on a small number of upstream suppliers: gas retailers and importers of fuel or operators of oil refineries. But in industries such as agriculture, there is a very large number of low-emissions businesses and emissions can be more difficult to measure. Identifying and reporting emissions for each one is likely to place a significant administrative burden on both government and the businesses affected.

It can also be difficult for politicians to win public support for cap and trade schemes. This is mainly because they can lead to increases in the prices of a wide range of basic goods and services, such as electricity and petrol. Prices go up because the cost of permits adds to the production costs for businesses covered by the scheme.

It doesn't help that cap and trade schemes can be hard to explain to the general public. Their mechanics might make sense to economists and public servants, but it's easier for non-experts to understand — and so support — schemes that offer a direct line of sight between actions and outcomes, such as a subsidy to install solar panels on household roofs.

Disagreement about how to design cap and trade schemes can also be a problem, particularly where they do not have bipartisan political support. The apparent complexity of cap and trade schemes means that there is always scope for disagreement. For example, in 2009 there was much disagreement with various aspects of the Government's CPRS proposal from the Opposition, the Greens and independent senator Nick Xenophon.

One point over which disagreement is always likely to arise is how the government should spend any revenue raised from the scheme, especially given that there is likely to be a wide range of groups calling for compensation or special assistance. (see Box 2.2).

2.2 Carbon tax

A carbon tax places a direct price on CO_2-e emissions. Liable organisations either pay the tax or reduce their emissions, whichever is cheaper. Carbon taxes apply in several countries, often alongside other emissions reduction policies. But new taxes are always hard to sell politically. This was demonstrated in Australia when the then opposition's campaign to "axe the tax" proved such a successful part of its 2013 election strategy.

2.2.1 What is a carbon tax?

A carbon tax is a fixed price paid to the government per tonne of CO_2-e emitted. Governments aim to set the tax at the level that delivers the targeted volume of emissions reductions required (see Figure 2.1).

Higher reduction targets will lead to a higher tax and so greater incentive to reduce emissions. As in a cap and trade scheme, businesses will reduce their emissions only to the point where the marginal cost of doing so is lower than paying the tax. Therefore, the average abatement cost will be no higher than the tax.

Under a carbon tax, the cost of emissions is fixed and the market determines the volume of emissions reduction. This is the mirror image of a cap and trade scheme, where the (targeted) emissions reduction volume is fixed and the market determines the cost. Like the price under a cap and trade scheme, the direct costs of a carbon tax are imposed on businesses, which typically pass the higher costs on to their customers in the form of higher prices. Governments may seek to compensate some households and businesses for these cost impacts using revenue generated by the tax.

The great advantage of a carbon tax is its simplicity. In practice, that simplicity can restrict a government's ability to make discretionary decisions, and so limits the effectiveness of a carbon tax as an emissions reduction policy.

2.2.2 Australian experience

A fixed price on carbon applied in Australia between 2012 and 2014. The price was $23 per tonne in 2012-13, rising to $24.15 per tonne in 2013-14.[23] The scheme was characterised as a 'carbon tax' by the federal opposition, a label that was eventually conceded by the then Prime Minister, Julia Gillard.

Australia's carbon tax was not a pure carbon tax. As discussed in section 2.1.2, it was a precursor to a cap and trade scheme: payment of the 'tax' actually represented a purchase of emissions permits. Moreover, a number of businesses received free permits as industry assistance, and therefore did not have to pay the tax on all of their emissions. The rationale for this is explained in Box 2.3.

Businesses directly liable for the tax included those emitting more than 25,000 tonnes of CO_2-e per year, and those importing and producing certain types of gas.[24] Over 300 businesses paid $13 billion in total over the two years of the tax.[25]

The impact of the carbon tax on emissions is not easy to measure. Emissions did fall after the tax was introduced, but other factors played a role, including lower electricity demand and disruptions at large electricity generators. To assess the precise effect of the tax we would need to know the level of emissions that would have occurred in its absence, which can only be estimated.

Additionally, most businesses and consumers were aware that the tax was likely to be short-lived, at least in its existing form. A

[23] Department of Climate Change and Energy Efficiency (2011)
[24] CER (2015a)
[25] CER (2015c); Grattan analysis. It should be noted that the amount of tax paid is not the abatement cost.

Box 2.3: Emissions-Intensive, Trade-Exposed Industries

An emissions-intensive, trade-exposed (EITE) industry is one that is highly exposed to the costs of an emissions reduction policy, but cannot recover these costs through price increases. EITE industries include the manufacture of steel and cement.

Imposing emissions reduction policies on EITE industries creates two related problems. The first is **loss of competitiveness**. Emissions constraints increase the costs of production for EITE industries. If their international competitors do not face the same constraints — if other countries are not acting on emissions policy, or not acting as quickly — the Australian businesses affected will not be able to pass these costs on to their consumers.[a] The result is either lower profits, and so lower tax revenues, or losses, which are unsustainable in the long run, and will result in either reduced production, relocation away from Australia, or closure.

The second problem is **carbon leakage**. If emissions constraints imposed in Australia drive production to another country, the result can be lower global emissions overall, which is arguably an intended result of the policy. But it could also lead to an *increase* in global emissions if the overseas production process produces more emissions per unit of production, which is clearly not an intended result.

The issue of EITEs has been described as a 'truly dreadful problem' for policymakers.[b] The best solution is for governments to pursue international agreements to ensure that international competitors face the same pressures to reduce emissions.

In the absence of a level playing field, there are several things governments might do to protect EITE industries. One would be to choose emissions reduction policies that limit the cost impacts on EITE industries. Another would be to exclude EITE industries from emissions reduction policies until there is coordinated global action. Government could also consider providing direct export rebates to these businesses or imposing import taxes on their competitors. Any action of this type could be difficult to implement as it may contravene trade rules or agreements.

Alternatively, EITE industries could be provided with compensation or assistance. This is effectively what happened under the fixed carbon price. EITE businesses received free permits in accordance with their production levels — effectively a subsidy to these industries.

Under its 2012-14 emissions reduction policy, the Labor Government handed the task of reviewing EITE support to the Productivity Commission. Assistance was assured for the first five years of the scheme. But after that, with a minimum three years' notice, the Productivity Commission could adjust the number of free permits as circumstances changed.

None of these solutions is perfect, although any approach that distorts the domestic emissions reduction market is highly undesirable as it would increase the cost of the policy across all other sectors.

[a] A loss of competitiveness can occur even where a there is agreed international action to limit emissions. Countries that are required to reduce their emissions sooner than others are liable to have their competitiveness impacted.

[b] Garnaut (2008)

change in government would mean the outright abolition of the tax, while the return of the Labor Government would mean that the market would set a price well below its existing level. This uncertainty weakened the incentives created by the tax. Rather than make long-term investments to drive emissions reductions, it is likely that many businesses opted to just pay the tax.

2.2.3 International experience

Carbon taxes have a long history overseas. As of mid-2015, a carbon tax (or similar fixed price) applied in at least 18 jurisdictions.[26] The level of tax per tonne ranged from less than US$1 to US$130, with a median of around US$17.[27]

Carbon taxes have applied in the Nordic countries and Poland since the early 1990s.[28] These taxes vary widely in their rationale, scope and size, and have evolved over time. They were also introduced in the context of broader economic reforms.[29]

Other jurisdictions introduced carbon taxes during a period of heightened climate-change concern in the 2000s. A number of these are not 'pure' taxes, but effectively act as taxes, and interact with emissions trading schemes. For example, businesses can meet their obligations under Alberta's emissions intensity trading scheme (discussed in section 2.3) by paying a fixed fee per tonne of emissions. In the UK, a price floor exists such that a minimum cost is placed on emissions even if the price of permits in the EU's ETS falls to zero.

Carbon taxes are still being introduced in countries around the world. France, Mexico and Portugal have all introduced a form of carbon tax since 2014. South Africa and Chile plan to introduce carbon taxes in 2016 and 2018, respectively.

2.2.4 Strengths

A carbon tax provides a clear and direct price incentive and leaves it to the market to find least-cost emissions reductions up to that price.

Like a cap and trade scheme in which permits are auctioned, a carbon tax raises revenue for the government. This revenue can be applied in a range of ways, as discussed in Box 2.2. British Columbia's carbon tax, for example, is 'revenue neutral': every dollar raised is returned to households and businesses via reductions in other taxes.[30]

A carbon tax provides price certainty, at least in the short term, so businesses can reasonably accurately assess their liability. Carbon taxes also effectively put a cap on the overall cost of emissions reductions since only those reductions that cost less than the tax will occur.

2.2.5 Weaknesses

It can be difficult for politicians to get public support for carbon taxes because they increase the price of basic goods and services. Like the cost of permits under a cap and trade scheme, a carbon tax becomes a cost of production that is passed on via higher prices.

[26] World Bank (2015)

[27] World Bank (ibid.); Grattan analysis. Some jurisdictions have an upper and lower bound on their carbon tax. For the purposes of calculating the median, we took the midpoint of these jurisdictions' ranges as their level of tax.

[28] Since 1990 (Finland and Poland), 1991 (Sweden and Norway), and 1992 (Denmark).

[29] Andersen (2010) attributes the introduction of carbon taxes in the Nordic countries to a meeting of concerns about climate change and the need for tax reform. The introduction of a carbon tax in Poland coincided with its transformation to a market economy.

[30] British Columbia Ministry of Finance (n.d.)

Carbon taxes are arguably made even more politically difficult because of their unfortunate name; there is rarely political reward for creating new 'taxes'. This was borne out in Australia's experience. Julia Gillard, who promised not to introduce a carbon tax, was accused of breaking that promise by introducing a fixed price on carbon.

Another drawback of a carbon tax is that it doesn't explicitly constrain emissions, which means the government has less certainty about meeting emissions reduction targets. Getting the level of the tax right can be difficult. Establishing a predictable process by which the tax will be reviewed in future years is another challenge. Too low and the target for emissions reduction will not be met. Too high and businesses incur unnecessary costs.

As in a cap and trade scheme, there is likely to be much disagreement regarding how the tax revenue should be spent.

2.3 Intensity baseline and credit

Emissions intensity refers to the level of a business's emissions per unit of output. Intensity baseline and credit schemes work by creating credits for businesses that produce at an intensity below a specified baseline; the credits can then be sold to businesses that produce at an intensity above the baseline.

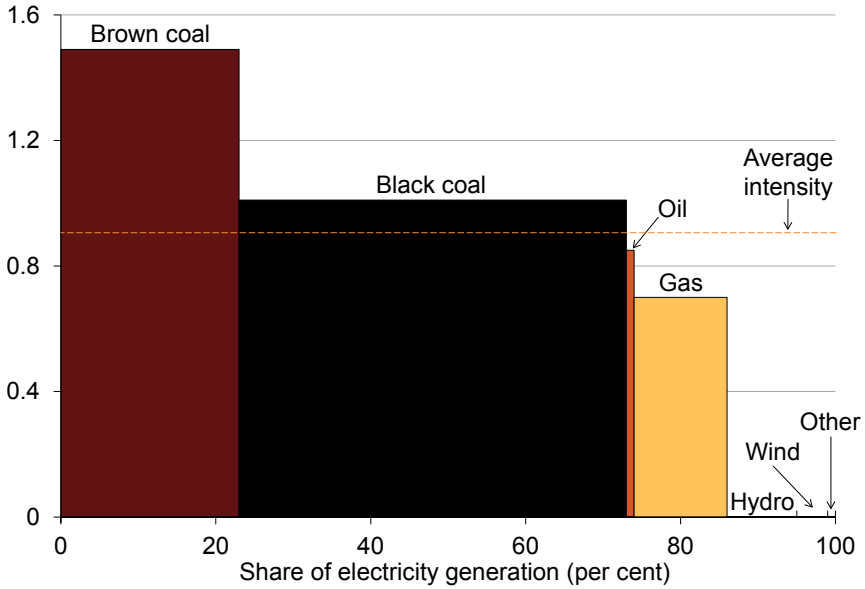
An intensity baseline for a given sector is set using a measure of output relevant to that sector, such as tonnes of CO_2-e per megawatt hour of electricity. Once set, the baseline can be gradually reduced to drive a shift to less emissions-intensive production. But an intensity baseline and credit scheme does not guarantee lower emissions overall: the absolute emissions from a sector can increase or decrease with the level of sector activity or production, irrespective of the emissions intensity.

The best example of the sectoral approach is in the electricity generation sector. A baseline is set for CO_2-e emitted per megawatt hour (MWh) produced, as shown in Figure 2.3. Generators whose emissions intensity is greater than the intensity target (in this case the average intensity of the electricity generation market) will need to purchase credits for every unit of electricity they produce; those producing electricity with lower emissions will generate credits.

An intensity baseline increases the relative cost of high-emitting generation, such as brown coal and black coal, and reduces the relative cost for low-emitting generation, such as gas and renewables. The result is more low-emitting electricity generation overall and less high-emitting generation.

In sectors where participants have fairly similar emissions intensities, an intensity baseline scheme will act as either a tax or a subsidy, depending on the level of the baseline. As the baseline is reduced it should provide an incentive for innovation towards lower-emissions forms of production in the sector.

Figure 2.3: Electricity is produced with varying levels of emissions
Average emissions intensity (tonnes of CO_2-e per megawatt hour) by source, NEM, 2014



Notes: Other includes solar PV and other renewables. Does not include rooftop solar.
Source: AEMO (2015a), and AER (2014)

2.3.1 Australian experience

The Greenhouse Gas Reduction Scheme (GGAS) was an intensity baseline and credit scheme that operated in New South Wales from 2003 until 2012. Under this scheme electricity retailers (and some generators that sold direct to customers) were liable to meet a state-wide benchmark of tonnes of CO_2-e per capita. If electricity retailers could not meet their liability, they were required to purchase certificates. If liable businesses failed to meet their target with purchased certificates, they had to pay a penalty.

Certificates could be created through a variety of mechanisms, including:

- improved energy-efficiency of coal-fired generators [across all states within the National Electricity Market (NEM)];
- generation from lower-emissions gas-fired technology (across all states within the NEM);
- sequestration of CO_2-e in trees;
- combustion of waste methane from coal mines, sewage treatment plants or landfill;
- energy efficiency measures, such as water-efficient shower heads and energy-efficient light globes; and
- switching from high-emissions fuel to low-emissions fuel.

The original benchmark was set at 8.65 tonnes per capita. In 2007 it was reduced to 7.27 tonnes per capita. Over the life of the scheme, 144 million certificates were created, which equated roughly to 144 million tonnes of CO_2-e abatement.[31] The price of certificates varied between $15 or so at its peak to around 50c, the price just before the scheme closed.

Although the scheme delivered a reasonably large quantity of emissions reductions at a relatively low price, there were criticisms. First, the way in which the target was expressed, in tonnes of CO_2-e per capita, made it difficult for individual electricity retailers to determine their liability under the scheme.[32]

The second issue was the extent to which those emissions reductions were actually achieved. The scheme was criticised on the grounds that it failed to take into account what would have

[31] IPART (2012). This relates to the face value of the certificates, not the actual abatement achieved.
[32] IPART (2013)

happened in its absence: in other words, there was no certainty that all emissions reductions were genuinely additional.[33]

2.3.2 International experience

Various forms of intensity baseline and credit schemes operate in China, India and Canada, and in other countries around the world.[34] The Specified Greenhouse Gas Emitters Regulation (SGER) scheme in Alberta, Canada, sets emissions intensity baselines for large emitters. If they emit below their baselines they generate credits. If their emissions exceed the baseline, they have a choice between purchasing credits created within the scheme (or recognised offset credits created by organisations outside the scheme) or paying a penalty. The penalty is in the form of a contribution to Alberta's Climate Change and Emissions Management Fund. The emitter must pay a fixed fee of CA$15 to the fund for each tonne of carbon it emits above their baseline.[35]

Between 2007 and 2014, the scheme delivered emissions reductions of 61 million tonnes, either through activity at one of the liable entities, or through credits generated by offset activity.[36] But it appears that a large number of the liable entities chose to pay a penalty rather than meet their baselines. CA$578 million has been paid in penalties since the scheme commenced.[37] While this means that the scheme may not have reduced emissions in the covered sectors by as much as was intended, the revenue it has raised has been used to fund other emissions reduction activity, or to help Alberta adjust to the impacts of climate change.

[33] IPART (2013)
[34] CCA (2014)
[35] Alberta Environment and Parks (2015)
[36] Ibid.
[37] Ibid.

2.3.3 Strengths

An intensity baseline and credit scheme is another form of emissions trading scheme, and shares many of the benefits of cap and trade schemes: essentially, the market is used to identify and deliver lowest-cost emissions reduction.

A potential advantage of intensity baseline and credit schemes however, is that they have a lower impact on the prices faced by consumers.[38] Under an intensity baseline, a business need only buy and surrender credits for emissions above the baseline. Under a cap and trade scheme, permits must be bought and surrendered for *all* emissions.[39]

2.3.4 Weaknesses

An intensity baseline will raise the prices of goods and services, though to a lesser degree than a cap and trade scheme or carbon tax.

An intensity baseline is, however, no easier to explain to the public than a cap and trade scheme. Here again, there is no direct line of sight between actions and outcomes. Moreover, a baseline's ability to limit the absolute level of emissions is less obvious than it is with a cap and trade scheme or carbon tax. Disagreement about how to set baseline intensities within and across sectors could also be a barrier to their adoption.

Like carbon taxes, intensity baselines do not directly constrain emissions. Therefore, the government has less certainty about meeting emissions reduction targets.

[38] Frontier Economics (2010)
[39] As discussed in section 3.1, in a cap and trade scheme, even if permits are given away for free, their value will be passed onto consumers through higher prices.

2.4 Emissions purchasing scheme

In an emissions purchasing scheme the government buys emissions reductions directly from individual organisations.[40] The government bears the cost of the emissions reductions, either through taxation or greater government borrowing.

An emissions purchasing scheme's ability to achieve significant abatement at low cost depends on:

- the **breadth** of the scheme — designing a scheme that allows for the purchase of all potential emissions reductions across a range of sectors is complex. In practice, schemes are likely to target emissions reduction activities that are easy to measure and can be delivered in the short term.
- the **verification** process — how the scheme ensures that claimed emissions reductions are achievable and 'additional'. An emissions purchasing scheme can pay for the emissions reduction in advance, based on estimates of the reductions — the question then becomes whether the reductions that have been paid for actually occur. Another challenge is to ensure that the claimed emissions reductions would not have been delivered without the government payment.
- the **purchase mechanism** — the extent to which the purchase mechanism (e.g. tender or reverse auction) provides incentives for project proponents to bid for emissions reductions at lowest cost.

2.4.1 Australian experience

A form of emissions purchasing scheme is the centrepiece of the Australian Government's action on climate change. Under its Emissions Reduction Fund (ERF) the government committed $2.55 billion to purchase emissions reductions to help meet Australia's 2020 emissions reduction target. Since then, the government has committed to a further $200 million a year from 2020 to help it achieve its 2030 emissions reduction target.

There are three parts to the ERF: emissions crediting, emissions purchasing and the Safeguard Mechanism. The first two components constitute an emissions purchasing scheme. The government has developed a set of approved methodologies for different activities that can reduce emissions. The set of approved methodologies continues to expand. Proponents of such activities can bid through reverse auctions (the lowest bid wins) to secure a contract under which the government will purchase their emissions reductions.

There have been two auctions under the ERF so far. The first took place in April 2015 and resulted in the purchase of 47 million tonnes of CO_2-e abatement at an average price of $13.95.[41] The second, in November 2015, purchased 45 million tonnes at an average price of $12.25.[42] It is now expected that future auctions will occur about twice per year.

2.4.2 International experience

Overseas, emissions purchasing schemes are less common than trading schemes and carbon taxes. One example is the World Bank's Pilot Auction Facility for Methane and Climate Change Mitigation (PAF), which began operation in 2015. The PAF provides a minimum price guarantee for emissions reduction credits created through private sector projects.

[40] Alternatively, the government could purchase verified emissions reduction certificates from schemes in other countries.

[41] CER (2015b)

[42] Ibid.

Initially, eligible projects will be those that reduce methane emissions at landfill, animal waste, and waste-water sites. The PAF provides a minimum price guarantee through a reverse auction of put options — these give project operators the choice of either selling their credits to the facility at the price specified in the put contract, or selling in the market if the price there is higher. The World Bank, through government donations, has so far committed US$100 million to the facility.

2.4.3 Strengths

An emissions purchasing scheme has a simple rationale: the emissions reductions required are directly funded. The scheme can use a market mechanism — such as an auction — to purchase reductions. If designed correctly, the market mechanism can put downward pressure on the cost of reducing emissions.

An emissions purchasing scheme can also have a less visible impact on the cost of living than a carbon price because it is funded through government budgets.

2.4.4 Weaknesses

Such schemes can only reduce emissions if the reductions purchased are additional to what would have occurred under a business-as-usual scenario. This is difficult to prove because the emissions of a business-as-usual scenario can only ever be estimated.

Governments must also manage the risk that projects may not deliver the contracted reductions. Imposing a penalty for non-delivery does not avoid the loss of reductions.

Nor is there is direct link between an emissions reduction target and the purchased emissions. Without additional mechanisms that prevent increases in emissions elsewhere in the economy, there is a risk that the emissions reductions will be offset. This is the reason the government established the Safeguard Mechanism within the ERF.

There is also a practical limit to on-budget funding of emissions purchases. That limit will be tested as increasingly ambitious targets are set. The government has effectively recognised this limit in its recent projections, which estimate that the majority of emissions reductions between 2020 and 2030 will be achieved outside the ERF.[43]

[43] Commonwealth of Australia (2015a)

2.5 Regulation

Under a regulatory approach, the government simply introduces laws and regulations to reduce emissions. A government might aim to meet its emissions targets by imposing regulations on all sectors of the economy. Alternatively, regulations in particular sectors could be combined with other policies to provide a whole-of-economy approach.

Governments will generally seek to do two things when regulating to reduce emissions:

- mandate restrictions on or ban particular items from the set of product choices available to consumers; and/or
- mandate, license or ban particular technologies or production techniques used by firms operating in the domestic economy.[44]

For example, emissions-intensity standards can be applied to specific industries such as steel or aluminium manufacturing. Initially, standards might be set at levels consistent with international best practice. The government would then set out a timetable that tightens the emissions standards over time. Businesses would have to develop new operating models or face closure.

Alternatively, the government could place restrictions on the types of goods available. For example, regulations have been passed to ensure all light globes sold in Australia meet a certain energy efficiency standard.

Regulations are likely to be adopted where governments elect to apply different policies to different sectors of the economy, rather than adopt an economy-wide policy such as a cap and trade scheme. Each regulatory intervention will be specifically tailored to the individual sector.

[44] Garnaut (2008)

There may be a case for applying regulation to specific sectors as a complement to an economy-wide trading scheme, where the existence of market failures prevents emissions abatement being achieved at the lowest cost.[45] Regulations may help solve market failures associated with energy use, such as split incentives[46], information asymmetries or market failures associated with the research and development costs of new technologies. Regulations that apply minimum standards to energy appliances are a specific example. Regulations have also been considered for application to electricity generation, energy efficiency and transport.

2.5.1 Electricity generation

Regulation could be used to gradually squeeze emissions-intensive generation out of the electricity supply mix in Australia. Governments could apply a maximum emissions standard to generation or, more directly, implement a timetable for the closure of fossil fuel generators based on age or relative emissions intensity. Power stations that exceeded the emissions threshold would either have to find ways of cutting the emissions from their plant to meet the standard (for example, through the adoption of carbon capture and storage) or close. The emissions-intensity standard would be reduced over time leading, potentially, to the eventual closure of all fossil fuel generation.

This form of regulation depends on government taking a more centrally planned approach to the sector, and raises problems of supply reliability that could be created if the withdrawal was not well planned. It is unclear that centrally planned closure would be

[45] Denniss, Grudnoff and Macintosh (2012); Garnaut (2008); Naughten (2013)

[46] A typical example is where the owner of a building has no incentive to invest in energy efficient appliances because the tenant will get the benefit of lower electricity bills.

achieved at lower cost than closure that came about in response to a credible and rising carbon price.

2.5.2 Energy efficiency standards

Energy efficiency standards reduce emissions by decreasing the energy used to provide a given benefit, such as heating or lighting. They impose requirements that goods or buildings meet a minimum level of energy efficiency.[47] This is a detailed technical exercise that usually involves:

- developing or adopting product standards to define a set of products to which energy efficiency regulations will apply;
- developing or adopting technical standards to define and measure the energy efficiency of each relevant product type;
- established testing facilities and regimes to assess whether products meet the energy efficiency standard.

Energy efficient products are typically more costly to develop and therefore more expensive to buy. Inevitably, consumers will sometimes choose to buy cheaper and less energy-efficient products. Even if there is an economy-wide price on carbon that people pay via their electricity bill, people tend not to make purchasing decisions in the supermarket according to the optimal trade-off between higher or lower bills later and cheaper or more expensive light bulbs now. For that reason, government can have a greater impact by restricting, through standards, the range of products available.

Australia has a National Strategy on Energy Efficiency, and a range of supporting standards and policies in different sectors. Notably, standards for domestic appliances and commercial buildings have led to material decreases in emissions.[48]

2.5.3 Light vehicle emissions standards

Vehicle emissions standards reduce the average level of CO_2-e emitted by vehicles per kilometre driven. Like energy efficiency standards, they can overcome barriers, such as lack of good information, to the uptake of more efficient vehicles and may complement other broader policies.

Emissions from light vehicles account for 10 per cent of Australia's total emissions.[49] The Climate Change Authority (CCA) estimates emissions standards on light vehicles supplied in Australia can avoid 59 million tonnes of emissions by 2030.[50]. Its analysis indicates that this represents one of the lowest cost emissions reduction opportunities in the Australian economy.

Like energy efficiency standards, vehicle emissions standards allow governments to achieve greater emissions reductions than might be achieved through consumers' decision-making. For instance, the CCA refers to consumers' limited ability to take into account all relevant information when buying a vehicle as a 'behavioural barrier' to making efficient decisions.[51] By overcoming this barrier, vehicle emissions standards are likely to complement any central policy for reducing emissions. Emissions standards also improve air quality by reducing some of the more visible and dangerous forms of vehicle pollution (i.e. particulate matter).

[47] Daley and Edis (2011)

[48] Ibid.

[49] CCA (2014)

[50] Ibid.

[51] Ibid.

2.5.4 International experience

Although emissions trading schemes operate in some states in the US, market-based schemes have failed to gain bipartisan support in Congress. As a result, the US federal government is taking a regulatory approach to reducing emissions. In 2013, President Obama announced his Climate Action Plan, which involves a wide range of measures tailored to reducing emissions in specific sectors.[52] These measures include:

- emissions standards for fossil fuel power plants;
- standards for methane emissions from agriculture, mining and landfill;
- facilitating and funding investment in renewable energy generation; and
- standards, funding, and voluntary programs for energy efficiency in buildings and appliances.

2.5.5 Strengths

Regulation can appear to deliver emissions reductions at no apparent cost to the public. This is because the link between the costs of regulation and higher prices may not be clear in the eyes of consumers.

Regulation has the advantage that the emissions reductions it achieves flow clearly from government policy. In this respect they are different to price mechanisms, which work in a much more indirect way through what might be a long supply chain.

Regulation has shown itself to be a politically feasible approach. For example, Minimum Energy Performance Standards (MEPS) already apply to a range of products in Australia, such as air conditioners, commercial and residential refrigeration, and lighting. The premise for such standards is easy for the public to understand and support: energy efficiency reduces pollution and can help consumers save on their electricity and gas bills. There is also increasing support for regulation of the electricity generation sector on the basis that it will provide greater certainty to investors.[53]

2.5.6 Weaknesses

The success of regulation depends on politicians and policymakers picking the best reductions opportunities, rather than using the market to do it for them. To minimise costs, regulations need to be applied at the right time, in the right sectors and to an appropriate volume of emissions reductions. Yet governments do not have perfect foresight. Anticipating changes in technologies and consumer preferences is difficult. As a result, regulatory approaches can be sub-optimal.

Designing a set of regulations that will meet a national emissions reduction target is a very complex task. Regulatory processes are also particularly vulnerable to pressure from special-interest groups seeking changes that might benefit themselves but lead to sub-optimal outcomes overall.

[52] Executive Office of the President (2013)

[53] AGL (2015); Origin (2015)

2.6 Tradeable green certificate schemes

The generation of electricity and heat is responsible for 42 per cent of global emissions.[54] In Australia, electricity generation alone accounts for 33 per cent of emissions.[55] In a number of countries, market mechanisms have been used to lower the emissions intensity of the electricity sector by creating demand for more renewable technologies such as wind and solar. They work by requiring energy retailers to purchase 'green' certificates which each represent one unit of low-emissions electricity generation or emissions abatement.

Over time, the proportion of required renewable energy increases and electricity retailers must surrender more and more certificates, decreasing the net emissions from the electricity consumed. Retailers acquire these certificates either by building their own renewable generation or abatement projects, or by purchasing certificates from other accredited entities. The revenue generated from certificates is used to fund renewable generation or abatement projects. If there is a shortage in supply of certificates, the price will increase to encourage new renewable generation or abatement.

The direct cost of the certificates is borne by energy retailers, who will typically pass the cost onto their customers. But this cost increase for consumers may be partially offset by the impact that these schemes can have on wholesale prices. In some markets, including Australia's, these schemes are responsible for an increasing proportion of zero-marginal cost generation, which lowers wholesale electricity prices overall.

A tradeable green certificate scheme creates demand for renewable generation and allows the market to determine the price for that generation. The mirror image of such a scheme can also exist, in which case the price of renewable generation is fixed via feed-in tariffs or power purchase agreements with governments, and the market determines the level of supply (see Box 2.4).

Box 2.4: Feed-in tariffs

Feed-in tariffs are payments made to generators for providing renewable electricity to the grid. By encouraging the supply of renewable generation, they work to reduce the share of electricity produced through emissions-intensive generation and therefore the emissions that would have occurred otherwise in the electricity generation sector.

In Australia, feed-in tariffs for household solar have been in operation since the late 2000s. Although typically legislated by state and territory governments, these tariffs are usually paid by electricity networks or retailers, and the costs are passed on to consumers. This creates a potential fairness issue, give that many consumers who do not have the physical or financial capacity to install household solar are paying part of the cost for those that do.

Feed-in tariffs have contributed to strong growth in household solar installations. Existing household solar in Australia is expected to reduce emissions by 66 Mt by 2030.[a]

A variation on a feed-in-tariff on a larger scale would be power purchase agreements with governments, as have been implemented in the Australian Capital Territory.

[a] Wood and Blowers (2015)

[54] IEA (2015)
[55] Department of the Environment (2015b)

2.6.1 Australian experience

In Australia, a tradable green certificate scheme, the Renewable Energy Target (RET), has existed in one form or another since 2001. The current Large-scale Renewable Energy Target (LRET)[56] requires buyers of wholesale electricity, mainly electricity retailers, to acquire and surrender a certain number of renewable energy certificates every year. A renewable energy certificate is created through the generation of electricity from renewable resources, with one certificate equivalent to 1 MWh generated. The LRET now requires 33,000 GWh of Australia's electricity to come from renewable sources by 2020.

Australia's RET has reduced emissions at moderate cost. A previous Grattan report found the cost to be $30 to $70 per tonne between 2001 and 2011, consistent with a Climate Change Authority estimate to 2012 of $40 per tonne.[57]

2.6.2 International experience

Tradeable green certificate schemes operate in a number of countries, including in the EU, the US and India.[58] Like the RET, some of these schemes have now been operating for over a decade.

In 2002, the Renewables Obligation (RO) was introduced for most of the United Kingdom.[59] Like the RET, the RO required electricity suppliers to obtain a proportion of their electricity from renewable energy sources. They could do this by purchasing certificates created by the generation of renewable electricity.

In 2009, however, the government became concerned that the scheme was not promoting technologies that had the potential to be lowest cost in the future. In order to encourage the adoption of less mature technologies, a system of 'banding' was introduced, under which different renewable technologies receive a different number of certificates for every unit of electricity produced. In 2009 for example, one megawatt of onshore wind energy created one certificate, whereas one megawatt of offshore wind energy created 1.5 certificates.[60] But banding also made the scheme more complicated: the government was now effectively picking technology winners rather than using a competitive market to deliver the lowest cost renewable energy.

The RO scheme is due to close to new renewable generation from March 2017. However, in June 2015, the government announced that it would close the scheme to new onshore wind generation a year early on the basis that there were enough projects in place to meet the UK's renewable energy requirements.

2.6.3 Strengths

Tradeable green certificate schemes provide a market mechanism to deliver low-emissions electricity generation.

Schemes that deliver renewable energy have often been politically popular, particularly when the costs are hidden or subsidised. In Australia, the RET has proven to be more politically viable than many other climate change policies. In principle, the RET could be extended beyond the current target using existing legislation and infrastructure. It has operated in some form since 2001, and enjoys bipartisan support.

[56] The LRET is complemented by a small-scale renewable energy scheme that provides a subsidy for small-scale renewable energy technology, mainly household solar.
[57] Daley and Edis (2011); CCA (2012)
[58] Sustainability Roundtable (2012)
[59] The RO was not introduced to Northern Ireland until 2005.
[60] Pollitt (2010)

2.6.4 Weaknesses

As an emissions reduction policy, tradeable green certificate schemes are inferior to carbon pricing. They work on the premise that building a narrowly defined range of low-emission sources of electricity is the best way to reduce emissions from the sector. But this may not be true.

As demonstrated by the RET debate in Australia and the demise of the RO in the UK, these schemes often get caught up in additional design complexity, and fierce debate over their objectives, particularly when there are multiple objectives that may be in conflict.

As discussed in a previous Grattan report, government intervention may be required to support research and development in low-emissions technologies that have the potential to be low cost in the future.[61] There is also scope for policies that can complement a central emissions-pricing scheme. But the RET is not the answer in either case. As currently designed the RET rewards *today's* lowest-cost renewable technology, rather than the lowest-cost renewable technology in the long term.[62]

The RET provides no incentive for existing generators to reduce their emissions intensity. Nor does it reduce emissions outside the electricity sector. According to its design, it delivers only the technologies defined by the scheme, and excludes others that might be lower-cost alternatives to delivering an emissions reduction target.

[61] Wood (2012)

[62] Chapter 3 of CCA (2012) notes that the RET supports the deployment and commercialisation of technology, but not the research, development or demonstration.

3 Assessing Australia's emissions reduction policy options

As Australia moves toward current and future emissions targets, the challenge for policymakers across the political spectrum is to construct an emissions reduction policy framework from the various options outlined above. The framework must meet certain essential criteria. A policy that may be ideal from a theoretical economic perspective, for instance, may be too complex to secure political or community support. The criteria are:

- **credibility**: ability to meet the volume of emissions reductions required by current and future targets;
- **political viability**: capacity to evolve from current policy settings and achieve bipartisan support;
- **flexibility**: ability to adjust for changes in targets, political developments and technological change;
- **adaptability**: potential to move towards an economy-wide market-based scheme over time;
- **public acceptability**: ability to be understood and accepted by the community;
- **low cost**.

The policy framework should be agnostic as to the level of Australia's emissions reduction targets. The level of the target should not drive the policy choice; rather, the policy should be capable of responding to changes in the target. Picking policies to meet a specific target will result in more of the policy chopping and changing that led to the undesirable levels of uncertainty that exist now.

In addition to meeting these criteria, any policy framework must address three contentious design questions:

- How, if at all, will international permits contribute to Australia's emissions reduction goals (see Box 2.1)?
- How will it deal with the issue of EITE industries (see Box 2.3)?
- What role will emissions offsets play (see Box 3.1)?

The credibility of any policy framework will largely depend on how it handles these issues.

The remainder of this chapter summarises how each of the six policy options performs against the criteria above, either on a stand-alone basis or as part of a suite of policies combined into a policy framework.

Cap and trade

A cap and trade scheme directly targets the market failure by pricing the externality — greenhouse gas emissions. It is **credible** and **flexible**, since the cap of the scheme can be set and adjusted to meet any given target.[63] It provides incentives for low-cost emissions reductions across a range of sectors, and is thus likely to promote **lowest cost** abatement. Moreover, because it can be applied to a broad base, there is less need for other forms of emissions reduction or complementary policies.

[63] Although if international permits are allowed, domestic emissions can exceed the domestic cap.

Box 3.1: Carbon offsets

Carbon offsets are credits generated through activities that reduce emissions below the level that they would have been had the activity not taken place. For example, planting trees, which reduces the level of CO_2-e in the atmosphere, can generate carbon offsets or credits.

Countries can use offsets to help meet their emissions reduction targets. Where a country has an explicit carbon price, a liable entity can purchase offsets instead of paying a carbon tax, or instead of buying permits created as part of an emissions trading scheme. The benefit of offsets is that they increase the emissions reduction opportunities available to liable entities and so can reduce the costs of meeting their liabilities.

Carbon offsets give countries two opportunities to access low-cost emissions reductions.

- Low-cost reductions in sectors outside the scheme

  It may not be practical for all sectors of a country's economy to be covered by a broad, emissions trading scheme, such as cap and trade. Yet excluded sectors may contain low-cost emissions reductions opportunities. Carbon offsets or credits can be generated in these sectors and then sold to liable entities under the emissions trading scheme, so reducing the cost of the scheme.

  In Australia, the Carbon Farming Initiative (CFI) was one example of an offset scheme. Emissions reduction activities that occurred in sectors of the economy not covered by the carbon price, such as agriculture and forestry, generated credits. Businesses covered by the carbon price would buy these credits if they cost less than the cost of reducing their own emissions, or if they were cheaper than the price of carbon.

- Low-cost reductions in other countries

  Offsets created in other countries (international permits) could be used by businesses to meet their emissions reduction liabilities. The most notable global offset scheme is the CDM. The use of international permits and the CDM is explained in more detail in Box 2.1.

The key question relating to carbon offsets is the extent to which they are *additional* — that is, whether or not they represent a genuine reduction in emissions from business as usual. Rigorous evaluation processes must be put in place to ensure all offsets represent authentic reductions in emissions. These processes can be costly and impose an administrative burden.

Australia's Emissions Reduction Fund (ERF) could act as a mechanism for providing offsets. Currently, all credits generated by the scheme are bought by the government, but they could equally be bought by liable businesses if an emissions trading scheme were introduced. Alternatively, international permits generated either through offset schemes, such as the CDM, or other countries' emissions trading schemes, could be used by Australia to offset its emissions in the future.

But a cap and trade scheme has some major drawbacks. It clearly does not enjoy bipartisan support today, and so only partially satisfies the **political viability** criterion. And its complex design makes it hard to communicate, which means it performs poorly on the **public acceptance** criterion. A form of cap and trade scheme (absolute baseline and credit) could be developed from the existing ERF Safeguard Mechanism. But it will be hard to design a scheme that can overcome current objections from both the Coalition Government and the Labor Opposition. Once secured, political support would have to develop into broader community support — which would be unprecedented in the history of carbon pricing schemes, although cap and trade schemes have been successful for other pollutants such as sulphur and nitrous-oxide emissions.[64]

Although a cap and trade scheme is **adaptable** — it is already a market-based scheme — and can be applied broadly, challenges will arise in some sectors as more stringent targets are set. It is more difficult to put a price on emissions in cases where emissions are hard to measure or where emitters are small in size, but numerous.

Carbon tax

A carbon tax also directly targets the market failure. It shares some of the strengths and weaknesses of cap and trade schemes, not least that it will drive **low-cost** emissions reductions. In addition, it is **adaptable**, since it is relatively straightforward to extend a tax to multiple sectors and a carbon tax can be transformed to a market-based scheme. The obligation to pay the tax is gradually replaced with the obligation to hold tradeable permits.

A particular challenge with a carbon tax is to design it so that it is both **credible** and **flexible**: so that it can be relied on to deliver a specific emissions reduction target, and is capable of being revised to achieve future targets. Carbon taxes fix the price, but not the quantity of emissions reductions.

But the fact that it is, explicitly, a tax means it lacks **political viability** and will struggle to achieve **public acceptance**. Good communications and effective use of the revenue may have been sufficient to overcome this obstacle when a fixed price on carbon was first introduced in Australia, but the politically bruising nature of that experience makes it highly unlikely that it will be attempted again soon.

Intensity baseline and credit

Intensity baseline and credit schemes use market mechanisms to drive emissions reductions at **low cost**. An intensity baseline and credit scheme also has a smaller direct effect on consumer prices and the cost of living than a cap and trade scheme or carbon tax. This makes it more **politically viable**. And with less need for compensation, it can appear cheaper to implement. But the complexity of the scheme will still make it difficult to explain and secure **public acceptance**.

Because there is no direct link between the baselines that are determined for individual facilities or sectors and the overall target for emissions reduction, the scheme is not as **credible** as some others. In theory, the intensity baselines of all sectors could be calculated in a manner that ensured a reduction target is met, but this would be highly complex. The lack of a direct link between baselines and overall emissions makes it harder to set out predictable progress towards future targets.

Intensity baseline and credit schemes offer a degree of **flexibility**, since individual intensity baselines can be adjusted. But the process of estimating the correct intensity baseline across many

[64] Daley and Edis (2010)

sectors in order to meet a specific target makes it more difficult to adjust than other schemes.

An intensity baseline and credit scheme is somewhat **adaptable** since it is a market-based scheme, but it may be onerous to apply to multiple sectors. It can, however, be transformed over time to a cap and trade scheme. This would likely involve the reduction of baselines to zero over time, so that, eventually, businesses would have to purchase a credit or permit for all emissions. These permits would have to be issued by the government at the same time as the baselines were being reduced.

Intensity baselines are set narrowly, making them difficult to apply across multiple sectors. But an intensity baseline approach need not apply to the whole of the economy. It could be restricted to particular sectors where there might be widespread, negative flow-on effects from a carbon price: the electricity generation sector has been identified as the main example.[65]

Emissions purchasing schemes

When targeting low levels of reductions, an emissions purchasing scheme may be **publicly acceptable**. Consumers do not bear the costs directly through price increases for essential services such as electricity. But if the quantity of emissions reductions required increases significantly, the costs will start to show either in higher taxes, or cuts to government spending. The **political viability** of emissions purchasing schemes is questionable given that it currently lacks clear bipartisan support: the Labor Party has committed to scrap the ERF if it returns to power.

The extent to which the emissions reductions purchased by the scheme are additional is hard to demonstrate; used on its own, the scheme does nothing to prevent emissions rising in other parts of the economy. The **flexibility** of an emissions purchasing scheme to adapt to changing circumstances or increased targets may also be limited, given that a higher target would require additional funds from the budget that may not be available. An allocated budget sets a limit on the achievable reductions target, thereby reducing the scheme's **credibility**. And because it is voluntary, an emissions purchasing scheme cannot guarantee that a specific target will be met.

Nonetheless, reverse auctions, as used by the ERF, can be an efficient way of securing **low-cost** emissions reductions, albeit from a set of predefined opportunities. An emissions purchasing scheme can use the strength of the reverse auction to encourage market behaviour. It could also be extended to cover all sectors of the economy, though the cost to government budgets makes this unlikely. For this reason the ERF, of itself, is unlikely to be sufficiently **adaptable** to meet stronger targets in the future. A better approach may be to redevelop the ERF's associated Safeguard Mechanism as an absolute baseline and credit scheme, as suggested above.

The government's existing ERF could play a useful role in a future emissions reduction framework. The methodologies that underpin the projects funded could be used to generate permits that can be traded under a baseline and credit scheme or used as carbon offsets. Instead of the government being the sole buyer, the emissions reductions could be purchased by those who exceed their baselines.

Regulation

Regulation can be a clear and direct way to reduce emissions, and in some sectors could be both **politically viable** and **publicly acceptable**. However, the need for precise and extensive information on the costs of specific actions means that regulation is

[65] Frontier Economics (2010)

unlikely to reduce emissions at the **lowest cost**. It would also be less **credible** than other policies. Applying regulations across all sectors as the primary emissions reduction policy would be administratively complex, and linking these regulations to a specific target would also be very difficult.

Regulation could be popular for some sectors. Some stakeholders, particularly within the electricity sector, are already arguing that a regulatory approach should be adopted to drive the gradual closure of fossil fuel generation in Australia. The costs of regulation can also be less transparent to the general community than an explicit carbon price. While businesses will resist most policies that add costs or constraints, they are likely to be more resistant to widespread regulation as a policy to meet emissions reduction targets.

Regulations are far less **flexible** and **adaptable** than the market-based mechanisms considered in this paper. Adjusting regulations can be time-consuming and, by their nature, regulations cannot be transformed into market-based mechanisms. Adopting widespread regulation would also imply scrapping the government's current policy framework.

A regulatory approach would appear to be best suited to addressing market failures or barriers in specific sectors, or for use in circumstances where, for political reasons, a market-based mechanism is deemed impractical.

Tradeable green certificate schemes

These schemes would only apply to the electricity sector, forming one component of a broader emissions reduction framework. Nonetheless, one of the main attractions of the RET is the level of **public acceptance** of the scheme, and to a lesser extent, the political support it enjoys. Although both sides of politics are currently committed to the RET, the recent reduction in its target leaves its long-term **political viability** open to question. Still, providing incentives for renewable energy remains by far the most popular form of reducing emissions across voters from all parties.[66]

But on many other criteria, tradeable green certificate schemes like the RET do not perform so well. While estimates have shown emissions to be reduced at a moderate if not **low cost**, the RET is not **credible** as a core emissions reduction policy. Certificate schemes only target emissions in a single sector and, on their own, cannot be relied on to meet a specified, national target. Similarly, because they only cover one sector, they lack **flexibility**.

It's also hard to see how a certificates scheme could be **adaptable** for use in other sectors of the economy. Were a whole-of-economy market-based mechanism in place, there seems little reason why a tradeable green certificate scheme would be needed.

Conclusion: Considerations for an emissions reduction framework

The challenge facing Australia's policymakers is significant. None of the above policies on its own fulfils all of the criteria.

Table 3.1 summarises the performance of each of the policy options against the criteria. The lightness of colour indicates the degree of satisfaction with each criterion. The purpose of the table is not to identify the best, single policy option for Australia, but to highlight that each policy has strengths and weaknesses.

Poor performance on any one individual criterion should not exclude a policy from consideration as part of a wider policy framework. Tradeable green certificate schemes, such as the RET, may not be adaptable in the sense that they cannot be applied to

[66] Lewis (2015)

sectors beyond the electricity generation sector. But that doesn't necessarily mean that a RET wouldn't be suitable as part of a sectoral approach to reducing emissions.

Table 3.1 considers policies in terms of how they would perform as Australia's core policy to reduce emissions. Identifying a workable core policy is desirable because policies that can access emissions reduction opportunities across multiple sectors will lower the overall cost of reducing emissions.

But a core climate policy that covers multiple sectors — or even the entire economy — may not be politically viable or practical. Some sectors may be better suited to particular policies than others. The task is to either overcome the barriers facing individual policies, or find a combination of policies that will meet Australia's emissions reduction targets.

This working paper will be followed in early 2016 by a Grattan report that will identify an emissions reduction policy framework that not only meets the policy objectives, but can gain both bipartisan and public support. It will make recommendations to both sides of politics about the best way to meet Australia's current and future emissions reduction goals. By providing policymakers with a clear roadmap the report will aim to move the debate away from the current impasse towards an emissions reduction policy framework that will both credibly reduce emissions, and that has a real chance of bipartisan support.

Table 3.1: Summary of policy option assessments

	Credibility	Political viability	Flexibility	Adaptability	Public acceptability	Low cost
Cap and trade	Can be set to meet any target.	Does not have bipartisan support today, although an absolute baseline and credit scheme could be developed out of the existing ERF safeguard mechanism.	Can be adjusted to meet any target.	Is a market-based scheme that can be applied broadly, although there are challenges in applying it to some sectors.	Complex design makes it hard to communicate.	Can provide incentives for low-cost reductions across a range of sectors. There is less need for complementary or additional policies.
Carbon tax	Difficult to set the tax to achieve a specific target. Tax does not limit emissions.	Politically bruising history in Australia.	Can be adjusted, but no direct link to target.	Can be applied broadly, although challenges in some sectors. Can be transformed to a market-based scheme.	'Taxes' are unpopular. The bruising experience of Australia's fixed price on carbon adds to this unpopularity.	Can provide incentives for low-cost reductions across a range of sectors. There is reduced need for complementary or additional policies.
Intensity baseline and credit	No direct link between individual baselines and overall reduction target.	Smaller effect on consumer prices compared with other forms of carbon pricing.	Individual baselines can be adjusted, but estimating the baseline to meet a specific target is difficult.	Is a market-based scheme, but may be onerous to apply to multiple sectors. Can be transformed to a cap and trade scheme.	Smaller effect on prices makes it more acceptable than other forms of carbon pricing, but its complex design makes it hard to communicate.	Can provide incentives for low-cost reductions within a sector, but may be more costly to apply to multiple sectors.
Emissions purchasing scheme	Allocated budget puts a constraint on meeting targets. Lack of assurance that the target will be met given the scheme is voluntary.	Australia's current emissions purchasing scheme lacks bipartisan support.	Difficult to adjust since additional funds will need to be sourced from the budget.	Cost to the budget makes extending the scheme across the entire economy unlikely.	Acceptable for achieving low levels of emissions reduction, but cost visibility will grow for larger reductions.	Reverse auctions can secure low-cost reductions, but from a set of predefined opportunities.
Regulation	Difficult to link regulations across multiple sectors to meet a specific target.	Seen as a clear and direct way to reduce emissions.	Adjusting regulations is time-consuming, with no direct link to targets.	By its nature, cannot be transformed to a market-based mechanism.	Seen as a clear and direct way to reduce emissions. Costs of regulation can be less transparent to the public.	Need for precise and extensive information makes it difficult to target the lowest cost reductions.
Tradable green certificate schemes	Only covers the electricity sector and cannot be relied on to meet a specific, national target.	Both sides of politics committed to RET, but the recent reduction in its target raises questions as to whether this commitment is long-lasting.	Only covers the electricity sector.	Difficult to see how to apply to sectors outside of electricity.	Providing incentives for renewable energy is popular in Australia.	Australian experience shows emissions can be reduced at moderate cost, although not at lowest cost.

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