
5 Measures related to carbon emission reduction

All Australian governments have enacted policies that aim to reduce greenhouse gas emissions with the intent of averting damaging climate change. Governments have mandated the supply of minimum quantities of renewable energy, funded research into clean-coal technologies and subsidised the installation of solar hot water systems. In addition, the Australian Government proposes to implement the Carbon Pollution Reduction Scheme (CPRS), encompassing an Emissions Trading Scheme (ETS) and a number of transitional assistance programs. These measures have the potential to deliver benefits by contributing to a global reduction in harmful greenhouse gases. Many of these measures also directly or indirectly assist certain sectors of the economy, while penalising others.

Previous editions of *Trade & Assistance Review* have reported on a number of carbon emission reduction measures. The *Trade & Assistance Review 2006-07* noted that assistance to renewable energy is significant and increasing, and provided by both Australian and State Governments, in many different forms (PC 2008c). It further stated that a review of these measures could usefully consider the merits and effectiveness of assistance for renewable energy.

The Commission has also recently commented on climate change policy through:

- a submission to the Prime Ministerial Task Group on Emissions Trading (PC 2007d);
- an assessment of the methodology of the Stern Review (Baker et al. 2008); and
- a submission to the Garnaut Climate Change Review on the role of policies to supplement an emissions trading scheme (PC 2008f).

In addition, in August 2008, the Commission held a roundtable on *Promoting Better Environmental Outcomes* (PC 2009a).

This chapter draws on this work, and other more recent analysis, to provide preliminary estimates of the size and value of carbon emission reduction measures. Although the Commission has not estimated effective rates of assistance relating to these measures, it has identified 244 measures and more than \$23 billion in projected budgetary assistance, mainly over the five years to 2011-12. In addition,

the proposed Carbon Pollution Reduction Scheme will introduce a charge on carbon emissions, estimated to generate \$12 billion in 2011-12.

5.1 Measuring the impact of carbon emission reduction measures

The Commission has traditionally calculated rates of assistance by comparing a sector's returns with what those returns would have been in the absence of the assistance. These estimates indicate the extent to which a sector's returns are altered by government assistance.

Carbon emission reduction measures similarly attempt to change incentives, such that emitters of greenhouse gases face a cost associated with greenhouse gas emission, and that investors in carbon-saving technologies make a return associated with reducing greenhouse gases. In the absence of such measures, some emission-intensive activities would be undertaken for which the social costs, from a global perspective, outweigh the benefits. Or to put it another way, those investing in carbon-reducing methods would be penalised, as the full benefits of their decisions would not be rewarded.

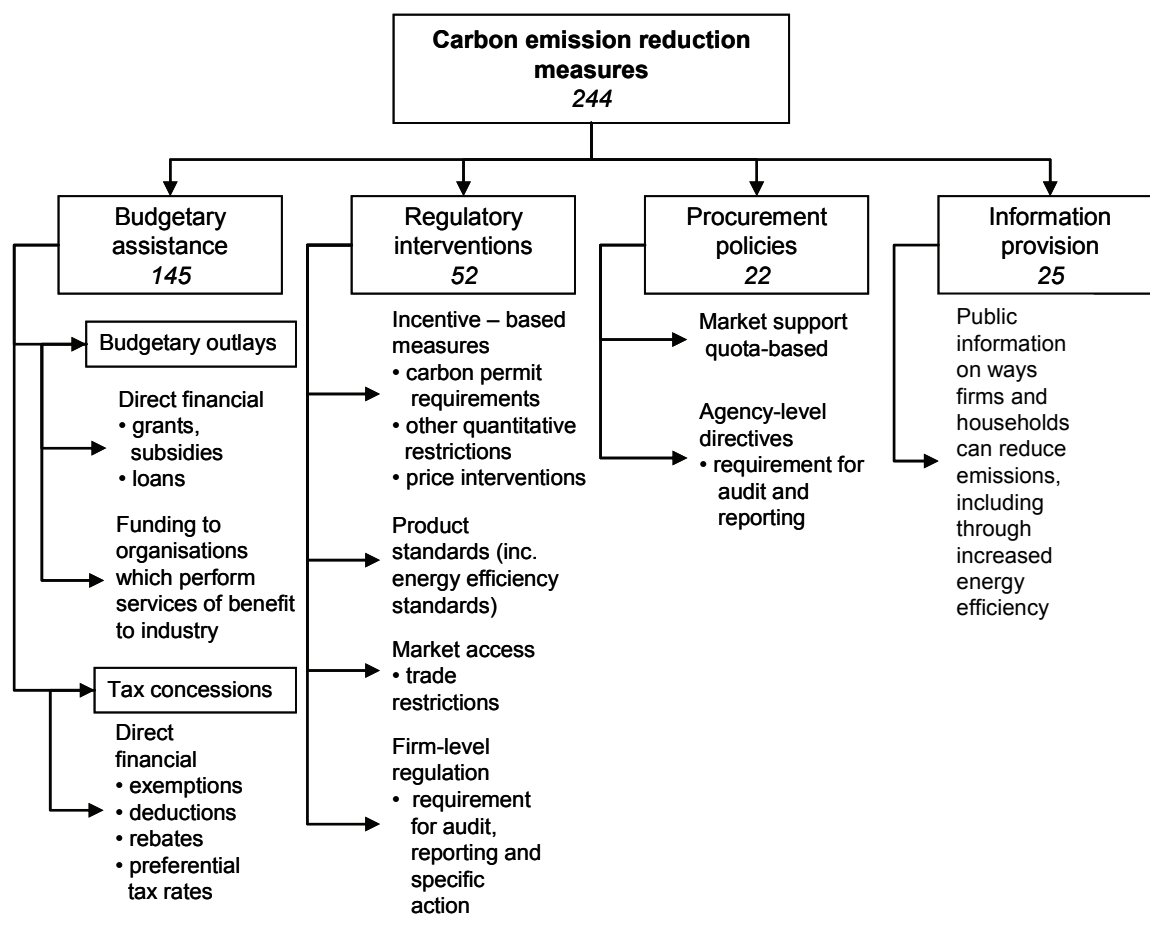
Carbon emission reduction measures selectively change the incentive structure faced by industry and consumers, and these changes can be represented within an industry assistance framework. Many of the measures have only recently been introduced, or are yet to be introduced, so the Commission has not comprehensively reported carbon emission reduction measures in an assistance framework.

To make a start on this, the present chapter reports a preliminary stocktake of carbon emission reduction measures (section 5.2); examines the assistance implications of these measures (section 5.3); and examines the processes for the evaluation and review of these measures (section 5.4). It helps to fulfil the role of the *Trade & Assistance Review* to '... report on assistance and regulations affecting industry and the effect of such assistance and regulations on industry and on the economy as a whole.'

5.2 Level and nature of measures

Government interventions aimed at addressing carbon emissions are a diverse array of budgetary, regulatory and other actions (figure 5.1).

Figure 5.1 **Forms of government intervention related to carbon emissions**



Establishing whether an assistance measure is intended to reduce carbon emissions is not clear cut, however. Some measures have objectives beyond carbon emission reduction and, while other measures do not deliver direct assistance to an industry, they do mandate standards or provide incentives to use more environmentally friendly products. Some guidelines that the Commission has used in identifying measures that would be appropriately included in the stocktake are provided in box 5.1.

Using these guidelines, the Commission has identified a total of 244 (quantified and non-quantified) current or prospective measures relating to carbon emission reduction, administered by 56 different departments or agencies. Of these, the Commission has quantified the assistance value of 135 measures, amounting to \$23.7 billion in projected budgetary assistance and a further 4 measures comprising \$470 million in regulatory assistance in 2009 (in maximum subsidy equivalent terms). These estimates are explored in more detail below.

The 244 measures comprise 145 budgetary assistance programs (including proposed permit exemptions), 52 regulations, 22 government procurement measures and

25 programs of information provision. Appendix C contains more details on all of these measures.

Box 5.1 Coverage of this stocktake

For the purposes of this preliminary stocktake, the Commission has relied on the following guidelines to compile a catalogue of existing and prospective carbon emissions reduction assistance measures:

- Is an objective of the measure, in whole or in part, to reduce carbon emissions or to assist firms to adjust to a lower carbon economy?
- Does the measure selectively assist particular firms, industries, sectors or activities? In particular, even if assistance is directed at households, does it *selectively* assist particular firms, industries, sectors or activities?
- Can the measure be quantified given practical constraints in measurement and data availability?

For inclusion under these guidelines, measures must have both the requisite objective and be selective in their assistance impact. They do not need to involve *direct* assistance to industries, sectors or activities. So, for example, measures that provide rebates to households to install insulation, while not directly assisting the insulation industry, indirectly do so, and are included in this stocktake. In contrast, broader energy market reform measures (such as the installation of smart energy meters) are typically not included.

The Commission has also identified a number of measures that meet the above guidelines, except that they have not been able to be quantified at this stage. These largely relate to regulations, procurement guidelines and information provision policies. These measures are separately reported in appendix C and are not included in the figures presented in this chapter, unless otherwise stated.

Furthermore, where possible, the Commission has included both existing measures, and measures that governments are currently proposing to introduce. For example, the Commission has included the effects of the Australian Government's proposed CPRS as it is expressed in draft legislation released in March 2009 and in the Australian Government White Paper, *Carbon Pollution Reduction Scheme: Australia's low pollution future*, released in December 2008 (Australian Government 2008c and DCC 2009).

In addition, this preliminary stocktake is intended to provide a useful, illustrative guide to the extent and size of carbon emission reduction measures. However, as some measures have multiple objectives, the quantitative estimates may be an upper-bound estimate of the carbon emission-related aspects of those measures. On the other hand, it has not been possible to quantify the value of assistance afforded by most regulatory interventions, procurement guidelines or information provision measures, nor are forward estimates available for all programs. To this extent, the estimates presented understate levels of assistance.

Budgetary assistance

Aggregate estimates

Australian Government budgetary assistance measures are estimated at \$342 million in 2007-08, increasing to a projected \$8.2 billion by 2011-12 (figure 5.2). Total budgetary assistance for the period, from 2007-08 to 2011-12, is estimated at \$22.2 billion. These projections assume the implementation of proposed measures such as the CPRS.

The introduction of the CPRS would result in permit exemptions becoming the largest form of budgetary assistance. By 2011-12, Commonwealth permit exemptions will constitute almost 50 per cent of all budgetary assistance.

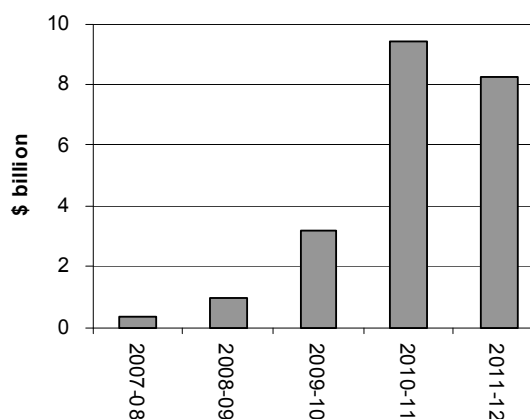
This includes \$3.1 billion of permit exemptions to firms in the Emissions-Intensive, Trade-Exposed (EITE) sector, and \$700 million in assistance to Strongly Affected Industries.

Nonetheless, even before the proposed start date of the CPRS, a range of smaller measures would see Commonwealth budgetary assistance more than triple in 2009-10. Some of this increase occurs because of additional funding to install insulation (\$1.4 billion), the Green Car Innovation Fund (\$168 million) and ethanol production grants (\$60 million). A total of 21 programs receive additional funding in 2009-10.

The Commission's estimates do not include measures that support the use of Liquefied Petroleum Gas (LPG), Liquefied Natural Gas or Compressed Natural Gas. Such measures amounted to \$943 million in budgetary assistance in 2007-08, but were not implemented with an objective to reduce carbon emissions, so they have not been included in this stocktake.

From 2007-08, the Commission estimates that State and Territory Governments have spent or allocated \$1.4 billion in budgetary assistance, over the medium term, relating to carbon emission reduction measures. In some instances it has not been possible to allocate the proposed expenditure to an expenditure year and some of it

Figure 5.2 **Australian Government budgetary assistance for carbon emission-related measures, 2007-08 to 2011-12**
\$ billion

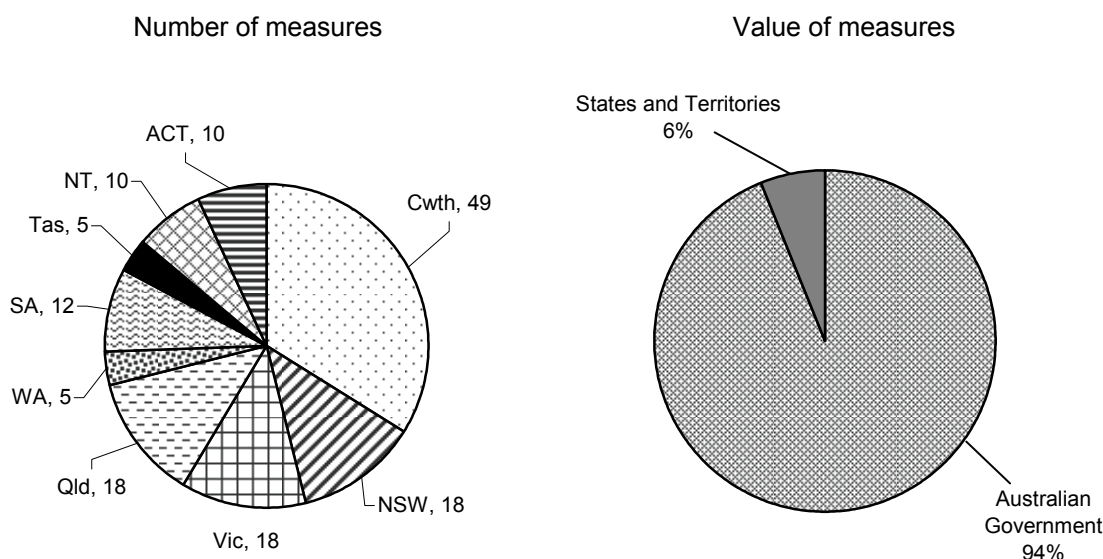


Source: Commission estimates.

may be spent beyond 2011-12. Further, part of this estimate captures money set aside for funds to finance ongoing carbon emission reduction measures.

Budgetary assistance delivered by State and Territory Governments represents only 6 per cent of the total amount of budgetary assistance estimated in this stocktake. Yet, the number of State and Territory government budgetary programs is nearly double the number of Commonwealth programs (figure 5.3).

Figure 5.3 Australian governments budgetary assistance measures by number and by value



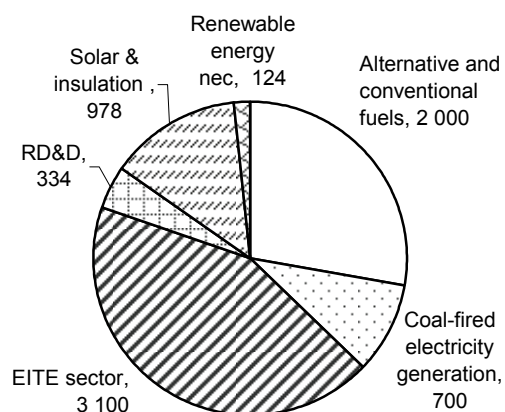
Source: Commission estimates.

State and Territory budgetary assistance focuses mainly on subsidies to selected activities or for the use of products with low levels of carbon emissions. Some of the largest measures include rebates for the installation of hot water systems in New South Wales (\$100 million), funding for a solar power station in Victoria (\$100 million) and funding for households to monitor and reduce their energy use in Queensland (\$60 million to 2011-12).

In addition to the budgetary programs, Australian and State and Territory Governments implement regulations, procurement processes or information provision programs focused on greenhouse gas emissions. Such programs are more common at the State and Territory level.

By 2011-12, several major programs of industry-specific assistance are expected to have commenced as part of the CPRS, and under the Nation Building and Jobs Plan.¹ Taking a snapshot of projected assistance for that year, the largest share of budgetary assistance will be provided to selected EITE industries and firms (figure 5.4). Expenditure under this program is intended to protect these firms from the potential for carbon leakage and is estimated at \$3.1 billion in 2011-12. Other measures include \$2 billion to adjust fuel excises to offset the impact of the CPRS and \$700 million for coal-fired electricity generation.

Figure 5.4 Australian Government budgetary assistance, related to carbon emissions by assistance category, 2011-12
\$ million



RD&D Research, Development and Demonstration
nec Not elsewhere classified.

Source: Commission estimates.

Carbon Pollution Reduction Scheme

As shown above, the proposed CPRS contains the largest of the measures intended to reduce carbon emissions. Under the proposed Scheme, firms emitting over 25 000 tonnes of designated greenhouse gases a year would be required to surrender emission permits equal to their annual volume of emissions, with Scheme requirements upheld by criminal sanctions.

The purchase of permits by liable firms is estimated to raise \$11.5 billion in revenue in 2010-11 and \$12.0 billion in 2011-12 (table 5.1). Emissions from agriculture and deforestation activities will be initially exempt from the Scheme, although most farms have emissions below 25 000 tonnes in any case.

¹ Under the National Building and Jobs Plan, the Australian Government has allocated \$3.9 billion to provide rebates for the installation of ceiling insulation and solar and heat pump hot water systems (see chapter 4).

Table 5.1 CPRS measures impacting on costs to industry

\$ million

	2009-10	2010-11	2011-12
<i>Cost increasing measures</i>			
Permit payment by industry	na	11 500	12 000
<i>Cost reducing measures</i>			
Fuel tax adjustment	na	2 400	2 000
Assistance to EITE sector	na	2 900	3 100
Assistance to Strongly Affected Industries	na	700	700
Climate Change Action Fund ^a	300	700	700

na Not applicable. ^a Only a portion of this fund will be available to reduce costs to industry as the fund also assists community sector organisations, workers, regions and communities.

Source: Australian Government (2008c).

The cost of purchasing permits, which effectively acts as a negative form of assistance for liable firms, will be partially offset for some firms according to their degree of emissions-intensity, their level of trade-exposure and other considerations such as potential loss in asset values due to carbon pricing. The offsets will provide selected assistance and be provided in the form of:

- fuel excise adjustment (worth \$4.4 billion in total for 2010-11 and 2011-12) for the use of most conventional fuels such as diesel, petrol and LPG;
- free permits (worth \$6 billion in total for 2010-11 and 2011-12) to firms that meet certain criteria for emissions-intensity and trade-exposure; and
- “once-and-for-all” assistance (\$1.4 billion in 2010-11 and 2011-12, and \$3.9 billion over the first five years of the Scheme) to ‘strongly affected’ industries, effectively coal-fired electricity generators that are above a certain emissions-intensity.

Additional transitional assistance is proposed for other industries and sectors. The Climate Change Action Fund (worth \$2.15 billion over five years) will provide assistance for a range of businesses, community sector organisations, workers, regions and communities, to support investment in energy efficiency, low emission technologies and structural adjustment. Adjustment assistance to the coal sector (worth \$750 million over five years) will be provided under the program to assist mines that will be significantly impacted by the introduction of the Scheme.

In addition, assistance to low and middle income households (estimated at \$3.9 billion in 2010-11 and \$6 billion in 2011-12), aims to ‘maintain their standard of

living while moving to a low pollution future’ (Australian Government 2008c, p. 17-1). Because this measure constitutes assistance to households that does not selectively assist a particular firm, industry, sector or activity, it is not included in this stocktake.

Non-budgetary measures

In addition to the budgetary assistance measures identified above, others provide assistance through non-budgetary means:

- Mandatory targets prescribe that a certain amount of energy is sourced from renewable or low-emission technologies.
- Some jurisdictions have introduced ‘feed-in’ tariffs that prescribe higher prices for electricity sourced from small-scale, low-emission generators.

In addition, other regulations, procurement processes and information provision policies are sometimes aimed at reducing carbon emissions, though the Commission has not been able to quantify their impact. Appendix C contains more details on these measures.

Mandatory targets for renewable and low emission energy

The Australian, Victorian and Queensland Governments have mandated targets for the supply of renewable or low emission energy. These targets directly affect the mix of electricity generation and support the development of lower-emission energy sources.

- The Australian Government’s Mandatory Renewable Energy Target (MRET), requires wholesale purchasers of electricity (retailers and large users) to proportionately contribute towards the generation of an additional 9500 gigawatt hours (GWh) of renewable energy annually by 2010 (box 5.2).
- The Victorian Renewable Energy Target (VRET) mandates that 10 per cent of Victorian electricity consumption be sourced from renewable energy generators by 2016, with the scheme legislated to continue until 2031.²
- The Queensland Gas Scheme mandates that electricity retailers, and other liable parties, source 13 per cent of their electricity from gas-fired generation. In addition, the Queensland Government’s Renewable and Low-Emissions scheme mandates that 10 per cent of Queensland’s electricity consumption be sourced

² VRET applies in Victoria in addition to the requirements of MRET. Therefore some Victorian generators and retailers will participate in both schemes (ESC 2009).

from renewable and low-emission generators by 2020, with the scheme legislated to continue until 2030.

New South Wales, Western Australia, South Australia and the ACT all have proposed to introduce similar schemes.

Box 5.2 The MRET scheme

MRET is an Australian Government requirement on large, wholesale purchasers of electricity to proportionately contribute towards the generation of an additional 9500 GWh of renewable energy annually by 2010. Introduced in 2001, the scheme is legislated to continue until 2020.

Wholesale purchasers meet their obligations through the surrender of renewable energy certificates (RECs) or by paying a shortfall charge (of \$40) for each MWh of their liability.

RECs are created by sourcing energy from:

- renewable energy power stations, including hydro, wind, solar and various biomass sources (though power stations existing prior to 1997 must generate electricity above established baselines to generate RECs);
- eligible solar hot water systems according to the amount of electricity they displace; and
- small generation units such as photovoltaic systems, mini electric hydro systems and small wind systems.

Source: Office of the Renewable Energy Regulator (2008).

The COAG Working Group on Climate Change and Water has developed a proposal for an expanded, nationally-consistent renewable energy target scheme. The proposed scheme is intended to consolidate the Australian Government's mandatory renewable energy target, and existing and proposed State and Territory government targets. The scheme proposes a Renewable Energy Target (RET) of 45 000 GWh of renewable energy by 2020 and is designed as a transitional measure, phasing out between 2025 and 2030, as the emissions trading scheme 'matures'. The scheme also proposes to provide additional incentives to small generation units. Over a transitional period, electricity generated by such units will receive multiple RECs for every 1 MWh generated. Draft legislation for the proposed scheme was released in December 2008 (DCC 2008).

In addition to these renewable energy schemes, New South Wales and the ACT have established programs that aim to reduce emissions from a broader range of sources. Under these schemes suppliers can choose to meet their obligation to

reduce emissions through the surrender of tradeable abatement certificates. The schemes target a set reduction in greenhouse gases each year.

Under each of the above schemes, suppliers who do not meet the designated targets must pay a shortfall charge per megawatt hour (MWh). While suppliers who can meet the requirements at a cost less than the shortfall charge will presumably do so, these shortfall charges and targets together determine the maximum effective subsidy to renewable or low emission energy implied by each scheme. For the MRET the maximum effective subsidy would be the product of 8100 GWh (the annual target) and \$40 per MWh (the shortfall charge).³ The level of maximum effective subsidy of these schemes can be as high as several hundred million dollars a year (table 5.2).

Table 5.2 Assistance provided by selected quota-based schemes

<i>Measure</i>	<i>Target in 2009^a</i>	<i>Shortfall charge</i>	<i>Maximum effective subsidy^b</i>	<i>Start date</i>	<i>Finish date</i>
		\$ in 2009	\$m		
MRET	8 100 GWh renewable	40 per MWh	324	2001	2010
VRET ^c	578 GWh renewable	46 per MWh	27	2007	2031
NSW GGAS	9.7 Mt CO ₂ -e reduction ^d	12 per t of CO ₂ -e	117	2003	2020 ^e
ACT GGAS	0.2 Mt CO ₂ -e reduction ^d	12 per t of CO ₂ -e	3	2005	2020
Proposed RET	12 500 GWh renewable (in 2010)	40 per MWh ^f	500	2010	2030

^a Legislated targets vary by year. ^b The maximum effective subsidy to renewable energy production is determined by the annual production target multiplied by the legislated shortfall charge. ^c The Victorian Government has indicated that it will only transition VRET into the proposed, national RET scheme, if the RET ensures a level of support at least equal to that provided to Victoria under VRET (Victorian DPI 2009). ^d The target of the New South Wales and ACT schemes is an abatement target, here expressed in Mega tonnes of carbon-equivalent emissions reduction. ^e While the NSW Government has committed to extending the targets to 2020, it has indicated that the Scheme will end on the commencement of the CPRS (IPART 2009b). ^f This estimate is based on the current shortfall charge for the MRET of \$40 per MWh. The commentary to the draft legislation proposes to apply a rate that is 'marginally above the projected peak REC price' (DCC 2008).

Source: Commission estimates; Australian Government (2008c); IPART (2009a, 2009b) and Victorian DPI (2009).

These estimates represent an upper bound of the annual effective subsidy of the targets. However, other costs and benefits to regulated firms or their competitors may arise. For example, a recent Commission research report (*the Annual Review of*

³ The calculations for the NSW and ACT Greenhouse Gas Abatement Schemes are slightly more complicated. These schemes mandate set reductions in carbon equivalent emissions per person, from a baseline level. The maximum effective subsidy is calculated here by the product of the reductions from the baseline, the State or Territory population and the shortfall penalty.

Regulatory Burden on Business: Manufacturing and Distributive Trade) noted concerns about the administrative costs imposed by MRET and the uncertainty around the tax treatment of certificates (PC 2008g).

Price-based market support

A number of jurisdictions have mandated a premium tariff for electricity fed into the grid by small generation units, such as photovoltaic rooftop systems. (As noted above, small-scale generation units will also receive concessional treatment under the proposed RET scheme.)

- In Queensland and South Australia, eligible solar generators receive 44 cents per kilowatt hour (kWh) for *net* electricity generated. At the time of the scheme's introduction in Queensland, this rate was around three times the existing domestic use tariff. Both of the schemes are proposed to last until 2028.
- In the Northern Territory, through the Alice Springs Solar City project, residents can access a *gross* feed-in tariff of 45.76 cents per kWh for systems up to 2 kW capacity, capped at \$5 per day.
- In the ACT, from March 2009, eligible generators with units up to 30 kilowatt installation capacity will receive, for *total* electricity generated, an initial rate of 50.05 cents per kilowatt hour. This rate is set at 3.88 times the most common price paid by the ACT electricity users, and it is to apply for a period of 20 years after connection to the grid.
- In Victoria, the proposed scheme (to commence in 2009) mandates that eligible generators, with systems up to 2 kilowatt installation capacity, receive for *net* electricity supplied to the grid, a rate of 60 cents per kilowatt hour, which is about four times the standard retail rate. The scheme will run for 15 years through to 2024.

COAG has recently agreed on a set of national principles to apply to these feed-in tariffs (COAG 2008). One element of these principles is that such schemes should be transitional in nature, recognising that any future national emissions trading scheme will provide increasing support for low emissions technologies.

Summary

This stocktake has identified a total of 244 measures that are aimed at reducing carbon emissions and \$23.7 billion in budgetary assistance. Measures other than budgetary assistance also have substantial assistance impacts through establishing quotas, or prescribing prices, for the use of low-emission energy, mandating standards or providing information to businesses and consumers.

There are two key characteristics that stand out from the stocktake of these measures:

- First, there are a significant number of carbon emission reduction measures and the funds allocated to these measures are comparatively large. If the CPRS and other proposed measures are implemented, this stocktake estimates budgetary assistance (relating to carbon emission reduction) at \$8.2 billion in 2011-12. This compares to an estimate of *total* budgetary assistance to *all* industry of \$8.3 billion in 2007-08 (chapter 2) — though this figure already captures some carbon emission reduction measures.
- Second, many of the measures are aimed at the same objective (say, for example, the installation of insulation or solar panels) and, because of this and other reasons, the effects of many of the measures are inter-related. Further, there are relationships between the measures identified in this stocktake, and other measures that more broadly relate to the regulation of the energy and transport sectors.

Against this backdrop, the next two sections respectively analyse some of the impacts of these measures from an assistance viewpoint, and examine the existing arrangements for the evaluation and review of these measures.

5.3 Assistance implications

As the previous section demonstrates, Australian governments have implemented, or are implementing, a range of measures aimed at reducing carbon emissions. Some of these are broad-based measures that change incentives for almost all sectors of the economy, while other schemes are narrowly targeted, providing assistance to specific industries or carbon-reducing technologies.

- First, the CPRS proposes to establish a price for carbon by imposing a limit on emissions. The trading of carbon permits will determine the carbon price (subject to a safety valve price or hybrid arrangement).⁴ The price of carbon effectively establishes a pecuniary penalty, or ‘assistance tax’, on carbon emissions. The resulting carbon price provides a signal to businesses and households on the cost of carbon emissions and an incentive to adopt least-cost ways of reducing emissions.

⁴ The carbon price would be set according to costs of abatement at the margin of the cap. Other design features will also affect the carbon price. For example, allowance for the international trade of permits, or the possibility of banking and borrowing permits, will change the marginal costs of abatement and, hence, the carbon price.

-
- Second, the CPRS proposes to provide transitional assistance that, while not directly designed to reduce emissions, may assist some industries to adjust to a lower carbon economy. Under the CPRS, selected industries (such as EITE industries or Strongly Affected Industries) will receive temporary allocations of carbon permits. As discussed below, some of these measures risk muting the price signal explicit in the carbon price. By doing so they hold resources in emission intensive activities longer than might otherwise be the case, allowing a more gradual transition to lower emission activities.
 - Third, Australian governments are providing a range of specific assistance to particular activities intended to reduce carbon emissions. For example, governments support a range of research and development activities that intend to find ways of reducing carbon emissions. Governments also directly subsidise some lower-emission activities.
 - Fourth, governments attempt to alter the behaviour of businesses and consumers through regulation and the provision of information. Such regulation benefits those industries to which activities are directed and imposes costs on those industries whose activities are restricted.

Assessments of the assistance implications of carbon emission reduction measures provide scope for explicitly recognising the cost of carbon emissions and their likely impacts. While the measures are intended to afford a net benefit to the community through lower carbon emissions, from an assistance viewpoint, they may introduce distortions that affect different industries and sectors differently.

Interaction between carbon emission reduction measures

Different carbon emission reduction measures do not operate in isolation but interact with each other. Under a broad-based emissions trading scheme, carbon emission reduction is determined by the price of an additional unit of carbon and the relative costs of abatement relating to certain activities. Most firms and households are likely to undertake abatement activities that have marginal abatement costs below the carbon price. At the same time, however, this stocktake has identified 113 measures that stipulate particular methods of reducing carbon emissions. Of these, 81 provide direct budgetary assistance, involving \$8.6 billion from 2007-08 to 2011-12, and a total of 22 programs (across all jurisdictions) subsidise the installation of solar panels or home insulation.

The selective specification of certain abatement activities has the potential to impose a higher total cost for a given reduction in carbon emissions. For instance, in the presence of an economy-wide cap on emission levels, supplementary measures

will not generally reduce emission levels further. Instead, supplementary policies generally have one of two effects:

- they can encourage abatement activities that are below the carbon price and are likely to have occurred anyway; or
- they can alter the mix of abatement activities that occur by inducing activities that are more costly than the carbon price.

However, additional measures may be warranted where they can be demonstrated to meaningfully address gaps in a broad-based carbon response (box 5.3). Such gaps may occur where there are impediments to the efficient setting of a carbon price or there are informational or other impediments to firms and households efficiently reducing carbon emissions.

Where these gaps do not exist, supplementary measures that encourage activities that are below the carbon price generate additional policy-related costs without any additional decreases in carbon emissions. Supplementary policies that encourage more costly abatement activities would tend to put downward pressure on the carbon price, for a given level of aggregate reduction in emissions.

From an assistance viewpoint, a lower carbon price potentially disadvantages other industries that could otherwise profitably mitigate emissions. For example, suppose that a supplementary policy supports technologies that reduce emissions in cement production. Such a policy would not just advantage the cement industry, it would disadvantage the cement industry's competitors that have more accessible or cheaper emissions reduction options available. In addition, a lower carbon price will benefit firms that must buy carbon permits to produce.

The potential for distorted results is heightened when a large number of measures deliver differing rates of support to carbon reducing activities and impose differing penalties on carbon emissions. For example, five jurisdictions have announced premium feed-in-tariffs that support the installation of small generation units (such as rooftop solar photovoltaic systems, small wind turbines and micro-hydro systems) — by paying a higher price for electricity sourced from these units. Yet, the national RET scheme also proposes additional incentives for these units, by allocating more renewable energy certificates to them than for the same amount of energy sourced from other renewable sources.

Box 5.3 **Possible rationales for supplementing broad based policies**

Notwithstanding the benefits of a broad-based carbon price, other measures may, under certain circumstances, complement the response to carbon emission reduction. Given the potential for such policies to undermine the signals given by a broad-based carbon price, a rigorous examination of the costs and benefits of such measures would need to precede their implementation.

First, investments in carbon-reducing technologies (such as renewable energy or carbon capture and storage) may result in spillover benefits, if private investors are unable to earn a sufficient return on the development of such technologies (as others may be able to cheaply replicate innovations). Existing policies such as patent law and R&D assistance will help improve these incentives.

Second, broad-based schemes are likely to exclude some sectors due to the administrative costs of monitoring emissions. For example, the proposed CPRS does not, at first, cover the agricultural sector because:

The agricultural sector is characterised by thousands of small emitters and the calculation of emissions is complex, so it would not be practical at this stage to cover those emissions directly. (Australian Government 2008c, p. xxix)

In these circumstances, other arrangements that encourage carbon reduction in uncovered sectors may be warranted to improve overall efficiency by lowering the adjustment burden on sectors covered by the broad-based scheme.

Third, in some circumstances, households or businesses may not make energy-efficient investments that would be more cost effective for them. For example, the public good characteristics of information provision may merit a role for governments to provide, or mandate that others provide, information on the energy efficiency of certain goods. Another reason is that consumers sometimes exhibit systemic biases in weighing up short-term costs versus long-term benefits.

Fourth, some industries may experience short-term difficulty in adjusting to a lower carbon economy. From an equity perspective, transitional assistance may be delivered to certain industries and sectors that are disproportionately affected by policy-induced reductions in carbon emissions. In addition, assistance to trade-exposed industries may be warranted ahead of a global response to carbon emissions (see below).

Fifth, other measures may beneficially supplement a broader response during a transition period to a more stringent carbon constraint. If businesses expect governments to provide further assistance once the more stringent constraint is in place, then they may have less incentive to adjust now.

Source: PC (2008d, 2008f).

Indeed, measures that encourage specific abatement activities at a state level can create additional distortions, as they not only designate types of abatement, they also often restrict the geographic location where abatement occurs. In addition, the

multiple administrative arrangements for these schemes add to the compliance costs of achieving abatement. Such costs will not only be imposed on businesses and households that must navigate the array of different measures in place (and the changes that are made to these measures from time to time), but also fall on governments that must coordinate multiple programs. Across the nine Australian governments, 56 departments and agencies are responsible for administering the 244 carbon emission reduction measures identified by the Commission's stocktake.

Transitioning to a lower carbon economy

Transitional assistance typically shelters individual activities from the full cost of carbon emission reduction policies for a period of time by providing direct support to affected industries, sometimes in the form of subsidies to undertake certain activities. Often transitional assistance is argued for on equity grounds based on targeting those that experience hardship as a result of reform. The CPRS proposes \$11.3 billion of assistance for strongly-affected industries and low and middle income households (over the three year period from 2009-10 to 2011-12) for these reasons.

However, it is difficult to design transitional assistance in ways that do not impede the adjustments that the original reform actually targets. For instance, often assistance cannot be directly targeted to those that require assistance. Disentangling the effects of any reform from the normal economic impacts that buffet industries from time to time is not always possible. As a result, proxy measures are often used to identify assistance recipients. Since these proxies can be imperfect, basing assistance on these measures risks prolonging the operation of inefficient activities. Even when those suffering harm can be identified, unless there is a strong commitment to make the assistance transitional, an inefficient cycle can persist when industries continually request assistance to take advantage of successive reform initiatives.

These issues are not unique to carbon emission reduction; they have been evident in many assistance programs tied to fundamental economic reforms. Transitional assistance packages delivered to the passenger motor vehicles, textiles, clothing and footwear and dairy industries are examples.

In the general context of national reform initiatives, the Commission has noted that adjustment assistance should be developed as a key part of a reform program in line with appropriately agreed principles. In contrast, designing adjustment assistance in an ad hoc way:

... heightens the risk of inappropriate intervention, or failure to provide adequate and well targeted support when desirable. (PC 2005c, p. xxiv)

In the context of transitional assistance relating particularly to carbon emission reduction policies, there are specific issues relating to assistance provided to counteract carbon leakage (in the transition to a global agreement to constrain carbon emissions) and the manner in which revenues from the sale of carbon emission permits (and associated taxes) are returned to businesses and households.

Carbon leakage

Carbon leakage occurs if, after Australia introduces a carbon constraint, emissions intensive production that would have otherwise been performed in Australia shifts to countries that have less stringent carbon constraints. An example could be if an aluminium smelter were to relocate to a country that has not yet imposed a carbon price. Other examples include reductions in new investment or the refurbishment of existing facilities that instead shift to non-carbon constrained countries.

The effect of such shifts would be for global emissions not to fall by as much as intended by the domestically-introduced emissions cap (or even to rise, if the substituted production proved more carbon intensive). Further, the production that shifts because of carbon leakage may return once a global carbon constraint is in place. This creates the potential for a double adjustment effect during the transition to a carbon constrained global economy. These effects provide an in-principle rationale for measures that aim to prevent carbon leakage.

An economy's exposure to carbon leakage depends on its emissions intensity and the extent to which domestic firms can pass on the cost of carbon emission permits (partly determined by their exposure to competition from overseas suppliers). Activities assessed to be particularly exposed to carbon leakage have been designated 'Emissions-Intensive, Trade-Exposed industries' in Australian policy frameworks.

In response to the issue of carbon leakage, the Australian Government has proposed, as part of the CPRS, to grant transitional assistance to EITE industries in the form of free permits. New and existing entities undertaking an eligible EITE activity will receive an allocation of 60 or 90 per cent of emission permits based on their previous year's production and historical emissions. It is further proposed that these allocations will reduce by a 'carbon productivity dividend' of 1.3 per cent per year. Trade-exposure assessments and historical industry-wide emissions intensity data (for a process or activity) would be used to determine eligibility as an EITE activity. Allocations would be based on historical emissions with the intention that they do not create incentives for firms to maintain emissions at artificially high levels. The Australian Government has also proposed delivering further assistance

to EITE firms disadvantaged by the proposed and expanded RET scheme (DCC 2008).

Nonetheless, such grants of emission permits afford assistance to the designated activities, raising returns and lowering the incentive to reduce production in those industries that receive assistance (box 5.4). However, as also described in box 5.4, policies that counteract carbon leakage will most likely transfer the abatement task to other sectors. This will impose additional costs on other firms that must buy permits to emit greenhouse gases.

In practice, determining the level of assistance to EITE activities is complicated by uncertainty about the extent of carbon leakage. A global carbon constraint would help abatement activities shift to where they impose the lowest costs. However, if Australia imposes a constraint ahead of other countries, production may shift to countries not because of cheaper abatement opportunities, but because firms in those countries do not pay the full price of their pollution. So, judging the extent of carbon leakage requires estimating a counter-factual: what activities would stay in Australia in the environment of a uniform and consistent global carbon constraint?

Accordingly, identifying activities that *may* contract, shut-down or shift offshore following the introduction of a domestic constraint is not sufficient. The test for carbon leakage is whether these shifts would still have occurred even if other countries efficiently constrained their carbon usage. The difficulty in forming these judgements make it likely that any policy response will at times fail to protect against carbon leakage and also at times provide assistance where no carbon leakage would have otherwise occurred.

The broader implications of transitional assistance

The provision of budgetary assistance comes at the cost of what else the government could have done with the revenue. Direct budgetary assistance requires governments to raise revenue from taxes that will generally impose broader distortions and consequent welfare losses. Likewise, concessions to revenue raising measures (such as the allocation of carbon permits without levying the permit price) potentially not only distort the allocation of economic resources, but also impose a cost reflected by the forgone revenue and opportunity to reduce distortive taxes. These ‘opportunity costs’ are substantial in the case of Australia’s proposed CPRS, given the significant value of the free permit allocations, other tax concessions and outlays proposed (a total of \$6.5 billion in 2011-12, table 5.1).

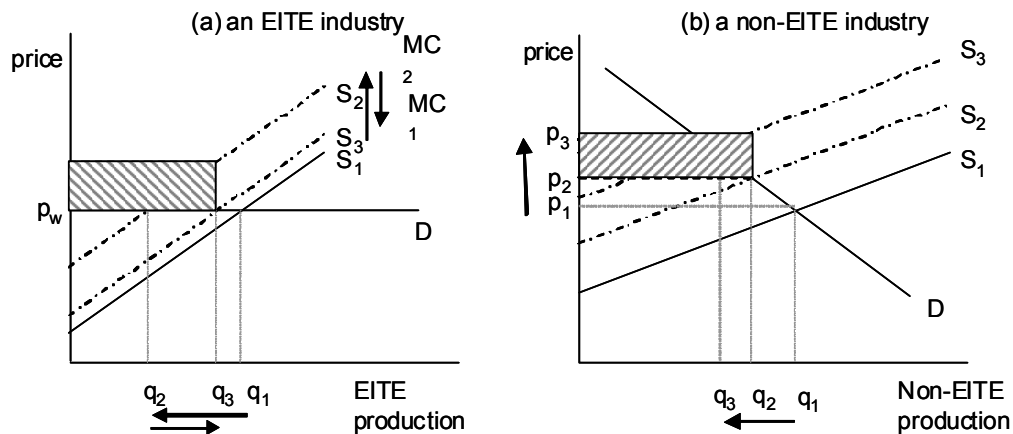
Box 5.4 Stylised representation of the assistance implications of carbon leakage

Policies that protect against carbon leakage (by reducing impacts on EITE industries) would transfer the abatement task to other sectors of the economy. Further, in the absence of international trade in emission reductions, this transfer would raise the domestic price of a carbon permit. This is because these measures constrain domestic abatement opportunities, concentrating the abatement task to a narrower section of the economy. The upshot is that providing protection against carbon leakage assists production and employment in some activities at the expense of other activities.

The impact of these ‘second round’ effects is shown in the stylised example below, where the solid lines indicate the status quo prior to the introduction of an ETS. (It should be noted that the diagrams are illustrative only, and the shifts in curves do not represent the expected magnitude of any changes.)

Since EITE industries are exposed to international trade they are likely to have little influence over the price of their output — this feature is represented by a flat demand curve, ‘D’ in panel (a). A unilaterally introduced ETS raises the costs of the EITE industry and shifts their supply curve to ‘S₂’ and reduces their production to ‘q₂’. However, if the EITE industry is granted permits to offset these increased costs, their costs (and hence supply curve) will shift back to ‘S₃’. The amount of the assistance is represented by the shaded area. The size of the assistance depends on the firms’ previous year’s production and the ability of an EITE industry to substitute to non-carbon intensive inputs. Indeed, if substitution possibilities are significant, it is possible that production may increase beyond pre-ETS levels.

For non-EITE industries that purchase carbon permits, the ETS originally raises their costs and hence shifts supply to ‘S₂’ (since some of these industries will not be trade-exposed they are drawn with downward sloping demand curves, panel (b)). However, the additional increase in the abatement that they must undertake (caused by EITE assistance and the transfer of the reduction burden to those other sectors) increases their costs, further shifting their supply curve to ‘S₃’. This further reduces the output (and increases the price) of the non-EITE industry’s output (the ‘assistance tax’ represented by the shaded area).



(continued next page)

Box 5.4 (continued)

It is important to note that this disadvantages not only the non-EITE industry, but also the customers of the non-EITE industry's output.

Hence, the economic effects of assistance relating to carbon leakage are not isolated to the firms directly affected by carbon leakage. Any policy that prevents carbon leakage will have adverse effects on some non-EITE industries.

In this context, some have argued that the auctioning of carbon permits potentially presents a 'double dividend' (Kaplow 2006). That is, raising environmental taxes could give rise to two kinds of potential benefit — first, a reduction in environmental damages and second, a reduction in the inefficiencies caused by the general taxation system — if the incremental tax revenue is used to replace or reduce existing 'distortive' taxes. However, a carbon price may introduce its own distortions as it will raise the price of goods relative to leisure, which, by reducing incentives to supply labour, may aggravate the distortions created by income taxes.

Though a double dividend effect may not strictly arise, these considerations make it more, not less, important to use tax revenues (including those raised from environmental taxes or the auction of permits) in efficient ways.

5.4 Processes for evaluation and review

A large number of the measures identified in the Commission's stocktake have been implemented progressively over the last decade in response to emerging concerns about climate change, and further measures are planned in parallel with the introduction of the CPRS. Not surprisingly then, concern has been raised about the risks of uncoordinated policy processes overlapping (Garnaut 2008 and PC 2008f).

Such issues have recently been considered by COAG, and through this process Australian governments have committed to reviewing a number of carbon emission reduction measures to ensure that they deliver efficient, effective and equitable results. In particular, at the 29 November 2008 meeting of COAG, Australian governments agreed to:

... review and streamline their existing climate change mitigation measures, with the aim of achieving a coherent and streamlined set of climate change measures in 2009. (COAG 2008).

The principles agreed by COAG that will guide this review include that complementary measures should:

-
- be tightly targeted at a market failure not adequately addressed by the CPRS or be targeted at managing the impacts of the CPRS on particular sectors of the economy;
 - adhere to best-practice regulatory principles including those of efficiency, effectiveness, equity and administrative simplicity;
 - be kept under review against these principles; and
 - be implemented by the level of government that is best able to deliver the measure.

In 2008 the Australian Government announced a review to develop a set of principles to assist its assessment of whether existing programs are complementary to an emissions trading scheme. The review, headed by Roger Wilkins AO, reported in July 2008 but has not been made public to date.

Australian, State and Territory Governments have individual responsibility for progressing reviews of carbon emission reduction measures and implementing the recommendations of these reviews.

In addition, the Australian Government has proposed that EITE assistance would be reviewed five years after the introduction of the CPRS. The Australian Government would provide five years' notice of any modifications to the EITE assistance program, unless the modifications were required for compliance with Australia's international trade obligations. The CPRS further proposes that firms may request the government to ask the Productivity Commission to assess whether, in the next five years, carbon leakage may result in the premature closure of an industry that would otherwise be competitive in a carbon constrained world (DCC 2008). The draft legislation for the nationally expanded RET scheme also mandates a review of the scheme in 2014.

The size and complexity of carbon emission reduction measures suggests that regular review of these measures across jurisdictions will be worthwhile. The inter-relation of carbon emission reduction measures with other national policy measures such as energy efficiency, road congestion and transport pricing indicates that broad ranging reviews are likely to be more effective than more narrowly focused reviews. In addition, the involvement of nine Australian governments (and the added complications of the need for an international carbon emission reduction agreement), increases the need for processes that engender coordination and cooperation across jurisdictions.

In recent Australian policymaking history, the implementation of National Competition Policy (NCP) provides an example where Australian governments coordinated the review of a complex set of interacting and overlapping regulatory

measures. Though not without its shortcomings, NCP oversaw the review of over 1800 pieces of legislation and reformed the regulation of access to essential services, food, trading hours, the professions and other areas. Many of the reviews in these areas adopted a national approach whereby a single review covered regulations across all Australian governments. The overarching reviews also assessed the regional and distributional effects of change and these assessments were important to understand the implications of reform.

In its review of NCP, the Commission (PC 2005c) found that some of the key institutional frameworks that improved the outcomes that NCP delivered included:

- clearly specified reform objectives and principles, including effective public interest tests;
- agreed implementation timetables;
- independent monitoring and public reporting on progress;
- adequate resourcing of key coordinating/decision making and assessment bodies; and
- mechanisms to lock-in reforms.

Accordingly, the Commission considers that it would be beneficial for Australian governments to give greater weight to institutional arrangements that will guide the review of carbon emission reduction measures. Although the agreed review processes have a number of strengths (including the commitment for ongoing review), the lessons from other policy reform agendas suggest that there may be scope to strengthen processes. For instance, experience has highlighted the importance of formal progress monitoring arrangements and mechanisms that provide for accountability against stated commitments. Transparent and independent assessment arrangements generally create an environment conducive to adherence to agreed reviews.

In this context, the Commission notes that the National Reform Agenda (NRA) establishes institutional frameworks to guide reform of infrastructure, regulations, health, education and training. The COAG Reform Council (CRC) has been established to monitor progress and assess the performance of governments in meeting their reform commitments under the NRA (COAG 2008). There are many synergies between a review of carbon emission reduction measures and other aspects of the national reform agenda, such as energy market reform and transport pricing reform.

5.5 Summing up

Designing efficient, effective and equitable policy responses to carbon emission concerns is a challenging policy task but a crucial one for Australia's economy and environment.

- The large number and magnitude of the measures (over \$23 billion) makes the potential gains from maximizing their efficiency and effectiveness commensurably large.
- Given the extent of the funds from the proposed sale of emission permits (estimated at \$12 billion in 2011-12) there will be pressure on governments to fund a variety of programs, some of which may not provide additional benefits.
- While most measures are aimed at reducing carbon emissions, some are concerned with distributing the adjustment burden among firms and households.
- The involvement of multiple jurisdictions and the interdependent nature of the measures make it particularly important to coordinate evaluation and review processes.
- The science, economics and global politics of reducing carbon emissions is evolving. In this environment, keeping track of the efficiency and effectiveness of existing and proposed measures will not be easy, yet assumes even greater importance.

Indeed, in its submission to the Garnaut Climate Change Review the Commission observed that achieving least-cost abatement of greenhouse gases would be Australian governments' 'most difficult ever regulatory challenge' (PC 2008f). To meet this continuing challenge, there is merit in governments establishing sound institutional frameworks to guide the review of carbon emission reduction assistance measures. Given that the effects of these measures are interdependent and applied by multiple jurisdictions, the payoff from establishing national approaches appears significant. The stocktake of measures in this report may assist governments to come to terms with the size and nature of the task ahead, as well as the best way to proceed.