

# 15 AN AUSTRALIAN EMISSIONS TRADING SCHEME

## Key points

The emissions trading scheme will issue permits for greenhouse gas emissions up to limits and release them in line with the scheme's emissions reduction trajectories. Trade will move permits to entities for whom they have most value. The trajectories will be firm for five years, and indicative through to mid century. Permits should be sold through a competitive process.

The more sectors included in the emissions trading scheme, the more efficiently costs will be shared across the economy. The transport sector should be included.

While there are advantages in moving directly to an unconstrained scheme, 2010–12 could be a transition period. If there were a transition period, the Kyoto Protocol would define Australia's emissions reduction trajectory and permits would be sold at a low fixed price. These years would be used to pursue effective international sectoral agreements, en route to a global agreement.

Unlimited hoarding of permits will be allowed, and the independent regulator, the Independent Carbon Bank, will be able to lend permits within five-year periods. No hoarding of 2010–12 permits could be allowed if there were price constraints in a transition period.

International linking will play an important role in the scheme, with fewer constraints in later years within an international agreement.

The Commonwealth Government has committed to implementing an emissions trading scheme in 2010 as its central policy measure for emissions mitigation.

In considering scheme design, much can be learnt from experiences with other schemes, such as the New South Wales Greenhouse Gas Reduction Scheme and the European Union emissions trading scheme. The Review has also studied previous design proposals for an Australian emissions trading scheme, in particular those of the National Emissions Trading Taskforce set up by the state governments, and the Task Group on Emissions Trading established by the former Prime Minister.<sup>1</sup> In addition, the Review has considered movement toward emissions trading in other jurisdictions, including New Zealand, Japan, and parts of the United States and Canada.

The Review is undertaking its work in an Australian intellectual and political environment that has been changed and improved by the discussion and experience of these schemes. However, the Review has applied first principles in developing a rigorous framework to guide the development of an Australian scheme. Table 15.1 gives an overview of the proposed scheme's design.

The response to the Review’s discussion paper on emissions trading (March 2008) has been wide-ranging and considered.<sup>2</sup> This chapter takes into account comments from interested people over recent months and in large numbers of written submissions to the Review.

**Table 15.1 Overview of the proposed emissions trading scheme design**

Design decision	Proposal
<b>Setting an emissions limit</b>	<p>The overall national emissions limit should be expressed as a trajectory of annual emissions targets over time, which define long-term budgets.</p> <p>A number of trajectories should be specified upon establishment of the scheme. The first, up to 2012, should be based on Australia’s Kyoto commitments (Australia’s existing emissions limit). The others, for the post-2012 period, should reflect increasing levels of ambition. Movement between them should be based on determining the comparability of Australia’s response to international effort.</p> <p>In its supplementary draft and final reports, the Review will provide advice to government on budgets, trajectories and targets for an Australian emissions trading scheme.</p>
<b>Changes to the emissions limit</b>	<p>Movement from one trajectory to another should only be on the basis of international policy developments and agreements (which should allow for new information and developments of an economic or scientific kind).</p> <p>Government should provide five years’ notice of movement to another trajectory. Any gap between the domestic emissions trajectory and international commitments during this period would be reconciled by the purchasing of international permits.</p>
<b>Coverage</b>	<p>Gases: Six greenhouse gases as defined by the Kyoto Protocol.</p> <p>Sectors: Stationary energy, industrial processes, fugitives and transport from scheme outset. Waste and forestry to be included as soon as practicable. The inclusion of agriculture to be subject to progress on measurement and administration.</p>
<b>Domestic offsets</b>	<p>Domestic offsets will have a small role, given broad coverage. Unlimited offset credits should be accepted from forestry before and during coverage in the scheme. The appropriateness of an offset regime for agriculture to be analysed further in the context of coverage of these emissions and advice provided in the supplementary draft and final reports.</p>
<b>Point of obligation</b>	<p>Set at point of emissions where efficient. An upstream or downstream point of obligation preferred where transaction costs are lower, accuracy of emissions measurement higher, or coverage greater.</p>
<b>Issuing (or releasing) permits</b>	<p>Permits released according to emissions reduction trajectory. All permits auctioned at regular intervals. (Note: Some permits may be used in lieu of cash in providing assistance to eligible firms that are in trade-exposed, emissions-intensive industries.)</p>
<b>International links</b>	<p>Opportunities for international linking of the Australian scheme should be sought in a judicious and calibrated manner.</p>
<b>Price controls</b>	<p>Not supported, except during transition period to end 2012.</p>

**Table 15.1 Overview of the proposed emissions trading scheme design**  
*(continued)*

Design decision	Proposal
<b>Inter-temporality (flexibility in time of use of permits)</b>	Unlimited hoarding allowed. Official lending of permits by the independent carbon bank to the private sector allowed within five-year periods.
<b>Treatment of trade-exposed, emissions-intensive industries</b>	Global and sectoral agreements to achieve comparable treatment of emissions in important competitors to be pursued as a priority. If they have not been reached post-2012, assistance should be provided to account for material distortions arising from major trading competitors not adopting commensurate emissions constraints.
<b>Governance</b>	Emissions limit and policy framework for the scheme set directly by government. Scheme administered by independent authority (independent carbon bank).
<b>Compliance and penalty</b>	Penalty to be set as a compliance mechanism. Penalty does not replace obligation to acquire permits; a make-good provision would apply.
<b>Use of permit revenue</b>	Auctioning of all permits would provide a substantial amount of government revenue. All revenue to be returned to households or businesses after administrative costs of system. Competing priorities for this revenue include: <ul style="list-style-type: none"> <li>• payments to trade-exposed, emissions-intensive firms</li> <li>• payments to households</li> <li>• support for investment in research, development and commercialisation of low-emissions technologies</li> <li>• cash reserves to purchase international permits/offsets to reconcile domestic emissions with international commitments.</li> </ul>

## 15.1 Framework to guide scheme design

### 15.1.1 The objective of an emissions trading scheme

To mitigate climate change effectively, a limit must be placed on rights to emit greenhouse gases to the atmosphere, and this must be reduced over time to the level that prevents any net accumulation in the atmosphere. Australia's limit will represent an agreed share of a global limit.

An emissions permit represents a tradable instrument with inherent value that can be exchanged between sellers and buyers in an emissions permit market. This enables the movement of permits about the economy to their highest value (or most economically efficient) use. It does this while ensuring the integrity of

the volumetric control, or emissions limit, imposed in order to satisfy the policy objectives of climate change mitigation.

After the policy objective of reducing emissions is established and it has been determined that this is most efficiently achieved by the implementation of an emissions trading scheme, the objective of the scheme should be kept as simple as possible in order to avoid compromising its efficiency. The singular objective of the scheme should be:

*To provide a transactional space that enables the transmission of permits to parties for whom they represent the greatest economic value.*

Generally, other policy objectives—be they economic, environmental or social—should be pursued through alternative policy instruments that operate alongside the scheme. However, other policy objectives will inevitably influence the key design features.

The necessary conditions for a smoothly operating emissions market are guided by five principles, set out in section 15.1.2.

An effective and efficient emissions trading scheme can be achieved if it is implemented in line with the above objective and the five guiding principles.

Successful implementation will result in observable outcomes, such as:

- low transaction costs
- price discoverability
- emergence of forward markets and other derivatives
- investor confidence
- low-cost mitigation spread over time in a way that minimises the present value of costs.

### **15.1.2** Guiding principles for scheme design

#### **Principle 1: Scarcity aligned with the emissions target**

Without a scarcity constraint, a market will not exist as permits will have no value and there will be no demand for them.

Where the scarcity of permits is uncertain, market participants will factor in risk premiums (if they suspect that the commodity will become more scarce) or risk discounts (if they suspect that the commodity will become more abundant).

#### **Principle 2: Tradability**

If market participants have no means by which to exchange a good, there can be no market. Tradability requires:

- clearly defined characteristics for the permit
- an unambiguous identification of the benefits a permit bestows on its owner
- the mechanism through which trade takes place
- a common understanding of the terms and conditions of trade.

While many platforms exist for trade, the most critical elements in designing a platform are:

- accessibility for those wanting to participate in the market
- ability to secure the exchange quickly and at minimal cost
- transparency of offer and bid prices.

### **Principle 3: Credibility**

Credibility, or faith in the enduring nature of the rules and institutions that define the emissions trading scheme, is essential for its ongoing success. Markets can quickly collapse if their credibility is shaken. This is all the more pertinent for markets that owe their existence solely to government decree.

As an emissions trading scheme exists entirely at the behest of government, market participants will be alert for any early signs of shifts in policy, management protocols or operating procedures that may undermine the integrity of the market. There may also be incentives to press for change if there appears to be a chance that the rules of the scheme can be influenced. Arbitrary changes to rules that benefit one party may come at the expense of financial interests of other market participants, or the community, or of the community's interest in the environment.

Reliable, steady and transparent operating rules are a necessary condition for the credibility of the market. These rules may need to be adjusted over time through reliable, steady and transparent processes.

### **Principle 4: Simplicity**

Simplicity requires that rules for the scheme should be easily explained and implemented. Rules should apply consistently; and special rules, concessions and exemptions should be avoided. Rules should be unambiguous and internally consistent. Where one rule necessitates the creation of another rule to ameliorate unwanted consequences, the first rule is probably suboptimal.

Compromises to the simplicity of the scheme should not be made lightly as they will inevitably result in increased uncertainty and transaction costs for market participants.

### **Principle 5: Integration with other markets**

An emissions trading scheme must be able to coexist and integrate with international emissions markets as well as with other financial, commodity and product markets in the domestic and international economies. This requires that there be no barriers to the appropriate transmission of information within and between markets.

If the scheme contains distortions that result in an emissions permit price that does not reflect its true scarcity value, this mis-priced market will adversely affect decisions about resource allocation by investors in other markets.

The converse is also true. Distortions in other markets may result in mis-priced outcomes in the scheme. However, the integrity of the scheme should not be compromised to compensate for distortions in other markets. Rather, policy makers should use the opportunity and insights gained from establishing the scheme to identify and correct distortions in other markets.

### **15.1.3 Exogenous factors**

The decisions made about particular scheme design features will depend on the broader conditions within which the scheme is established—the factors that are exogenous to the design of the scheme.

The first is the international and global context—what are other countries doing? Is there an international agreement (with narrow or wide participation) on emissions reduction? Without an international agreement, transaction and other costs will be extremely high, and the direct environmental benefits will be low. Australia, through domestic mitigation action and international diplomacy, can play a role in the emergence of an effective, international agreement (see Chapter 12 and 13).

The second is scientific and technological uncertainties. For example, uncertainties related to the measurement and verification of emissions can affect what sources are covered by the scheme, and how.

The third exogenous factor is the credibility of institutions—how much faith do participants have in the enduring nature of institutional behaviour in relation to the rules established at the outset of the scheme? The credibility of Australia's scheme will be influenced by the commitment of other countries to reducing emissions, as demonstrated by their actions.

## **15.2 The emissions trading scheme in operation**

### **15.2.1 The current context: an international agreement and Australia's strategy**

Building on the framework set out in section 15.1, this section identifies design features for an Australian emissions trading scheme in the absence of an effective international agreement.

Because a comprehensive global agreement is the longer-term objective in taking mitigation action, a domestic emissions trading scheme should support Australia in moving toward this ultimate objective.

### 15.2.2 Establishing the emissions limit set by the scheme

An emissions permit will enable the holder to emit a specified quantity of greenhouse gas—one tonne of carbon dioxide equivalent (CO<sub>2</sub>-e), once. The emissions reduction trajectory will determine the number of permits that can be released each year. The emissions allowed under the trajectory, over time, should sum to an emissions budget.

The emissions limit set under the scheme will be derived from Australia's economy-wide emissions limit. A number of trajectories should be specified when the scheme is established. The first, up to 2012, will be based on Australia's Kyoto commitments—Australia's existing emissions limit for that period. The trajectories for the post-2012 period would reflect increasing levels of ambition. Movement between them would be based on determining the comparability of Australia's response to international effort.

In its early years, the scheme will not cover all emissions. The emissions limit set will, therefore, need to take into account the treatment of non-covered sectors and emissions to ensure those covered by the scheme are achieving the mitigation necessary for Australia to achieve its overall emissions budget.<sup>3</sup>

If Australia's emissions trading scheme offers flexibility in the time of use of permits—through hoarding and lending—actual emissions could be above or below the trajectory at a given time, despite staying within the overall, longer-term emissions budget. The term 'lending' refers to transactions of permits between the independent authority and the private sector. The term 'hoarding' is reserved for net banking of permits by the private sector. If actual annual emissions (and use of permits) were above the level specified in international commitment periods (and if this were not made up by reductions in the non-covered sectors), the government could purchase permits in the international market to meet commitments.

In its supplementary draft and final reports, the Review will provide advice to government on budgets, trajectories and point-in-time targets for an Australian emissions trading scheme.

#### Changes to the trajectory and conditions under which these might occur

Measures can be put in place to minimise uncertainty about changes to the emissions reduction trajectory. First, a number of possible trajectories would be specified upon establishment of the scheme.

To ensure predictability, the conditions that would lead to movement from one trajectory to another would be specified in advance. If and when it was announced that the conditions had been met for movement to a tighter trajectory, five years' notice would be given.<sup>4</sup> There would be five years of firm caps, extended by one year, every year, and then a much longer trajectory of indicative caps, stretching out to 2050.

The framework of trajectories established in Chapter 14 is one in which there is an expectation that the trajectories will tighten over time. Within this framework the market would price in the possibility of the emissions budget tightening in future. This would be reflected in a higher forward price for permits, which would be likely to encourage hoarding of permits by participants and discourage the use of the lending provision.

### 15.2.3 Who will the scheme cover?

Coverage refers to the scope of the scheme in terms of greenhouse gases and sectors. Emitters in covered sectors will have an obligation to acquit permits under the scheme.

Coverage of the scheme should be as broad as possible, within practical constraints imposed by measurability and transaction costs. This is desirable in order to:

- provide an incentive for emissions reductions in all sectors according to lowest cost abatement opportunities
- maximise market liquidity and stability
- distribute the costs of the scheme in ways that minimise distortions in resource allocation
- facilitate integration with other markets.

The maximum number of anthropogenic greenhouse gases should be covered in the scheme. The Kyoto Protocol covers six key gases that contribute to climate change (see Chapter 3). The Review considers this coverage appropriate for the scheme, given current information, and scientific and technological constraints.

Australia's emissions are from the following sectors: stationary energy and transport; fugitive emissions from fuel production; industrial processes; waste; agriculture; and land use, land-use change and forestry.

The Review acknowledges that there are measurement difficulties and site-specific variability with fugitive emissions from coal mining and oil and gas fields (DCC 2008a). Overcoming these issues, with a robust methodology to estimate emissions, should be a priority, although proxy measures could be used in the interim.

The Review holds that a sector should be included in the scheme unless the costs of measurement and verification are prohibitive.

#### Costs

Costs of including a sector in the scheme may arise from a range of factors:

- **Uncertainties in emissions measurement**—in order for a sector to be covered by an emissions trading scheme, there must a reliable and accurate way to monitor, measure or estimate, and verify emissions from that sector. If the proxy or 'rule of thumb' applied is inaccurate, it can create distortions—

failing to reward good performers, and failing to penalise poor performers. Further, if accuracy improves and the proxy undergoes major change in the future, this could cause significant market shock. (However, if reliable and accurate proxies can be identified, that sector should be included.)

Emissions measurement is easier in some sectors than others, depending on the nature of emissions and activities. Emissions uncertainty varies between sectors.

- **Costs of developing accurate monitoring, measurements and verification arrangements**—for some sectors these arrangements are already in place; for others, establishing them may require a significant investment of finances and time.
- **Transaction costs of participation in an emissions trading scheme**—if emissions can be appropriately measured, it still may not be cost effective for all sources of emissions to undertake that measurement, or take on an obligation under the scheme. Consequently, thresholds would apply to covered parties—for example, electricity generators or waste facilities. Parties that are too small to be covered cost-effectively should be covered upstream or downstream, but may not have a direct obligation (see ‘Point of obligation’ below).
- **Trade exposure**—the lack of a global agreement means that there may be contraction of production among Australian trade-exposed, emissions-intensive industries if they are affected by the scheme, while their international competitors are not subject to a commensurate carbon constraint. There will be costs associated with correcting these distortions.

Many of these costs apply to the agriculture sector, and some also to the forestry and waste sectors. There is considerable potential for sequestering carbon through change in land and forest management and agricultural practices. However, full inclusion of agriculture and forestry in an emissions trading scheme will require issues to be resolved regarding measurement and monitoring of greenhouse gases. To a lesser extent, there are difficulties associated with coverage of emissions from waste, due to the variability of these emissions, and the timing of their release. Issues related to the coverage of agriculture and forestry emissions will be discussed in a more general treatment of the role of these sectors in the low-emissions Australian economy, in the final report.

The Review considers that inclusion of waste and forestry on the earliest possible timetable is desirable. It is achievable at reasonable cost early in the scheme’s life. Further analysis is required to assess the impact of including agriculture on the overall efficiency of the scheme. Its inclusion as a covered sector in the scheme is desirable in principle, but further analysis is required to determine whether it is the most cost-effective means of encouraging biosequestration and reducing net emissions from the sector. If a sector is not covered by the scheme, policies should be developed to drive net emissions

reductions from that sector, consistent with contributing to Australia's overall emissions reduction goal.

The treatment of forestry, agriculture and waste is of large consequence for the Australian and global mitigation efforts. Among the many implications are prospects for large-scale participation of Indigenous lands in the mitigation effort (NAISMA 2008). These matters will be discussed in detail in a chapter on the economic adjustment of agriculture and forestry in the final report.

By contrast, emissions from stationary energy, transport,<sup>5</sup> industrial processes and fugitive emissions from fuel production can be accurately measured or estimated at reasonable cost and could be covered by an Australian emissions trading scheme commencing in 2010. Depending on the nature of emissions and activities of covered sectors, their points of obligation may be different (see below).

Scheme coverage may also have implications for linking. For example, coverage of the agriculture and forestry sectors may present a complication to linking with the EU emissions trading market, at least in the short term, because of the European Union's reluctance to recognise land-use-related emissions units in trading. On the other hand, demonstration of credible inclusion would make the case for coverage of these sectors in others' schemes. It is highly desirable, indeed essential, that forestry and agriculture emissions eventually be covered by international agreements, and it is appropriate for Australia, as a country with an unusually large interest in these sectors relative to other developed countries, to improve international carbon accounting approaches in this direction.

### **Domestic offsets**

A reduction or removal of emissions from activities in one area of the economy can be used to counterbalance, or offset, emissions in other sectors. Emissions reductions in sectors not covered by the scheme could be eligible to create offset credits. Offset credits would generally be treated as substitutes for permits, and could be used by parties covered by the scheme to meet their obligations. Lower-cost mitigation from offsets can replace higher-cost mitigation options within the covered sectors.

Where coverage of a particular source of emissions is not considered possible, or viable, such activities may be able to provide offset credits. This approach may be suitable for sectors in which emissions from some sources and activities, but not others, can be measured or estimated. Partial coverage of a sector in the scheme could create intra-sectoral distortions; allowing these activities to create offset credits provides an incentive for mitigation, but avoids this risk of distortion.

Several issues need to be considered in relation to offsets. For example, an offset project should provide an emissions reduction that is additional to that which would have occurred anyway. If it did not, allowing a credit would actually

reduce the total national mitigation effort. This can be tested through several categories of additionality. For example, regulatory additionality would require emissions mitigation to be undertaken beyond what is undertaken to comply with existing legal or regulatory requirements. Such tests are arbitrary, and potentially a source of distortion, with the potential to undermine the credibility and scarcity principles of the scheme (see section 15.1.2).

Pending resolution of emissions measurement difficulties and its inclusion under the scheme, forestry is a potential source of domestic offsets. As reliable measurement rules of thumb are developed, carbon stored in wood products and biochar should also be reflected in carbon accounting and under the scheme. The increasing carbon content of growing forests should be brought to account; recent technological developments would seem to make that possible. Forestry offsets would provide an incentive for the sector to reduce emissions before it is covered under the scheme. The use of these offset credits should be unlimited.

The same approach could be applied to agriculture. However, given the magnitude and variety of difficulties associated with emissions measurement in this sector, it is worth investigating whether other policies may deliver greater emissions reductions, at lower cost, than an offset regime.

As a non-covered sector in the initial years of the scheme, waste should be considered for offset creation. The inclusion of waste raises issues requiring careful assessment. Ahead of being covered in the scheme, other policies to encourage mitigation in the waste sector should be pursued.

Section 15.2.7 discusses international offsets, and considers their role in an Australian emissions trading scheme.

### **Point of obligation**

The point of obligation is the point in the supply chain—from those who produce goods and services that involve the release of greenhouse gases to the atmosphere, to those who consume those products—at which monitoring and reporting of emissions is required for the purposes of the emissions trading scheme (see Box 15.1). These emissions must be accounted for under the scheme by acquitting permits equal to those emissions.

The point of obligation is determined by the ease and accuracy of monitoring and estimating emissions, and the cost of doing so.

There is no need for the point of obligation to be the same across schemes in different countries. Point of obligation should be chosen for what is most effective for local conditions in each country.

A natural starting point when considering the point of obligation is the emissions source. However, it may make sense to select another point of obligation when there is evidence that transaction costs are significantly lower at that point, or if accuracy of emissions measurement is higher or coverage would be substantially wider. There is a reasonably strong, although

not definitive, presumption that the source of emissions is the best point of obligation for stationary energy.

The possibility of allowing large energy users to opt in to accept an obligation for their (indirect) stationary energy emissions should be considered. This would require the generator to have the ability to track and net out that energy use. The existence of a power purchase agreement may support this option.

The point of obligation can be set at the facility level for oil and gas production, gas processing and fugitive emissions from coal mining. The point of obligation for pipeline system fugitive emissions could be placed on pipeline systems, as defined by operational control of the physical infrastructure, such as pipes, valves and compressor stations. Generally, industrial process emissions can be measured or estimated at their source.

Emissions from waste—primarily methane emissions from organic waste—could also be covered at source. This would allow emissions to be collected or measured with reasonable accuracy from the landfill facility or treatment plant.

By contrast, emissions from transport are released at a much smaller scale, by individual vehicles. For the transport sector, then, an upstream point of obligation may be a cost-effective way to cover a large number of smaller emitters. Many parties that produce fuel for the Australian market are located overseas, beyond the coverage of an Australian emissions trading scheme, so petroleum could logically be covered by making the point of excise the point of obligation. Large liquid fuel users, for example, fleets or freight operators, might be allowed to opt in to accept an obligation under the scheme.

A complication will arise where the relationship between fuel and emissions is not constant. For example, sometimes petroleum is used as an input in manufacturing processes (such as for plastics or petrochemicals), resulting in the release of few or no emissions. Where this is the case, such fuels sales would need to be netted out of an upstream party's obligation, or a credit system established so that producers could claim back the permit price passed through to their liquid fuel purchase.

In other cases, where practical difficulties interfere with measuring emissions at the source, a downstream point of obligation may be suitable. For example, under the New Zealand emissions trading scheme, a point of obligation further downstream is being considered for a subset of agriculture emissions—such as covering emissions from enteric fermentation and manure management through a point of obligation at the dairy or meat processor.

**Box 15.1 Emissions monitoring, reporting and verification**

The emissions trading scheme will require parties with an obligation to monitor and report their emissions to the scheme regulator. The system used to collect this information must be transparent, credible and efficient.

In September 2007, the federal *National Greenhouse and Energy Reporting Act 2007* was introduced.<sup>6</sup> This legislation will establish a national greenhouse and energy reporting system that will underpin the emissions trading scheme. Firms registered under the Act will provide information on their greenhouse gas emissions, energy production and energy consumption to the Greenhouse and Energy Data Officer. Those required to report will be facilities with over 25 kilotonnes of emissions, or production/consumption of 100 terajoules or more of energy in a given year. Thresholds have also been set at corporation level, and are to be phased in progressively during the first three years of the reporting system.

The system is in place from 1 July 2008, and the first year of reporting will be the 2008–09 financial year.

Data from the national greenhouse and energy reporting system should be the basis for making assessments about parties' obligations under the emissions trading scheme. However, additional data may be required, for example, in order to net out emissions from an upstream party's obligation.

Robust arrangements will also be required to verify emissions data.

### 15.2.4 Releasing permits into the market

#### Manner of permit release: auction or free allocation?

Governments can release permits by allocating them free to a range of potential recipients, selling them through a competitive process ('auctioning'), or a combination of the two. Whether a permit is sold or granted freely, the recipient will acquire the full economic and financial benefit it bestows because it is a scarce and valuable resource.

Ronald Coase (1960) demonstrated that economic efficiency will be achieved as long as property rights are fully defined, and that completely free trade of all property rights is possible.

The manner of permit allocation will not affect the operations of the scheme—the price of permits or the costs of adjustment to the scheme. The impact of an emissions trading scheme on the price of goods and services is independent of the approach adopted by governments for allocating permits (see Box 15.2). Whether permits are allocated freely or auctioned to existing generators, the impact on electricity prices—and consumers—will be the same. This is suggested by economic analysis, and has been demonstrated by the experience of the EU emissions trading scheme.<sup>7</sup>

Allocation of permits, however, will have large effects on the distribution of income (see Chapter 19). Costs and risks differ depending on the manner of allocation. Free permit allocation would be highly complex, generate high transaction costs, and require value-based judgments. If permits are to be freely allocated in part, or wholly, to existing emitters, a methodology must be developed for doing so. The most important aspect of this methodology would be the algorithm applied for distributing permits, which would require a baseline emissions profile against which an emitter's entitlement to free permits could be determined. There would be unavoidable arbitrariness in choosing a baseline.<sup>8</sup>

The definition of principles, collection and application of data, and resolution of disputes would be time-consuming. Indeed, it would seem to be impractical for Australia to administer a free allocation scheme in time for introduction of the emissions trading scheme in 2010. The complexity of the process, and the large amounts of money at stake, encourage pressure on government decision-making processes, and the dissipation of economic value in rent-seeking behaviour.

As well as having lower implementation and transaction costs, auctioning of permits is supported by the scheme design principles of credibility, simplicity and integration. Australia, with its well-established legal, regulatory and administrative structure, is in a favourable position for full auctioning of permits. This would maintain government discretion over the disbursement of the rent value of permits in the Australian economy in the most transparent and accountable manner. A sound auction design is important to avoid introducing new inefficiencies or distortions in the market.<sup>9</sup>

Revenue from the auction of permits will provide government with a tool to address the scheme's income distribution effects, and to offset market failures in the development of new, low-emissions technologies. The introduction of the scheme will be associated with many valid claims for increased government expenditure. Permit auction revenue will provide a means of meeting these claims, without placing pressure on public finances (see Chapter 19).

If payments are required for particular firms on efficiency grounds under the arrangements for trade-exposed, emissions-intensive industries, the amount of the payment would be assessed in cash. There would be no substantive implication if the government were to make the payment transparently in the form of permits of precisely equivalent value.<sup>10</sup>

Note that the method of permit release would be different during the transition phase (up to 2012), if permits were sold at a fixed price (see section 15.3).

**Box 15.2 Pass-through of permit value**

If a manufacturer is emitting as part of its production process and is required to purchase a permit via an auction, the cost will need to be recovered through the price received for the manufactured good.

Alternatively, if the manufacturer is granted a free permit, then it must decide whether the permit is of greater value if used or sold. If it is of greater value to use rather than sell the permit, the manufacturer will need to at least recover its opportunity cost. In other words, the recipient will need to attain value from the use of the permit at least as great as if the permit had been sold at the market price.

In such an instance, the manufacturer selling the domestic market in the absence of international competition faces the choice of either (1) continuing to manufacture (thus emitting greenhouse gases) and using its permits to acquit its obligation, or (2) selling some or all of the freely acquired permits, and reducing its production to a level consistent with its remaining permits. If the manufacturer decides to use rather than sell the permits, then it has forgone income. Therefore, the manufacturer will recover the price of every permit not sold by the income generated from continuing to produce.

It follows that the impact on the price of goods and services of pricing carbon through an emissions trading scheme is independent of the approach adopted by governments for determining the allocation of permits. Although the price impact is independent of the allocation method, the pass-through of permit price to the price of goods and services will depend on the competitive nature of the relevant market.

Studies of the power sector in certain countries under the EU emissions trading scheme indicate pass-through rates of between 60 and 100 per cent, depending on carbon intensity of the marginal production unit and other market or technology-specific factors concerned (Sijmi et al. 2006). There will be situations in which a firm will have to decide between passing through the cost of purchasing permits (or reducing emissions), risking a loss of market share, or absorbing those costs with a resultant loss in profit.

**Rate of permit release**

Permits should begin to be sold into the market as soon as possible after the full details of the scheme are finalised, and before the scheme commences in 2010. This will provide market participants with a guide to price before price figures directly in domestic market transactions. Emitting firms could ensure that they obtained necessary permits in advance of operation of the scheme. If the fixed-price permits are to be issued in the Kyoto period, some permits for use after 2012 should be sold into the market in small quantities from 2010. This will support the development of forward markets and provide guidance to market participants on future prices.

Auctioning will proceed on a fixed schedule—weekly, monthly, quarterly or on any other basis that suited market participants. The frequency and timing of auctions will have implications for business cash flows and corporate balance sheets. Some parties with an obligation, such as fuel companies, will be required to purchase permits for all emissions from their fuel. Fears about this financial risk have led some fuel companies to suggest that auctions should be as frequent as weekly. The Review expects deep market-supporting financial services to emerge quickly around the scheme, so that the market will be able to operate effectively across a range of frequency of auctions.

### **15.2.5 Financing purchase of permits**

In the consultations on the Review's Emissions Trading Scheme Discussion Paper, many firms expressed anxiety about cash flow problems associated with purchase of permits. The Review does not think that this will be an important issue in practice: an elaborate financial services system will develop for the financing of permit purchases prior to acquittal, and acquittal will be after receipt of revenue from sales in most cases.

To ease anxieties without distorting the system, the Review suggests a simple expedient for at least the early years of the unconstrained scheme.

The independent regulator could issue to emitters on request a number of deferred payment permits (taken from the release trajectory). For example some anticipated permit requirements over the next five years could be set aside for direct purchase at the time of acquittal. These would be issued up to a maximum proportion (say, one-third) of expected annual requirements—enough amply to cover permits for which corresponding sales revenue had not been received at the time of acquittal.

These permits would have the characteristic that payment for them could be made at the time of acquittal. The payment price would be the market price on the day of acquittal. The effectiveness and need for these special measures would be evaluated at regular intervals and they should be disbanded once they are no longer considered necessary.

### **15.2.6 Accounting issues**

Implementation of an emissions trading scheme will require resolution of issues relating to financial accounting standards and tax treatment, including:

- avoiding distortions between the purchase of emissions permits and other options for meeting emissions targets—that is, pursuing tax neutrality between purchasing a permit, undertaking capital expenditure to reduce or sequester emissions, investing in research and development or reducing production) (Prime Ministerial Task Group on Emissions Trading 2007)

- valuing permits, given that they are only valid once, but can be hoarded and loaned—how should a discount rate, or interest rate, be applied over time (Shanahan 2008)? The price of the permit will be rising over time—in ‘normal’ circumstances at the Hotelling rate—so that the interest rate, or the expectation of it, will be built into any lending transaction. The independent carbon bank may also choose to add a margin. Valuation will be on the basis of current market values (mark-to-market)
- recognition as income—a permit granted free to a trade-exposed, emissions-intensive enterprise would be treated as income.

### 15.2.7 International trade and links

The costs of any specified degree of mitigation can potentially be substantially reduced by international trade in permits. However, linking with an economy that has a flawed domestic mitigation system will result in the import of those flaws. Variations in the quality of mitigation arrangements across countries will make the decision to link with particular markets a matter for judgment. Ultimately, global mitigation will only be successful if countries can trade in emission permits. Opportunities for international linking of the Australian scheme should be sought in a judicious and calibrated manner. This section summarises the discussion in Chapter 13 on international trade in emissions as it applies to Australia.

Currently, opportunities for linking are limited, but are likely to grow. Because of the benefits of linking, the vision for the Australian scheme should be of a market that is fully integrated into global carbon markets.

The benefits of linking centre around the potential of international carbon markets:

- to reduce mitigation costs and price volatility
- to provide financial incentives for developing countries with opportunities for low-cost mitigation to take on commitments
- to make it easier to set and adhere to national emissions budgets
- to provide equal treatment or a level playing field for trade-exposed industries, through convergence of carbon pricing across countries.

Given the rapid growth of emissions-intensive industries in Australia, it might be expected that Australia will be a net purchaser of permits for some time. Linking opens the possibility of Australia remaining a large exporter of emissions-intensive products, to the extent that that is economically and environmentally efficient on a global basis, and balancing this with import of permits.

But linking also has risks. Since the Australian market is relatively small, if it is linked to other, bigger markets it will become a price taker. The price would be set by carbon markets in the European Union or the United States, Japan or

China should they develop and Australia link to them. This exposes Australia to risk from other countries' policies and market responses. Linking might lead to price volatility, for example due to external policy change.

There is a particular issue in relation to surplus eastern European permits from the Kyoto period. Some argue that the Russian permits and some others should not be purchased because they have not arisen as a result of mitigation effort. Future treaties would not be credible, however, if countries' targets are agreed to at the time of signature, but those countries are not allowed to reap the financial rewards if they exceed them. Pre-2012 purchases of such permits in Australia could be restricted to government, and not opened to the market.

From 2012 on, the following approaches are proposed in order to enjoy the benefits of trading while minimising risks. Note that separate approaches are required for trading in permit and offset markets, and for trading with countries that have an emissions cap but not a carbon market.

### **Linking with other permit markets**

Determining strategic and policy parameters for linking with other permit markets should be a role for the Commonwealth Government. The independent regulatory authority would certify individual permit markets as being of a suitable standard for linking. Certification would be periodic. If there were a decline in quality, then the certification could be revoked. Once a market was certified as being suitable then unlimited trading with that market—or more precisely, unlimited acquittal of permits from the overseas market—would be allowed. All private sector parties would be allowed to trade, and there would be no limits on the amount of overseas permits that could be acquitted in fulfilment of obligations under the Australian scheme, at the individual or the aggregate level.

In the initial stages, it may be a useful precaution to set a quantitative limit on aggregate permit purchases from certified international schemes. (The EU emissions trading scheme, however, envisages no such limit.) Any such limit would be applied in aggregate (to all certified permits). The limit would only apply in unusual, potentially destabilising circumstances, and so should be set high enough that it is not actually expected to be reached in a typical trading period.

When making its assessment, the independent authority would assess the compatibility of the market proposed to be linked with the Australian one. Both markets need to embed mutually acceptable levels of mitigation ambitions (or one market will undermine the other by pushing prices too low). They both need to have adequate monitoring and enforcement mechanisms. And they need to have compatible market rules—for example, on the unit of emissions, and potentially on lending and hoarding.

When making its assessment, the independent authority would also need to consider indirect links. If Australia were considering linking to one market, which

was itself linked to a third market, Australia would have legitimate reasons not to link to the second market if the rules governing the third market were not acceptable. Ultimately, the decision to link or not is within the gift of executive government, given the international dimensions.

In parallel, Australia should seek to strengthen international monitoring and enforcement, and to harmonise standards across markets. Deep integration with other markets (that is, joint regulation) should be sought where appropriate and where prospects for policy coordination exist.

Linking, and any resulting changes, would fundamentally affect the effect of the emissions limit under the scheme, and the functioning of the scheme. Therefore, advance notice of new links should be provided in the same way, and with the same period of notice, as a move to a different emissions reduction trajectory.

Decisions to cut links, or alter quantitative limits on acceptance of international permits, however, may need to be taken more quickly if market quality elsewhere deteriorates suddenly. As with the notice for change of trajectory, it would be open to the government to move more quickly in introducing the new trade opportunity, and to balance the revealed effects of the change on the domestic market by countervailing international permit sales or purchases.

Given Australia's close economic links with New Zealand, and common interests on greenhouse gas mitigation, linking or even deeper integration may make sense, if the New Zealand scheme is judged to be of sufficient integrity. New Zealand is moving quickly towards finalisation of its emissions trading scheme design. The Review suggests that, prior to the indelible conclusion of scheme design in either country, the Australian and New Zealand governments meet at ministerial level to discuss linking, and to identify any impediments to linking that may warrant adjustment to one or other or both scheme designs. Similarly, Japanese scheme design development will proceed over the next few years, and high-level consultations should take place to ensure that there are no unnecessary impediments to productive interaction. Proposals for phase 3 (post-2012) of the EU emissions trading scheme appear well designed. Australia should explore the possibility of trading with the EU scheme, although EU views on excluding forestry and agriculture from its scheme may be a problem for two-way linking in the early stages. Australia should seek, at a minimum, agreement with the European Union to accept EU permits into the Australian emissions trading scheme, thus making the EU permit price an effective ceiling price for the Australian market.

Building a regional market that encompasses (in the first instance) Papua New Guinea, other south-west Pacific developing countries, and—with greater difficulty and in the context of involvement by other developed countries—Indonesia, would also be desirable. Papua New Guinea and Indonesia have large opportunities to reduce land-use change and forestry emissions and to

quickly replace coal (Indonesia) and petroleum with low-emissions fuels. To be fully engaged, these countries would need to accept national emissions targets. Australia should be prepared to work with these countries within the international framework and, if necessary, outside it, to accelerate progress on mitigation, and to demonstrate new modes of cooperating with developing countries.

### **Permit trading by and with governments**

The Australian government could always trade directly with other governments and firms in other countries. This could be necessary in order to balance the actual emissions trajectory against Australia's national commitments under an international treaty. Such divergence could occur, for example, if Australia's international obligations were to change before its scheme's trajectory changed, or if domestic emitters chose to hoard or lend permits.

Trading through government gateways may also be necessary in purchasing permits from countries that take on recognised national targets, but do not have a domestic emissions trading scheme in place. The transition economies are currently in this category, and other developed countries may also decide not to implement emissions trading schemes domestically. Similarly, developing countries would be expected to be sellers of permits but are unlikely to have developed national emissions trading schemes. It is unclear how transactions with them will evolve, and therefore impossible to give precise guidance at this stage.

### **Linking with offset markets**

Offset credits arise when emissions are reduced in a country or sector not subject to an emissions limit. Under the Kyoto Protocol, international offsets can be created as certified emissions reductions under the clean development mechanism (see Chapter 13).

Linking with international offsets, for example by accepting certified emissions reductions created from clean development mechanism projects, raises different issues to the acceptance of international permits. This is because of the inherent flaws in the design of offsets (see section 13.3). One of the objectives of the post-2012 agreement should be a much smaller role for international offsets, with countries moving instead to national targets, which are in many instances one-sided. To encourage participation by low-income developing countries that do not yet have targets, provision should be made for international offsets, but with restrictions on the source and quantity of offset credits that can be used under the Australian scheme. If the role of the clean development mechanism is substantially changed or expanded after 2012, a re-evaluation would be needed of international linking in general, both to offsets and to permit markets.

The European Union has limits on the extent of the clean development mechanism for use in its emissions trading scheme, expressed in terms of a share of expected reduction effort (European Commission 2008).

We suggest that the limit on international offsets be a fixed proportion to Australian permits. This would provide greater investor confidence and simplicity.

It is simplest to enforce the limit on acquittal of international offsets (certified emissions reductions) in a centralised way, through the regulatory authority. The authority would auction a limited amount of supplementary permits, each one of which would allow the holder to acquit one clean development mechanism credit. Once attained, these international offset credits could be traded and used as other permits, in fulfilment of obligations under the scheme. The market price of permits to acquit a certified emissions reduction would reflect the expected differential between the price paid for certified emissions reductions in the international market, and the domestic permit price in the emissions trading scheme.

### 15.2.8 Flexibility in meeting targets

Demand for permits, and therefore the price of permits, will fluctuate over time with economic and seasonal conditions, changes in consumption preferences and technologies. Rigid adherence to annual targets would place large and unnecessary short-term adjustment strains on the economy.

This problem can be partially addressed by setting targets spanning several years, as the Kyoto Protocol has done with its 2008–12 compliance period.

International trade in permits can also provide flexibility in matching the rate of permit use with domestic permit release schedules.

Other options for helping smooth permit prices, and helping parties meet obligations, including price controls and inter-temporal flexibility in the use of permits, are discussed below.

#### Price ceilings and floors

The disadvantages of price controls include the unreliability of emissions reductions in relation to targets, the exclusion of international trade in permits, the possibility of setting the price control at an inappropriate level, and the fact that it transfers risk to government (or its agency) from the private sector.

For the normal operation of the scheme, the costs of including price ceilings or floors outweigh the benefits. The specific advantages of a fixed price during the last years of the Kyoto period, 2010–12, are discussed in section 15.3.

#### Inter-temporality

The approach to setting emissions trajectories and budgets outlined in section 15.2.2 suggests an alternative and less problematic means of introducing flexibility in the face of fluctuations in demand for permits.

Permits are designed to allow the holder to emit a given unit of emissions, once, at any time throughout the scheme. Hoarding of permits by the private sector and lending of permits by the authorities within prudential restrictions can introduce flexibility without breaching emissions budgets. This helps to minimise volatility in permit prices and allows market participants to use permits at the time when they have greatest value. This inter-temporal flexibility would cause market participants to see the issue as one of optimal depletion of a finite resource. Optimisation over time would see the market establish a forward curve rising from the present at the rate of interest, forcing increasingly deep emissions reductions, in an order that would minimise mitigation costs.

Lending by the independent regulatory authority allows parties to use permits from the future— ahead of their scheduled release according to the trajectory— to meet current obligations.<sup>11</sup> Of course, the loan must be later repaid. The independent regulator would undertake prudential monitoring of the level of lending. It would place restrictions on the amount of lending if it became so large as to raise questions about the current or future stability of the market. Such restrictions on lending could be applied in terms of:

- Time—given the plan for the permit release trajectory to be fixed for five years, and the same period of notice to apply before major changes are made to scheme operations, permits should not be loaned for a period exceeding five years.
- Quantity—the independent carbon bank should lend amounts it believes will not destabilise current or future market.
- Eligibility—borrowers must be creditworthy. Criteria determining creditworthiness should be applied and communicated, so participants have a clear understanding of the likelihood of being eligible to borrow. Financial intermediaries would provide opportunities for others to borrow, at a higher price.

**Box 15.3** Minimising risks associated with lending

Recent commentary has suggested that inter-temporal flexibility in the use of permits, and in particular lending, might affect the overall timing of mitigation—and delay mitigation—in a way that was environmentally disadvantageous; that it might breach international commitments on emissions reduction targets; and that it would lead to breaches of emissions budgets if loans of permits were not repaid.

On the potentially adverse effects of delayed mitigation on the environment, the multiple emissions trajectories proposed by the Review would create a bias towards hoarding of permits by participants and away from lending.<sup>12</sup> The initial budgets would be looser than the budgets that were expected to succeed them. The market would therefore tend to price in some probability of budget tightening, so that future prices were higher than those that would probably emerge from confident expectations that budgets would remain at their current severity. Such expectations would be likely to encourage hoarding.

The Review considers that, with the five-year limit on term of lending, environmental impacts due to variations in timing of acquittal of permits are not likely to be a material consideration. Such short-term lending is akin to smoothing, and would not be expected to have any global environmental impacts. This lending arrangement is similar to the five-year Kyoto commitment period and the five-year carbon budget approach in the UK Climate Change Bill. The Review's approach formalises the mechanisms by which participants can borrow, and has a five-year rolling, rather than fixed, period within which lending can occur.

In the context of international agreements on targets and trajectories, any unlikely strong tendency towards net lending in Australia would be accompanied by a requirement to buy permits abroad to meet commitments on emissions reductions. As a result, delays in reductions of emissions in Australia would be balanced by acceleration of reductions elsewhere.

On the suggestion that loans may lead to a blow-out in the emissions budget because they may not be repaid, this is a matter of governance. The authorities would need to ensure that loans of permits were made only to creditworthy borrowers, that they were backed by security, and that contracts were enforced—just as they would have to ensure that emissions were backed by permits.

Loaned permits should be repaid when the loan becomes due. The value of the permit at the time of repayment would generally be higher than at the time of lending, and participants would factor in that cost. Further, the independent regulatory authority could also apply an interest rate to cover risk and costs. The interest rate would be raised at times when the authorities judged it prudent to reduce the amount of lending.

## **15.2.8 Addressing distortion in trade-exposed, emissions-intensive industries**

### **A truly dreadful problem**

A potential distortion arises if an Australian emissions trading scheme is introduced in the absence of, and until such time that there is, an international arrangement that results in similar carbon constraints or carbon pricing among major trade competitors (as discussed in Chapter 13). If firms in the traded sector were subject to a higher emissions price in Australia than in other countries (which as price takers they were unable to pass through), there could be sufficient reason for emissions-intensive activity to relocate, in part or in whole, from Australia to countries with lesser constraints on emissions. In the worst case, this could result in carbon leakage.<sup>13</sup>

The concern arising out of differences in carbon constraints amongst our trade competitors is not that some Australian firms may reduce their level of production. Rather, the concern is that some firms may reduce their level of production too far—that is, beyond the level that would eventuate if competitor countries were subject to commensurate carbon constraints.

The risk to the Australian economy from this overshooting includes the consideration that once productive capacity is lost, the effect may not be reversible at a later stage when a carbon-inclusive world price eventuates in the relevant commodity and goods markets. (The overshooting problem is explained further in 15A.)

Therefore, under certain circumstances, there are environmental and economic reasons for establishing special arrangements for emissions-intensive industries that are trade-exposed.

Australia is not alone in facing distorted investment and production decisions in trade-exposed, emissions-intensive sectors in the absence of a global agreement. No jurisdiction (whether supra- or sub-national) is comfortable about subjecting its export- and import-competing industries to an additional tax on inputs when its current or potential trade competitors are not willing to take corresponding policy measures.

The dilemma facing policy makers is even more acute in relation to new investment by trade-exposed, emissions-intensive industries—investments that, but for the Australian permit price in the absence of a global price, would be attractive. Such investments could potentially lead to notable increases in domestic emissions. With a fixed supply of permits available, this would drive up the carbon price and increase the adjustment burden on other businesses and households. In Australia's circumstances, the additional costs on other firms and households could be high. They would be higher still to the extent that trade-exposed industries were 'protected' from the competitive effects of the carbon constraint.

In recent public debate and commentary, it has been apparent that industries will seek to influence the design of any such assistance arrangements in ways that maximise their respective returns from the scheme. This is to be expected. It also signals the scale of the challenge faced by policy makers in not succumbing to special interests.

The dreadful problem of trade-exposed, emissions-intensive industries facing Australian policy makers has the capacity to destabilise support for the emissions trading scheme. This problem is exacerbated by the resource boom of the Platinum Age (Chapter 4), which is driving expansion in some of our most emissions-intensive industries.

These are truly dreadful problems for every nation's emissions trading scheme in the absence of a global arrangement. Indeed, the dilemma created for individual governments is so great that it has the capacity to pervert individual domestic schemes to the point of non-viability. The sum consequence of the compromising of individual schemes could leave the world with little chance of avoiding dangerous climate change.

In the era of global trade, it takes only a handful of non-compliant countries—large or small, developed or developing—to drive all other countries to implement policies that significantly compromise the overall objective of reducing emissions.

However, there are options that may avoid this destabilisation and descent into ineffective global action before a binding, comprehensive international agreement has been struck.

### **Taking a multitrack approach**

Australia may well have more to lose than any other country from an internationally fractured and partial approach to dealing with trade-exposed, emissions-intensive industries. The immediacy of this problem means that Australia must simultaneously pursue three potential options for solving this problem. This is not an 'either/or' choice. All options must be pursued simultaneously. Two of the options rely on international agreements while the third is a domestic arrangement. In order of preference, these options are:

- a comprehensive global agreement on mitigation under which all major emitters have national emissions limits (see chapters 12 and 13)
- effective sectoral climate change agreements for trade-exposed, emissions-intensive industries placing particular industries on a more or less level playing field. These agreements may require backing by a World Trade Organization agreement on border adjustments (see Chapter 13)<sup>14</sup>

and, as a last resort:

- domestic assistance measures for our most exposed industries that address the failure of our global competitors to act on limiting their carbon emissions.

Alongside the negotiation of a global agreement, the negotiation of sectoral agreements in priority areas for Australia (including metals, liquified natural gas (LNG), cement, and sheep and cattle products) must be an urgent and an immediate trade policy priority for the Commonwealth Government. We will need to step into a global leadership role as far as sectoral agreements are concerned.

But timely success is not assured. Contingency planning for the third option is also required.

In designing a domestic assistance arrangement, an important distinction must be made. Providing assistance to address the failure of our global competitors to act on limiting their carbon emissions is not the same as compensating domestic firms for the government's decision to implement a domestic emissions trading scheme.

The case for government intervention to support trade-exposed, emissions-intensive industries is made on the grounds of economic and environmental efficiency, that is, the overshooting and carbon leakage problems. As discussed in Chapter 14, there is no basis for compensation arising from the loss of profits or reductions in asset values following the introduction of the domestic emissions trading scheme.

Assistance should be provided in order to avoid a temporary loss of real production until our global competitors act to limit their greenhouse gas emissions. The assistance program should be designed with a view to the long-term comparative advantage of the Australian economy in a world of comprehensive carbon constraints, while at the same time not transferring a disproportionate share of the emissions reduction task to other businesses or households.

### **Domestic assistance arrangements for trade-exposed, emissions-intensive industries**

Assistance measures addressing the overshooting problem should seek to ensure that production by trade-exposed, emissions-intensive industries does not fall below the level that would eventuate had international agreements been in place. This implies the following definition of the appropriate level of assistance:

Assistance received by a firm	=	Expected uplift in world prices of the relevant good or commodity	×	Expected level of production by the firm in the event of the new world price
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The effect of these assistance measures is demonstrated in 15A.

The assistance payments should be made contemporaneously with firm sales. Calculation of the expected uplift in world prices, while requiring estimation applying appropriate global models, is not inherently difficult.<sup>15</sup> It will

require the administering authority to have substantial analytic capacity, and to adopt transparent simplifications that can be revised in the light of experience and criticism. However, scheme administrators are at a significant informational disadvantage in trying to assess the hypothetical level of production by individual firms in a world of comprehensive carbon pricing. This is a problem of information. The information problem is exacerbated by information asymmetry.

A less principled starting point for calculating assistance might therefore be thought necessary, in a period prior to establishment of the mechanisms required for principled and rigorous assessment. This would be at the cost of introducing a degree of arbitrariness into the design of the assistance regime. Arbitrariness inevitably introduces complexity, higher transaction costs and reduced efficiency of the assistance regime. If the simplifications to the approach are nevertheless thought to be attractive, it is important that they still:

- ensure that assisted firms continue to have an incentive to pursue lower-emissions opportunities in accordance with national policy to reduce greenhouse gas emissions
- reward firms that are already advanced in reducing emissions by providing assistance at a similar rate to all firms in an assisted industry, whatever their current emissions profile, and whether they are new or established
- encourage the commencement of an adjustment process within trade-exposed, emissions-intensive industries towards a future reality in which they will be competing on the basis of their carbon-inclusive comparative advantage.

The emissions intensity and trade exposure of industries must be assessed against rigorous materiality thresholds. Failure to do so would lead the scheme quickly to become administratively unmanageable and invite pressures on the political system, as the openness of the Australian economy means that many firms have some level of exposure to international markets, directly or indirectly.

Materiality thresholds must be calibrated so that only industries that are at genuine risk of large, excessive reductions in domestic production, are eligible for assistance.<sup>16</sup> While the definition of 'large' is ultimately a matter for judgment, it must be defined in a mind that is aware of normal, cyclical fluctuations in operating conditions. This will be examined in the light of the modelling results.

It is also necessary to identify at which point in the production chain the eligibility criteria are applied. Often value is added further down the production chain, but at a lower level of direct and indirect emissions intensity. For example, the production of steel and iron ingots is far more energy-intensive than the processes that prepare product for use. For practical as well as principled reasons, the process rather than the industry is the relevant basis for assessment of assistance. Unless circumstances overwhelmingly dictate otherwise, the process should end with an internationally tradable product.

It is the value of direct and indirect emissions associated with value added that should form the basis of the eligibility criteria for assistance. However, difficulties in calculating value added on a process basis argue for substitution of sales revenue with a corresponding adjustment to the industry threshold ratio.

Industry threshold ratio (eligibility for assistance)	=	Value (\$) of direct and indirect emissions from industry	÷	Sales revenue (\$ by process)
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The threshold ratio would be set at a level above which the industry impost from the permit price would represent an unreasonable shock relative to other vagaries of internationally oriented business. Payments would be made for permit costs in excess of the threshold.

Chapter 9 suggested that under a reasonable set of assumptions about the threshold ratio and the permit price, only a limited number of industries might clearly satisfy the emissions intensity eligibility criteria. As the permit price rises, they may include—assuming an economy-wide emissions trading scheme—aluminium smelting, cattle and sheep products, cement production, and iron and early stage steel manufacturing.<sup>17</sup>

The Review considers that considerable investment must be undertaken in developing the capacity required to implement, a principled and rigorous system for assistance. As outlined in section 15.3 this capacity may only be required from 2013, if there is a transition period with a fixed permit price.

Assistance payments would be made as closely as possible to contemporaneously with the timing of acquittal obligations.

For those firms eligible for assistance, whether payments were provided as cash or free permits is immaterial, so long as the cash-equivalent of permits is calculated precisely at the time of payment. If used as the form of payment, permits would be drawn from the relevant year's release schedule for permits. Under such circumstances, recipients of free permits would have no greater or lesser incentive to hoard permits for future use than any other market participant.

### **General business tax cuts and payments to trade-exposed, emissions-intensive industries**

Materiality tests and algorithms for assistance payments will to some extent be arbitrary and will impose some degree of deadweight loss on the economy. Policy makers can be expected to encounter extreme pressure to err towards generosity. This poses genuine risks to the credibility of the entire emissions trading scheme:

An overly generous threshold will make administration of the scheme prone to a large degree of discretion by officials.

The more firms that are eligible, the more expensive (and expansive) scheme administration becomes and the greater the incentives for firms to divert resources towards extracting rents from government, rather than investing in emissions savings and profitable business operations.

If the eligibility criteria are set too generously, the burden of emissions reductions will be shifted elsewhere in the economy.

This is not to say that firms that do not meet the eligibility criteria would not encounter some cost impacts (direct and indirect) from the introduction of the emissions trading scheme. However, governments simply cannot efficiently administer, and the community cannot afford, a firm-by-firm assistance scheme that effectively addresses this impact at such an atomistic level of application.

A more efficient and effective option would be for government to form a view on the appropriate total level of payments to trade-exposed, emissions-intensive industries, and to recycle that part of these payments that is not committed to firms that exceed the threshold, into broad-based efficiency-raising tax reductions to the corporate sector. The Review suggests that a total commitment of up to 30 per cent of permit value might be justified. That would be tested as data becomes available to the regulatory authority. Detailed advice on tax reductions could be provided within the Henry tax review. While this approach sacrifices the precision of targeted assistance schemes, well-designed tax relief has the potential to reduce rather than increase the deadweight loss incurred by the economy. Obvious candidates for reduction or abolition would be input-based or transaction taxes, which are highly inefficient. Any such tax cuts should be ongoing not transitional.

The inherent arbitrariness of any assistance measures will make them the subject of intense scrutiny and lobbying by special interests. Yet there will be no counterbalancing representation arguing against the lowering of the materiality thresholds—even though doing so inevitably shifts the burden onto others in the economy and community. Policy makers will stand alone in having to resist the temptation to appease narrow interests.

### **Timing issues**

Despite their importance, global and sectoral agreements will not be in effect in 2010 when the Australian emissions trading scheme begins operating. The Review judges that, given effective Australian leadership and diplomatic commitment, there are reasonable prospects for international sectoral agreements for carbon pricing to be in place by the end of 2012, at least for some of the resource-based industries in relation to which the Australian economy would be at greatest risk.

## 15.2.9 Governance and compliance

### Institutional arrangements

Scheme governance has large implications for the efficiency, stability, credibility and simplicity of the scheme. New institutions will be required to operate and regulate the emissions trading scheme.

Some of these functions are of a kind that are the indelible prerogative of government. These include decisions about establishing the scheme—setting the emissions limit, and providing assistance to those whose incomes are reduced by the introduction of the scheme (for example, structural adjustment assistance, and payments to low-income households). Government will undertake policy functions, as distinct from an administrative role.

Legislation of key features of scheme design, such as the permit release trajectory, can assist stability—particularly in the Australian situation of qualified government control of the legislative process.

The administrative content of several of the governance functions is of a kind that lends itself to independent administration, particularly due to the large amounts of money associated with administrative decisions (for example, payments to trade-exposed, emissions-intensive industries). Government would be under pressure from particular interests to favour them in administrative decisions. As with the customs and taxation functions, there is an advantage in delegating administrative judgments to an independent entity.<sup>18</sup>

The Review suggests that the administration of the emissions trading scheme be made the responsibility of an independent authority—the Independent Carbon Bank—established with a high degree of executive independence in the exercise of its powers. The closest analogue is the Reserve Bank of Australia. As with the Reserve Bank, the powers of the independent authority would be defined by legislation and by agreement with government. This same legislation would define the way in which government would exercise its policy responsibilities in relation to the scheme, and the obligations of private parties in relation to emissions and the need for permits.

The distinctive roles of government and of the proposed Independent Carbon Bank, are summarised in Table 15.2.

**Table 15.2 Governance of an Australian emissions trading scheme**

Functions of scheme governance	Policy—government responsibilities	Implementation—independent authority responsibilities
<b>Emissions trading scheme rules</b>	All, including coverage, point of obligation, and compliance (for example, setting the penalty). Broad offset rules and standards.*	
<b>Setting emissions limit</b>	Decide—and announce—the initial budget and trajectory, and the nature, extent and timing of changes to the budget and trajectory.	Administer movement from one emissions trajectory to another, when government has certified that the conditions of change have been met.
<b>Permit issuance and compliance, and use of revenue from permit sales</b>	Determine manner of permit issuance and setting fixed prices for permits from 2010–12. Set requirements for acquitting permits, and set penalties. Receive revenue for general allocation under formula.† Decide on the use of permit revenue.	Release permits in line with emissions trajectories established by government. Purchase permits abroad as required to reconcile domestic emissions in particular years with international agreements or to provide for the honouring of the five-year forward commitment after a change in trajectory. Enforce compliance.
<b>Trade-exposed, emissions-intensive industries</b>	If domestic assistance is required, set policy for eligibility. Negotiate global agreements and encourage effective sectoral agreements.	Assess eligibility and make payments.
<b>Use of permits and cost containment. Hoarding and lending, and supervision.</b>	Set broad policy on hoarding and lending.	Make decisions on lending and interest rates, supervision of market participants and stabilisation interventions. Monitor the creditworthiness of borrowers, and more generally the relationship between hoarding and lending and the stability of the market.
<b>Enforcement of trade rules</b>	Establish international trade agreement and rules for international linking.	Monitor trade, certify that conditions have been met in particular cases; purchase international permits to reconcile domestic and international obligations (for example, to meet a 2020 target).
<b>Market supervision</b>		Monitor integrity of market and transactions in the market, for stabilisation purposes.

\* There should be independent, expert review, amendment and approval of offset protocols and offset projects.

† Revenue would come from sale of permits, interest on loans of permits and profits from stabilisation interventions (losses a sign of counterproductive intervention and to be accounted transparently). The formula would leave the Independent Carbon Bank sufficient income to cover the costs of its overhead, plus monitoring and enforcement of the system, including international permit purchases that are necessary to meet international obligations.

### **Penalties and make-good provisions**

If a party with an obligation under the scheme fails to surrender permits equal to its emissions during a given compliance period, a penalty could apply—as a punitive measure rather than as an alternative form of compliance.

In a domestic emissions trading scheme, a penalty is required to drive compliance with the national emissions limit. Compliance would be enforced for:

- acquitting insufficient permits to match actual emissions
- failing to repay lent permits.

In case of non-compliance, a financial penalty would apply. It would need to be high enough to discourage non-compliance and to avoid it becoming merely a price cap.<sup>19</sup>

To ensure the integrity of the emissions limit and credibility of the scheme, financial penalties would need to be accompanied by a make-good provision applying to the non-compliant party that requires them to acquire and surrender an additional quantity of permits sufficient to cover (make good) these excess emissions, for example, in the next compliance period.

### **Scheme reviews**

The emissions budget or trajectory may change over time in response to international developments.

Over time, adjustments may be made based on experience of the scheme in operation.

The Review considers it appropriate to hold the first evaluation two years after scheme commencement.

A minimum period of notice should be provided before changes to the scheme are implemented. Any changes that affect the supply constraint, or the fundamental operations of the scheme, should be implemented only after five years' notice. Conditions under which changes would be made should also be detailed ahead of scheme commencement. This approach should apply to rules for international linkages and acceptance of international permits and offset credits, as well as for scheme trajectories.

## **15.3 Transition period: Australia's emissions trading scheme to the end of 2012**

### **15.3.1 Limiting scheme adjustment pressures to 2012**

There has been some discussion of whether there should be a 'transition period' in the early years of the scheme, in which a maximum price is placed on permits.

Chapter 14 discussed the problems of price caps and floors, in general, and concluded that they should not feature in long-term arrangements. Flexibility to avoid short-term spikes in price could be achieved through a combination of multi-year targets, international trade in permits, and hoarding and lending of permits.

Is there a case for fixed prices or price limits in a transition period?

It will be crucial that an unconstrained market system operate from early 2013. To be a credible party to international negotiations on the post-2013 arrangements, Australia must be in a position firmly to deliver on emissions reduction commitments that it makes. Minimisation of costs of achieving emissions reductions targets requires trade with other credible emissions trading systems, which would be precluded by price caps or floors.

Is there a case for price controls in the remainder of the Kyoto period, to the end of 2012?

An opportunity for treating 2010–12 differently from subsequent years arises out of the combination of Australia being more or less on track to meet its Kyoto targets, and now from the high energy prices in global markets leading to reductions in Australian energy use. Australia would be likely to meet its Kyoto targets with a relatively low permit price in the early years.

If this course were to be followed, it would be necessary to separate the markets for permits before and after the end of 2012. In particular, it would be necessary to stop the hoarding of permits acquired in the period of price controls, for use after 2012.

There is one way of placing high limits on the price that would not require separation of the pre- and post-2012 periods. This would be through the acceptance from the beginning of permits from a large, deep emissions permit trading system. The European Union's scheme is the currently available candidate. If European permits were accepted for acquittal of Australian scheme obligations from the beginning in 2010 this would set a maximum price at the European level. Such a price limit would be consistent with full and unconstrained operation of the scheme from the beginning, including full integration of pre- and post-2012 arrangements.

If a lower domestic price were sought for the transition period, it should take the form of a fixed price rather than a price cap since it is possible that Australia will overperform on the Kyoto targets even with a low carbon price. There is a good chance that, in the absence of hoarding of permits for later use, the price of permits would be zero or close to zero. A period of derisively low prices would be damaging for the credibility of the scheme in its formative years. A fixed price to 2012 would need to be accompanied by sale of post-2012 permits from the time that full details of the scheme had been articulated. This would be important to provide guidance on post-2012 market pricing, and to establish the credibility of post-2012 arrangements.

Is there a case for a transitional period with a fixed price, rather than immediate movement to the unconstrained scheme?

Many business submissions to the Review argued for low prices in a transition period, to reduce uncertainty about effects on costs while firms learned how the system worked.

A low fixed price would greatly reduce and, depending on the price and other factors, may obviate the need for payments to trade-exposed, emissions-intensive industries during the transition period. This would be a large advantage, allowing time for diplomacy to work towards establishing satisfactory sectoral agreements.

The disadvantages are also considerable. The process of learning the operations of the new market, and building the financial institutions and instruments to support it, would be somewhat delayed. Some uncertainty may be introduced about the credibility of post-2012 arrangements. The use of some fruitful opportunities for low-cost early abatement would be postponed—increasing the cost of meeting more demanding post-2012 trajectories.

On balance, the Review favours direct movement to an unconstrained system, with European Union permits being available for acquittal of Australian obligations if the necessary international understandings can be secured. Nevertheless, the Review recognises the advantages as well as disadvantages of a transition period with fixed prices to the end of 2012, and sees this as a legitimate second-best approach.

## **15.4 Optimal design features of an emissions trading scheme under a global agreement**

The emergence of a comprehensive global agreement on emissions reduction would realise the central objective of Australian mitigation policy.

Such an agreement would change the context for Australian policy fundamentally. Australia would be required to honour its contingent commitment to move to a tighter emissions reduction trajectory.

**Table 15.3 Key design features during a fixed-price transition period**

Design decision	Transition — 2010–12
<b>Setting an emissions limit</b>	<p>Australia's focus for the period to 2012 will be meeting its economy-wide emissions reduction target, established by its Kyoto commitment, reducing emissions in certain sectors according to a specified trajectory.</p> <p>It is likely to be easily met with a low, fixed price for permits. Overperformance on emissions reductions may allow issue of additional permits in the first post-Kyoto period. Any underperformance would be met by official purchase of international permits.</p>
<b>Domestic offsets</b>	<p>Acceptance of domestic offset credits would be allowed, noting that purchase of credits would be expected to occur only up to the value of the fixed permit price.</p>
<b>Issuing (or releasing) permits</b>	<p>Permits to be released according to demand, rather than in line with the emissions reduction trajectory.</p> <p>Permits to be sold at a fixed price, rather than being auctioned.</p>
<b>Trading permits</b>	<p>Trading of permits would be allowed, but unlikely to occur—parties could buy a permit at any time at a fixed price, and permits would not appreciate over time, so parties would be likely to leave purchases until close to the end of the compliance period.</p> <p>During the period 2010–12, there should also be some forward trading of post-2012 permits (to be acquitted post-2012). This will help establish futures markets and provide a guide to permit prices post-2012.</p>
<b>International linkages</b>	<p>During the period to 2012, acceptance of international permits and credits would be allowed (subject to limits outlined above) but would not occur unless the price of certified emissions reductions and international permits were less than the fixed price permit in the Australian scheme.</p> <p>Government may purchase international permits or offset credits to meet its Kyoto commitment if Australia's national emissions exceed its target.</p>
<b>Inter-temporality</b>	<p>There should be no hoarding or lending outside the period (post-2012). Similarly, hoarding and lending would not be expected within the transition period. Since permits have a fixed value over the period, there would not be an incentive to save or to bring forward permits, so long as a participant had the correct number for compliance.</p>
<b>Treatment of trade-exposed, emissions-intensive industries</b>	<p>Global and sectoral agreements should be pursued as a priority.</p> <p>During the transition period, price impacts should generally stay below reasonable thresholds, thereby limiting or entirely avoiding the need for assistance to trade-exposed, emissions-intensive industries.</p>
<b>Compliance and penalty</b>	<p>The aim of compliance in the transition period is for parties to acquit permits equal to their actual emissions.</p> <p>A penalty would apply for failure to surrender sufficient permits.</p> <p>A make-good provision would not apply.</p>

The tightening budget and trajectories in themselves would be challenging. The extent of the additional challenge would depend on the content of the international agreement. However, associated changes in the environment for mitigation policy would be helpful to Australian adjustment, and the expansion in the opportunities for trade in permits would reduce the costs of mitigation. The realisation of an international agreement would remove a negative influence on credibility: up to that point, critics of the Australian scheme could claim that the absence of a comprehensive global effort meant that the adjustment costs being borne by Australia were not buying a solution to the climate change problem.

Under the approach suggested in section 15.2.2, the government would give five years' notice of a change in trajectory. This would provide a cushion against immediate additional adjustment pressures. In any case, the move to the more constrained permit release trajectory would have been anticipated to some considerable extent in the market. Spot and forward permit prices for some time, and perhaps from the beginning of the scheme, will have embodied a positive probability of the change occurring. The associated higher permit prices will have encouraged hoarding of permits, which would provide another cushion for the immediate adjustment.

The authorities would need to cover any gap that emerges between permit use (actual emissions) and international commitments during the five-year notice period of a changed trajectory. This could be covered by purchase of international permits through the use of funds accumulated for the purpose. If a large tendency towards hoarding within the private sector had caused earlier permit use (and emissions) to remain below previous levels of international commitment, this would reduce the need to purchase international permits.

Distortions associated with the lack of emissions constraints or pricing in major competitor countries would be addressed by a global agreement on emissions mitigation. Payments to trade-exposed, emissions-intensive industries, were they to be in place, would fall away without explicit change of policy or institutional arrangements.

Opportunities for trade in permits are likely to have expanded gradually during the years leading up to a comprehensive global agreement. The trade-off between domestic autonomy in scheme arrangements and gains from international trade in permits will have moved strongly towards the latter. With a greater number of countries accepting binding targets, international offsets should play a smaller role.

Governance of the emissions trading scheme will be simplified by international agreement; much less intervention will be required. After the five years during which permit release continues on an agreed trajectory, and perhaps before the end of that period, the balancing of external commitments against rates of domestic permits release will be undertaken mainly through private international trade. The deeper, more mature international markets for permits are likely to be

more stable than national markets, so the need for official stabilising intervention in the market in Australia will be reduced

The successful operation of an Australian scheme in more difficult times—before an international agreement—will provide confidence in the challenging new mitigation environment. Evidence that substantial adjustment to a low-emissions environment had been achieved without economic dislocation would inspire confidence to face the adjustment challenge ahead.

## Notes

- 1 The National Emissions Trading Taskforce was established in 2004 by state and territory governments. The officials of the taskforce submitted its final report to the Garnaut Review, *Possible Design of a National Greenhouse Gas Emissions Trading Scheme: Final framework report on scheme design*, without endorsement from governments, in March 2008. The Prime Ministerial Task Group on Emissions Trading was established in December 2006. Its report was published in May 2007.
- 2 The Emissions Trading Scheme Discussion Paper, and stakeholder submissions received in response, can be viewed at <[www.garnautreview.org.au](http://www.garnautreview.org.au)>.
- 3 It will be important to implement measures to drive emissions reductions in the non-covered sectors ahead of their inclusion in the scheme, to ensure that the task of achieving an economy-wide emissions reduction target is not borne solely by sectors covered under the scheme.
- 4 Note that to provide confidence about forward prices, information should also be provided to participants about any other changes to the scheme that would significantly affect the scarcity constraint imposed by the scheme budget. For example, details should be provided about the acceptance of international permits or offset credits, and links to other countries, and the conditions under which such arrangements may change (see section 15.2.7).
- 5 Domestic and civil aviation and sea transport should be included, with trade-exposed, emissions-intensive industry principles applied if appropriate. Bunker fuels, which are used in international aviation and shipping, are not covered by the Kyoto Protocol or included in countries' emissions targets (Article 2.2). The European Union, subject to final agreement, will include emissions from domestic and international aviation—operators of all arriving and departing flights—from 2012 (flights within the European Union are to be covered in 2011) (European Commission 2008). A sectoral agreement between international transport providers, such as a global fuel tax, should be pursued as a priority (see Chapter 13).
- 6 Further information about obligations under the National Greenhouse and Energy Reporting Act and supporting regulations is available from the Department of Climate Change at <[www.greenhouse.gov.au/reporting/](http://www.greenhouse.gov.au/reporting/)>.
- 7 During the first two phases of the EU scheme, the majority of allowances were allocated free of charge, including to established fossil fuel-fired electricity generators. Generators have generally passed on to consumers the opportunity cost of permits that they were given free (European Commission 2005; IPA Energy Consulting 2005). Taking into account the demonstrated ability of generators to pass on the notional cost of emissions allowances, the European Commission has recommended that all permits for the power sector be auctioned in the post-2012 arrangements (European Commission 2008).
- 8 For instance, options could include emissions in a particular base year or years (say, 2008 to 2012); average emissions per unit of production, based on installed technology in a base year; average emissions per unit of production based on best practice technology; other approaches; or any combination of these.
- 9 See, for example, Evans and Peck (2007) for a discussion of key issues to consider in designing an emissions trading scheme permit auction.

- 10 If permits are allocated free, conditions should not be placed on their use (that is, they should be traded as normal) to maintain incentives to reduce emissions (and sell excess permits), and to minimise economic distortions associated with free permit allocation.
- 11 Once 'future' permits are loaned, the trade of these permits (private lending) of these permits should be unrestricted.
- 12 In order for hoarding to occur, there would have to be early and cost-effective mitigation opportunities beyond those set by the emissions reduction trajectory.
- 13 In this context, carbon leakage refers to a situation whereby production moves from Australia to other countries without carbon constraints and potentially with higher emissions intensity production processes.
- 14 It is possible that even with a broad international agreement in place, trade-exposed, emissions-intensive industries in some countries may continue to operate outside of a national emissions limit. As outlined in section 13.4, the sectoral agreements would ensure that trade-exposed, emissions-intensive industries in countries without national emissions limits would nevertheless face an emissions price comparable to those in countries which have such a limit. The WTO agreement, proposed in section 13.5, would allow countries to impose border adjustments to ensure that competitors in countries with neither national emissions limits nor sectoral agreements do not have an unfair advantage. The WTO agreement would also play the important role of preventing the use (or rather, abuse) of border adjustments as instruments of protectionism.
- 15 This modelling should be undertaken by an independent authority (desirably the Independent Carbon Bank, which would undertake an open process involving detailed consultation with relevant parties).
- 16 Note that as this is a measure addressing economic efficiency rather than compensation, the threshold continues to be defined in terms of real output rather than profits.
- 17 Borderline industries include: liquefied natural gas production; alumina refining; ceramic product, basic chemical and pulp manufacturing; other non-ferrous metals smelting; rice and pig production.
- 18 In designing the optimal governance arrangements, a continuing challenge to one aspect of the emissions trading scheme could generate uncertainty about it as a whole. Questions of income distribution are likely to be the most contentious in relation to the scheme. For this reason, distributional matters that are outside of the design of the scheme are fundamentally important to the success of the reform—adjustment assistance to low-income households in particular. These are discussed in more detail in Chapter 19.
- 19 The Review believes a price ceiling has disadvantages. Instead, market participants can be assisted in meeting the emissions limit through other means of cost containment, particularly access to international permits and offset credits, and flexibility in the time of use of permits through hoarding and lending.

## References

- Coase, R.H. 1960, 'The problem of social cost', *Journal of Law and Economics* 3: 1–44.
- DCC (Department of Climate Change) 2008a, *Fugitive Sector Greenhouse Gas Emissions Projections 2007*, Commonwealth of Australia, Canberra.
- DCC 2008b, *National Greenhouse and Energy Reporting System*, Regulations Policy Paper, Commonwealth of Australia, Canberra.
- European Commission 2005, 'Review of the EU Emissions Trading Scheme—survey highlights', <[http://ec.europa.eu/environment/climat/emission/review\\_en.htm](http://ec.europa.eu/environment/climat/emission/review_en.htm)>, accessed 3 March 2008.

European Commission 2008, 'Questions and answers on the Commission's proposal to revise the EU Emissions Trading System', MEMO/08/35, Brussels, 23 January.

Evans & Peck, 2007, *Further Definition of the Auction Proposals in the NETT Discussion Paper*, report to the National Emissions Trading Taskforce, <[www.emissionstrading.net.au](http://www.emissionstrading.net.au)>, accessed 18 May 2008.

IPA Energy Consulting, 2005, *Implications of the EU Emissions Trading Scheme for the UK Power Generation Sector*, report to the UK Department of Trade and Industry, 11 November, <[www.berr.gov.uk/files/file33199.pdf](http://www.berr.gov.uk/files/file33199.pdf)>, accessed 20 May 2008.

National Emissions Trading Taskforce 2007, *Possible Design for a National Greenhouse Gas Emissions Trading Scheme: Final framework report on scheme design*, submission to the Garnaut Review, <[www.garnautreview.org.au](http://www.garnautreview.org.au)>, accessed 10 March 2008.

NAILSMA (North Australian Indigenous Land and Sea Management Alliance) 2008, submission to the Garnaut Review, <[www.garnautreview.org.au](http://www.garnautreview.org.au)>, accessed 20 May 2008.

Prime Ministerial Task Group on Emissions Trading 2007, *Report of the Task Group on Emissions Trading*, Department of the Prime Minister and Cabinet, Canberra.

Shanahan, J. 2007, 'A carbon conundrum', *CFO Professional*, July 2007, p. 55.

## 15A Trade-exposed, emissions-intensive firms

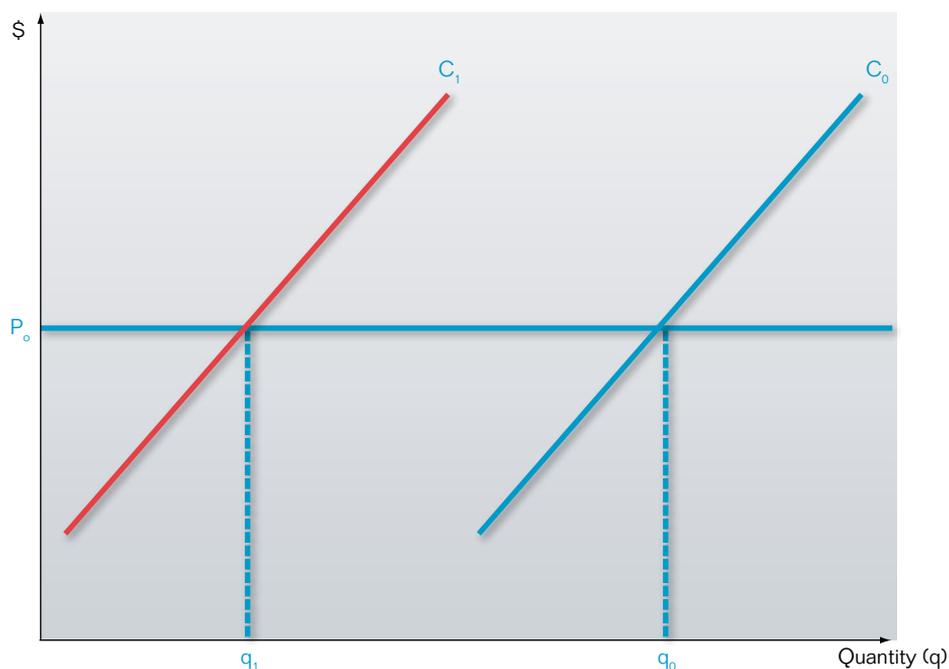
### 15A.1 The 'overshooting' problem for trade-exposed, emissions-intensive firms

Firms will seek to produce that level of goods or services that maximises their profits (though in the short term they might deviate from this objective in order to gain or maintain market share). With some factors of production assumed to be fixed in the short term—namely, the firm's capital stock such as plant and machinery—firms will produce at a point where their costs increase with each additional unit of production.

Where these firms compete in global commodity, goods or services markets they are assumed to be 'price takers'. Each firm's level of production has no bearing on the world price of the relevant product.

These descriptions of a trade-exposed, emissions-intensive firm can be usefully represented graphically with an upward sloping (marginal) cost curve ( $C_0$ ) and a flat price curve set at the world price ( $P_0$ ). The firm's resultant profit-maximising level of production is given by  $q_0$  (Figure 15A.1).

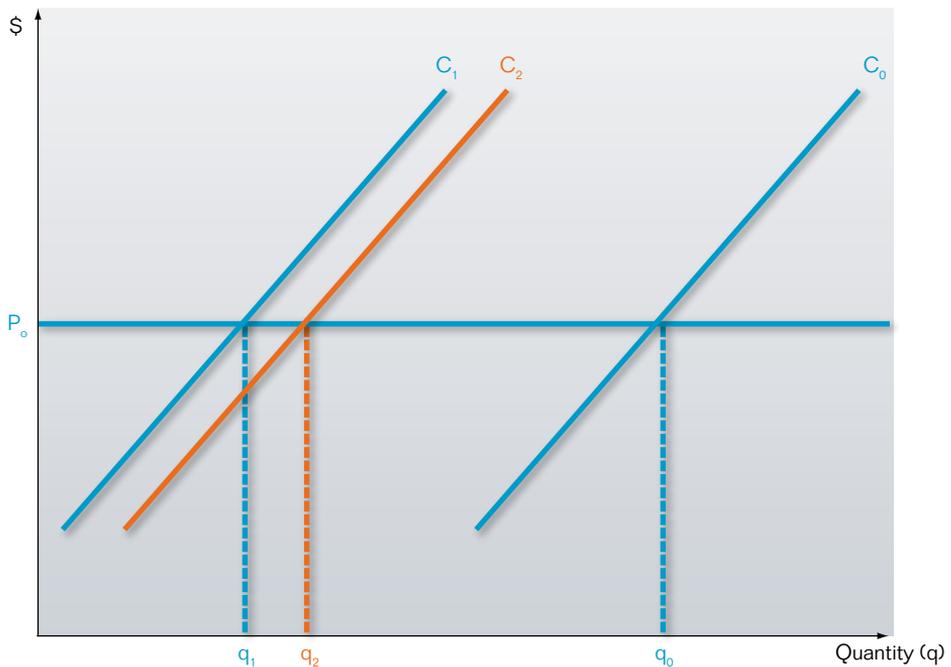
Figure 15A.1 Trade-exposed and emissions-intensive firm



The imposition of a carbon price increases production costs for all levels of production to the extent that firms employ emissions-intensive (direct and indirect) production processes. Graphically, a carbon price shifts the cost curve to the left ( $C_1$ ) but has no bearing on the world price for the product ( $P_0$ ). In response, profit-maximising firms will reduce their level of production to  $q_1$  (Figure 15A.1).

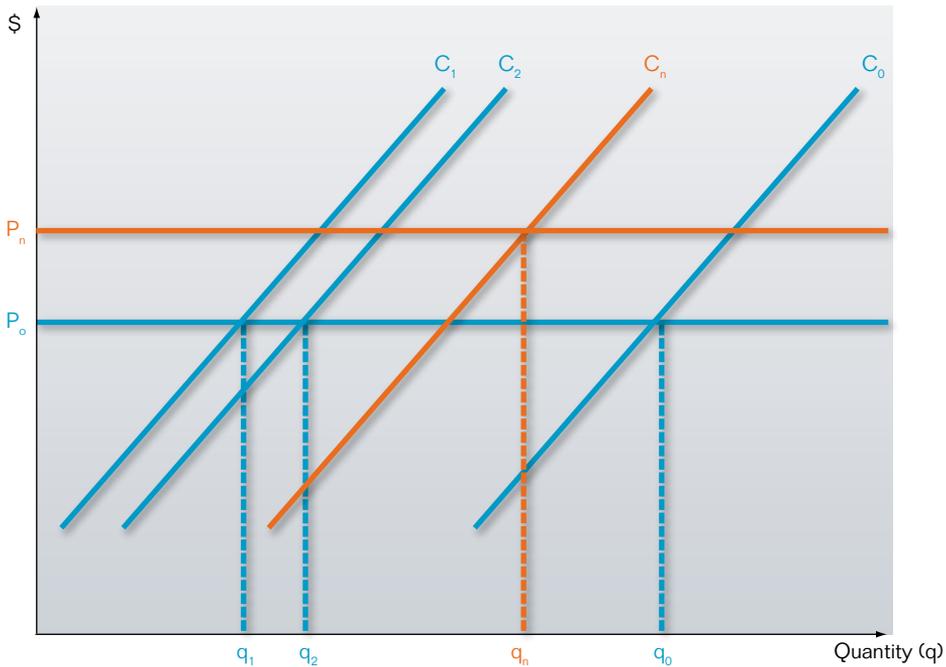
Over time, a firm facing a more expensive cost in its production process (namely, a price on greenhouse gas emissions) will look to switch from high to low emissions-intensive production processes in terms of both direct and indirect emissions. Graphically, this is represented by a shift of the cost curve to the right ( $C_2$ ) (Figure 15A.2). While this has no bearing on the world price for the product ( $P_0$ ), it will result in an increased level of production ( $q_2$ ).

**Figure 15A.2** Low emissions-intensive production



Eventually, as more and more countries adopt a carbon pricing regime, the world price of the relevant commodity, good or service will increase to  $P_n$ . In Australia, investment in new low-emissions processes by the relevant firm will continue until no further cost-effective improvements can be made to the production process. This is shown by cost curve  $C_n$  (Figure 15A.3).

**Figure 15A.3 The overshooting problem**



Under these conditions, the sustainable or long-run level of production for a profit maximising firm will be  $q_n$ . Figure 15A.3 shows an example where  $q_1 < q_n < q_0$ .

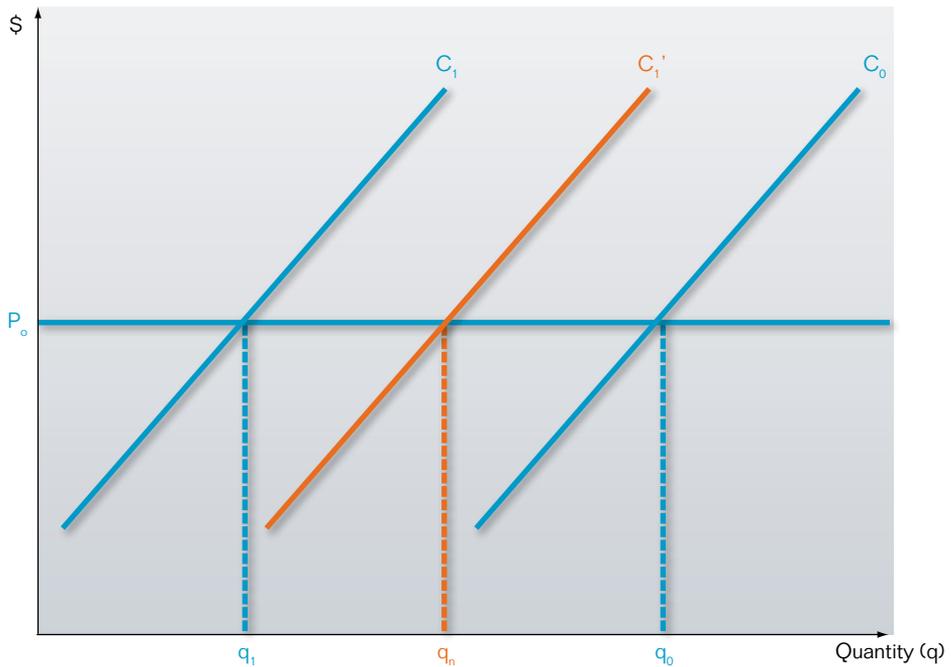
The overshooting problem is demonstrated graphically in Figure 15A.3 by the difference in production levels between  $q_n$  and  $q_1$ . This gap will reduce to  $q_n - q_2$  as the firm undertakes new investment.

If Australia is relatively more efficient than international competitors, it is possible that  $q_n$  could be greater than  $q_0$ —in which case there would be no overshooting problem.

### 15A.2 Domestic assistance arrangements for trade-exposed, emissions-intensive firms

Transitional domestic assistance arrangements for a trade-exposed, emissions-intensive firm would seek to correct for the overshooting of the sustainable level of production  $q_n$ . By countering the effects of the carbon price on the firm's cost of production, the government would be seeking to shift the firm's cost curve so that the profit-maximising firm will not reduce production below its sustainable level of production  $q_n$ . This would be achieved by the government making a payment (in cash or permits) per unit of production so that the firm's cost curve is shifted to the right ( $C_1'$ ). The unit value of the initial support given to the trade-exposed firm is given by the vertical distance between  $C_1$  and  $C_1'$  (Figure 15A.4).

Figure 15A.4 Domestic assistance



In time, the firm will invest in new production processes (shown as  $C_x$  in Figure 15A.5). Further, an increasing number of countries are expected to adopt some form of emissions constraint leading to the price of the traded commodity or good increasing (to  $P_x$ ), though not all the way to the sustainable world price ( $P_n$ ).

The new level of support is represented by the vertical distance between  $C_x$  and  $C_x'$ . Under such circumstances, the level of transitional support provided to the trade-exposed, emissions-intensive firm will diminish over time—that is:  $(C_x - C_x') < (C_1 - C_1')$ .

**Figure 15A.5 Domestic support diminishing over time**

