

AN AUSTRALIAN POLICY FRAMEWORK

13

Key points

Australia's mitigation effort is our contribution to keeping alive the possibility of an effective global agreement on mitigation.

Any effort prior to an effective, comprehensive global agreement should be short, transitional and directed at achievement of a global agreement.

A well-designed emissions trading scheme has important advantages over other forms of policy intervention. However, a carbon tax would be better than a heavily compromised emissions trading scheme.

The role of complementary measures to the emissions trading scheme is to lower the cost of meeting emissions reduction trajectories, as well as adapting to the impacts of climate change by correcting market failures.

Once a fully operational emissions trading scheme is in place, the Mandatory Renewable Energy Target will not address any additional market failures. Its potentially distorting effects can be phased out.

Governments at all levels will inform the community's adaptation response. More direct forms of intervention may be warranted when events unfold suddenly or when communities lack sufficient options or capacity for dealing with the impacts of climate change.

Climate change risks are a consequence of the greatest example of market failure we have ever seen (Stern 2007). Market failure occurs when the market fails to take into account the costs (or benefits) of an action that accrue to firms or people who are not parties to the action. Market failure in relation to the pricing of a resource leads to its overexploitation (or underutilisation). The failure to place a price on greenhouse gas emissions has led to overutilisation of a scarce resource: the atmosphere's capacity to absorb emissions without risks of dangerous climate change.

The correction of this market failure is the central task of climate change policy, in Australia and in the world.

Reducing emissions is often referred to as 'mitigation'. 'Adaptation' refers to actions taken in anticipation of, or in response to, the climate change impacts that cannot be avoided by mitigation policy. These two policy areas are often treated separately. This is not necessarily helpful for the design of good policy.

To mitigate human-induced climate change effectively, a restriction must be placed on rights to emit greenhouse gases to the atmosphere. This limit must be reduced over time to the level that prevents any net accumulation in the atmosphere. This comes at a cost to the economy. But so does the alternative of unmitigated climate change. Less mitigation will, in all likelihood, require a greater adaptation effort by individuals, communities and businesses. Less mitigation may also involve costs that cannot be avoided efficiently by adaptation.

Typically, the costs of mitigation will be felt long before the costs arising from the consequences of excessive emissions. The inadequate attempts so far to address the global market failure in greenhouse gas emissions mean that some of the consequences of climate change are already unavoidable.

The optimal policy choice will involve both mitigation and adaptation.

This chapter offers a framework for considering how Australian policy makers should approach this task. It serves as a bridge between the earlier and later chapters of this report. Chapters 2 to 7 present the global and Australian impacts of climate change. Chapters 8 to 10 discuss the challenges and policy options for reaching a global agreement on limiting greenhouse gas emissions and how to approach adaptation in an international context. Based on the framework outlined in this chapter, chapters 14 to 19 outline the necessary domestic policy interventions for dealing with the causes and consequences of climate change. The report concludes with a series of chapters (20 to 23) that describe the emergence of a low-emissions economy in Australia if these policies are successfully implemented.

13.1 Confronting uncertainty: the policy challenges of climate change

13.1.1 The policy continuum

Important climate change policy decisions are required now, because delay involves cost, including the cost of lost options. These decisions must be made despite innumerable scientific, geopolitical and economic uncertainties about:

- the strength of the tendency for global emissions to continue growing
- the relationship between the accumulation of greenhouse gases in the atmosphere and global warming
- the nature, timing and extent of local biophysical impacts in Australia and elsewhere as a result of the extent of climate response
- the level of ambition and the likelihood of international cooperation to reduce greenhouse gas emissions
- the development and costs of new technologies that reduce our reliance on emissions-intensive processes
- the adaptation choices that will be available domestically and internationally, and their cost.

Decision making in the face of uncertainty is not new. Business has developed many tools for identifying and managing risk. In recent decades, some of these instruments have been adopted by governments in Australia and around the world. But the range of possible outcomes under climate change is wider than for any other challenge that we face. The probabilities that can be assigned to these outcomes remain, for now, poorly defined. The scale, scope and timing of possible outcomes at global and domestic levels are unprecedented for the consequences of human action.

We come to these problems with economic, social and political institutions (public and private, domestic and international) that may not be appropriately constituted for dealing with them. We are therefore confronted simultaneously with the uncertainties of climate change and the potential for institutional inertia in dealing with these problems.

This is not a reason for resignation. A failure to act at any point will narrow the options available at any future point. But the lives of Australians will continue beyond the point of failure and new decisions will present themselves, with the possible outcomes shaped partly by that failure.

The uncertainty of climate change must be confronted.

As with any form of uncertainty that affects decision making, there is value in methodically reducing the extent of the unknown. This is achieved in one of two ways.

First, we can seek to understand the consequences of climate change better, globally and locally. Greater information is needed in order to understand and to estimate the potential costs of different levels of climate change to our prosperity and to other things we value. Additional resources must be allocated and new institutional structures established to fill the significant gaps in Australia's climate change research program.

The quest for understanding must also cover greater knowledge about the adaptation options available for dealing with climate change as well as appropriate responses for dealing with any outstanding uncertainty.

The second strategy involves reducing the causes of the uncertainty created by climate change, namely, greenhouse gas emissions to the atmosphere. Slowing or halting the rate of climate change reduces the likelihood of extreme outcomes as well as the range of potential outcomes. This allows more confidence in decision making. But mitigation comes at a cost.

The extent to which these strategies fail to reduce uncertainty will determine the need for a third strategy, namely, the ability to operate in a world that is changing in ways that we do not now fully understand.

For now, we can only assume that neither climate change nor the uncertainty so created can be eliminated by the deployment of a single strategy.

The investment that society is prepared to make in reducing risks of climate change is dependent on the costs of taking such action, weighed against the costs of failing to do so over the period before it is expected that annual benefits will exceed annual costs. This balance has not featured prominently in the policy

debate in Australia in recent years. Rather, attention has focused on the costs of reducing climate change as if doing so provided no benefit. What is true, however, is that any attempt to minimise the extent of climate change is dependent on global cooperation and not just Australian emissions reduction.

The purpose of pursuing an Australian mitigation policy ahead of a comprehensive international commitment is to maximise the chances of an effective global agreement being reached as quickly as possible. The rate at which emissions are reduced by Australia in the meantime, and the rates of reduction to which we are now prepared to commit ourselves in the context of an effective global agreement, will be among the most significant policy decisions made in this country for many years.

The cost of any given emissions constraint imposed on the Australian economy will depend on the means by which it is implemented. Poorly designed policies will result in unnecessarily high transaction costs and misallocated resources.

It is inevitable that some degree of climate change will occur and that adaptation to its impacts will be required. For our current purposes, both natural and human-induced climate change are relevant. The optimal form of this adaptation, as well as its extent and timing, will depend on the ability of communities and businesses to assess the risks they face and the options available for addressing those risks.

The relevant literature typically refers to adaptation policy as separate and distinct from mitigation policy. This has unhelpfully led to a policy approach to adaptation that is nebulous. The Review considers that mitigation and adaptation are more usefully considered within the single policy framework described in the next section.

13.1.2 A coordinating framework for climate change policy

Climate change will alter fundamentally some important relationships within the economy—for example, the relative value of different factors of production. So too will any policy interventions to mitigate greenhouse gas emissions.

The economic impacts of climate change and mitigation measures are best thought of as representing ‘shocks’. A shock is defined for this purpose as an event that alters relationships within the economy.

Climate change policy is therefore most usefully considered as a set of interventions by governments to minimise the economic consequences of these shocks.

Table 13.1 summarises the nature of the shocks that direct the design of mitigation and adaptation policies.

When approached in this way, mitigation policy can be seen to consist of both the source of the shock (that is, emissions reductions) and the response to that shock through measures to minimise its adverse effects on the economy and the community. Adaptation policy also responds to shocks, but those caused by the climate change that global mitigation policy has failed to avoid.

Table 13.1 Attributes of mitigation and adaptation shocks

	Mitigation shocks	Adaptation shocks
Source	Constraint on emissions imposed by policy	Impacts from climate change
Scale	Determined by policy	Uncertain and variable ^a
Primary manifestation	Price	Productivity
Commencement	Distinct	Ambiguous
Parties directly affected	Relatively few	Localised and variable ^a
Indirect effects	Economy-wide	Variable ^a
Predictability	Relatively high	Typically uncertain
Temporal nature	Immediate and increasing	Eventual and worsening

^a In this context, 'variable' indicates that this attribute is a direct function of the type of shock arising from climate change and so defies generalisation.

Viewing climate change policy as the management of shocks to the economy and the community suggests that properly designed mitigation and adaptation policies ought to have more in common than a simplistic policy dichotomy suggests.

Well-designed mitigation and adaptation policies only require government intervention when there is reason to believe that the effects of the shocks will not be dissipated efficiently, effectively or equitably.

As an open, flexible and market-oriented economy, Australia is well placed to deal with a wide array of events whether they are anticipated or not.

Harnessing the market in order to provide options and opportunities is central to lowering the cost to the Australian community.

In the case of mitigation, the necessary policy response is to correct for the missing market resulting in the unfettered release of greenhouse gases to the atmosphere. Section 13.2 assesses different options for doing this and concludes in favour of a well-designed emissions trading scheme, the preferred features of which are outlined in Chapter 14.

By itself, this is unlikely to be a sufficient policy response for reducing emissions. Mitigation policy must not only correct for the missing market. It must also address any market failures that inhibit the efficient operation of that new market. The main market failures are introduced in section 13.3.5 and analysed in detail in chapters 17 to 19. The case for government intervention is made where the cost of that intervention is outweighed by the reduction in the costs of the market failure being corrected.

Adaptation policy differs from mitigation policy in that there is no immediate or obvious missing market or market failure. Ongoing effort is required to enhance the capacity of existing markets, such as those for agricultural products, water and insurance, so that they may deal efficiently with the impacts of climate change. Measures that seek to promote the development of global and domestic markets for products (beyond carbon) and factors of production will assist in dissipating a wide array of shocks, whether they originate in Australia or beyond.

As with mitigation policy, correcting the market failures identified in chapters 17 to 19 will also be centrally important to an efficient and effective adaptation policy response.

Ideally mitigation and adaptation strategies would embody measures that correct the tendency for regulatory and institutional arrangements, and policy uncertainty, to create significant barriers to change.

Governments will need to review existing policies to ensure that they do not adversely interact with the objectives of successful mitigation and adaptation and, most immediately, the introduction of an emissions trading scheme. Reviews should cover federal and state taxes and subsidies, procurement policies, industry assistance programs, product and technology standards, accounting standards, taxation rules and public investment in research and development. The aim should be to identify perverse incentives that might inhibit adjustment to the effects of an emissions trading scheme or adaptation to the effects of climate change.

Commitments have already been made for reducing the regulatory burdens on business, expanding investment in infrastructure, reviewing federal tax arrangements and reforming Australia's approach to human capital formation. The successful implementation of these policy reforms would assist the introduction of an emissions trading scheme as well as the community's capacity to deal with the effects of climate change.

Beyond the establishment and enhancement of markets, governments at all levels will continue to play an important role in informing, planning and coordinating the community response to climate change. More direct forms of intervention may be warranted when events unfold suddenly or when communities lack sufficient options or capacity for dealing with the impacts of climate change.

Many of the existing instruments of government will be relevant, though their use will rarely be justified overtly in the name of climate change—which will typically be insidious rather than abrupt in its manifestation.

Health and community services, education and skills creation, quarantine and environmental protection, urban planning and transport, disaster relief and emergency services may all, at various times, be affected. It will be incumbent upon policy makers to be attentive to the changing demands on these services. The appropriate response will depend on circumstances as they emerge. It will vary between being anticipatory and reactive. Some responses will be systemic. Others will be determined by local conditions, and led and implemented by local communities and businesses. However, as climate change only forms one of innumerable considerations in the design of these policy responses, the Review does not explore these issues in detail.

The market-based discipline for tackling climate change preferred by the Review will be efficient in determining the allocation of resources across the economy, but may have undesirable distributional consequences.

A well-designed emissions trading scheme can be expected to be environmentally effective (in reducing emissions) and economically efficient. Individuals and households will be affected by its introduction to the extent to

which firms pass on higher input costs in the form of higher prices. The scheme will have greater impact on regions and communities that are dependent on particular emissions-intensive industries or firms.

To the extent that climate change impacts cannot be avoided through effective global mitigation efforts, regions and communities face changing patterns of production as well as alterations to their quality of life.

Chapter 16 discusses the distributional effects of an emissions trading scheme and appropriate policy responses to them. It also outlines the limited conditions under which structural adjustment assistance by governments may be warranted, whether as a result of mitigation policy or as part of adaptation to climate change.

While human systems can ultimately respond to the impacts of climate change, at some economic and social cost, the natural environment has limited capacity to dissipate the effects of climate change through normal evolutionary and adjustment processes.

The value we attach to the natural environment is not easily quantifiable. Neither is the damage wrought by climate change, which does not readily lend itself to cost–benefit analysis. These difficulties may lead to an inefficiently low level of ambition in mitigation policy, resulting in even worse consequences for the natural environment.

Do such consequences warrant increased investment in environmental management by government as part of adaptation policy? The answer relates to the value attributed to these non-market costs by the community. (See Chapter 15 for a discussion of the challenges for the management of ecosystems and biodiversity.)

13.1.3 Modelling the effects of climate change and climate change policy

The Review has undertaken extensive modelling of the costs of climate change as well as of the costs of mitigation policy (Chapter 11). This modelling is important in informing the interim targets for Australia’s emissions reduction trajectory recommended in Chapter 12.

The modelling has relied on a composite of climate models and numerous partial and general equilibrium economic models, both domestic and global. By and large, these models were not designed to be integrated into a single effort. Nor were they designed to answer the questions put to them by the Review. The economic models were certainly not built to look at the time frames that are relevant when considering climate change.

Nevertheless, the ambition and the achievements of the Review’s modelling effort are unprecedented and provide invaluable insights for policy makers to consider and for the community to debate. It lays the foundation for a continuing and larger investment in the modelling of climate change and climate change policy.

As noted above, climate change and climate change policy will alter fundamentally some relationships within the economy. This does not sit

comfortably with economic models that are predicated on known and measurable past behaviours.

Experience shows that once consumers and producers have accepted the inevitability of change, and face predictable incentive structures, they will alter their behaviour to account for the new conditions more efficiently and effectively than previously predicted. This experience suggests that economic models are likely to underestimate the benefits or overestimate the costs of changes in economic conditions, so long as the change is to stable institutional arrangements and predictable incentives. This bias may be further exacerbated by lack of data about the full costs of climate change impacts and a corresponding downward bias in the estimated benefits of avoided climate change.

These limitations are particularly relevant when policy makers consider the overall emissions reduction goal of mitigation policy. If they determine the goal solely on the basis of assumed technological developments and known consumer preferences at a particular moment, they will probably underestimate the true potential of the economy to reduce emissions in the future—that is, overestimate the price of permits and the economic cost of adjustment. This risks raising political resistance to new policies to tackle climate change. On the other hand, goal setting that is based on assumptions about unknown technologies and unobserved preferences runs the risk of overestimating the capacity of the economy to adjust. Economic modellers and policy makers will tend to err on the side of caution.

This is evident in the Review's own modelling. While the central assumptions of the modelling may be realistic from our perspective in 2008, history confirms the dogged recurrence of ingenuity. For this reason, the Review has also modelled alternative states of the world in which innovation is more responsive to an increasing carbon price. At first, this is applied in the energy and transport sectors (internationally and in Australia), where we have a reasonable chance of imagining how a more innovative future may unfold. However, we cannot be sure how these new technologies will manifest themselves later in the century. We can, though, foreshadow that 'backstop' technologies will remove the final vestiges of economic growth's reliance on emissions-intensive forms of production and consumption, provided there are positive economic returns for innovators from doing so.

These alternative technology scenarios were modelled by the Review, and are discussed in more detail in chapters 20 to 23. These scenarios illustrate the potential for the net costs of global mitigation to fall markedly from around the middle of the century.

As new technologies emerge, the global community will be increasingly confident in accepting more ambitious goals for reducing greenhouse gas emissions. The setting of targets and trajectories is best seen as an iterative process, with more ambitious mitigation goals being built on growing confidence that they can be reached at reasonable cost.

A study of history shows that when change is sudden, and its magnitude exceeds some hidden threshold, institutions governing the political, social and economic affairs of humanity can fracture. Things fall apart. Costs beyond previous

contemplations can accumulate rapidly, as they have always done in great wars, domestic political convulsions and economic depressions. There is therefore likely to be some asymmetry between miscalculation of the costs of adjustment to moderate charges and incentives (the transition to a low-emissions economy), and to major changes in the biophysical environment (the more severe of the possible manifestations of climate change).

13.2 Avoiding the greatest market failure ever seen

The initial parameters of Australia's mitigation policy will need to be set ahead of a comprehensive international agreement to reduce global emissions. In this context, consideration needs to be given to Australia's unilateral commitment to domestic emissions reductions, the most efficient means for meeting that commitment, and the impacts that this will have on the broader economy.

13.2.1 Setting emissions limits for Australia

There would be no point in Australia introducing mitigation policy on its own. The entire purpose of Australian mitigation policy is to support the emergence of an effective global effort.

Reaching a comprehensive international agreement will not be easy, but there is a chance that Australia and the world will manage to develop a position that strikes a good balance between the costs of dangerous climate change and the costs of mitigation. The consequences of the choice are so large that it is worth a large effort to take that chance while we still can. A significant mitigation effort by Australia and other developed countries is the cost of preserving some hope of a comprehensive international agreement for avoiding dangerous climate change.

How Australia defines and implements its mitigation policy will establish its credibility and its place in negotiating an international agreement.

Nevertheless, until there is a comprehensive international agreement, there will be little difference between gross and net costs to the Australian economy from domestic mitigation policy. There will be little countervailing benefit arising from climate change avoided. Setting emissions limits will rely on a series of judgments about what value to place on Australia, with other wealthy countries, assisting movement towards a comprehensive global agreement by moving ahead of such an arrangement.

The period of Australian mitigation effort before there is an effective global effort should be short, transitional and directed at achievement of a sound global agreement.

The Review therefore proposes unconditional and conditional interim targets and trajectories that balance the requirements of developed country policy leadership with the costs of acting ahead of a comprehensive global agreement (Chapter 12). The unconditional offer needs to be broadly in line with the approaches of other developed countries. The conditional offer is determined by Australia's likely share

of the burden under the most ambitious global agreement that is feasible in the current state of knowledge about the costs and benefits of mitigation and the current state of international cooperation. At present, and until any new agreement at or beyond the Copenhagen conference in 2009 is reached, the most ambitious feasible outcome may be to stabilise emissions at 550 ppm CO₂-e by 2100. In time, and with the introduction of new technologies, Australia along with other countries will feel increasingly confident in adopting more ambitious targets for emissions reductions.

Having established as a policy objective the reduction of Australia's greenhouse gas emissions according to a set of trajectories (and the conditions by which those trajectories might be changed), policy makers must choose the most efficient option for limiting emissions.

13.2.2 Domestic policy options for reducing emissions

The options for meeting the policy objective of reducing Australia's greenhouse gas emissions are either regulatory or market based. Within these two categories, numerous policy instruments can be applied.

Regulatory responses to the mitigation objective work by:

- mandating restrictions or banning particular items from the set of product choices available to consumers, and/or
- mandating, licensing or banning particular technologies or production techniques used by firms operating in the domestic economy.

Regulatory, or prescriptive, approaches to reducing emissions can be haphazard. They are inevitably informed by assessments of current and future mitigation opportunities by officials, based on expectations about the rate of technological development and the changing state of consumer preferences. Such policy mechanisms have difficulty in responding to the sometimes rapid but usually unpredictable evolution of technology and consumer preferences.

Market-based approaches seek to alter price relativities in a way that reflects the externality embedded in goods and services—that is, direct and indirect emissions arising from the production and distribution process. Consumers are left to choose whether, when and how to change from high to low carbon-intensive products. As they do so, firms begin responding to new consumption patterns by investing in alternative technologies and new products.

Under market-based approaches, governments cannot simultaneously control both the price and the quantity of emissions. The choice of approach should take into account the importance placed on having control over the level of emissions, relative to the importance attached to being able to control the emissions price.

Four market-based approaches are available.

Emissions (or carbon) taxes

Administratively, the simplest pricing mechanism is to impose a tax on emissions, typically known as a carbon tax. Carbon taxes are straightforward to apply and avoid the need for governments to take discretionary decisions about who ought

to be allowed to emit. Carbon taxes also provide certainty about the marginal costs of mitigation.

However, while a carbon tax avoids the arbitrariness of regulatory interventions, the meeting of emissions reductions targets cannot be guaranteed. Compatibility with other systems internationally may also be limited. Moreover, the achievement of ongoing and increasing reductions in accordance with one of the trajectories outlined in Chapter 12 would require variation of the carbon tax rate on the basis of continuing reassessment of the relationship between the rate of the tax and the level of emissions.

Emissions trading scheme 1: cap and trade

Under a cap and trade scheme, the government issues tradable permits that allow the holder of the permit to emit a specified volume of greenhouse gases to the atmosphere. A permit is an instrument with clearly established property rights. The sum of all permits on issue equates to the total greenhouse gases that may be emitted to the atmosphere. Permits are issued according to the trajectories discussed in Chapter 12.

The issuing of permits may involve government auction, or free allocation to particular parties. The decision about how to allocate permits involves a judgment over the allocation of the rent value of the permits.

Trading between parties allows permits to move where they have the greatest economic value.

As permits are traded, the price comes to reflect the balance between scarcity of permits and options to abate. The price is the balancing variable between the supply of, and demand for, permits. The price is determined by the market, not the government. It is likely to entail some volatility, especially at the outset of the scheme when there is no or limited experience about abatement responses and costs. A well-designed scheme will not eliminate volatility in the permit price, but it can avoid the unnecessary dissipation of resources arising from second-guessing of policy makers on changing scheme parameters by market participants.

As well as providing incentives for mitigation beyond the scheme, a cap and trade scheme provides greater potential to reduce the cost of abatement opportunities through international trade in permits, which can concentrate higher levels of abatement in the countries where it can be achieved at lowest cost.

Emissions trading scheme 2: baseline and credit

Baseline and credit schemes also rely on the creation of tradable permits. These schemes differ from cap and trade schemes in that they effectively place the creation of permits in the hands of private parties (existing emitters) rather than the government.¹

The baseline feature of these schemes involves an algorithm that provides existing emitters with some level of entitlement to emit. If their actual emissions are below this entitlement, then the surplus entitlement is converted into tradable

permits (or credits). Emitters that exceed their entitlement must purchase permits to account for any emissions above their respective baseline.

Options for calculating the baseline entitlement include:

- emissions in a particular base year
- 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
- any combination of these or other approaches.

The choice of algorithm introduces a high and unavoidable degree of arbitrariness into the design of a baseline and credit scheme. This would raise transaction costs and encourage rent-seeking behaviour (as the entire rent value of permit scarcity accrues to existing emitters).

Hybrid schemes

Hybrid models address the tension between wanting certainty in both price and quantity. The basic feature of these models is the establishment of an emissions trading scheme (cap and trade) with an imposed upper limit on the price of permits (McKibbin & Wilcoxon 2002; Pizer 2002). This involves initially issuing tradable permits up to a cap, but with a commitment by government to issue unlimited amounts of extra permits at a specified ceiling price.

Like the carbon tax, the hybrid approach with a ceiling price has the advantage of providing certainty about the maximum permit price while preserving some aspects of an emissions trading scheme to the extent that the market price can be expected to remain below the cap. However, it also combines the disadvantages of both approaches. In particular, the full institutional and administrative apparatus—and therefore cost—of an emissions trading scheme is required, without any guarantee of the required domestic emissions reductions. The use of ceiling prices would create a problem for Australia's role and credibility in international mitigation negotiations, since it would not allow firm commitments on levels of emissions.

A floor price for permits would require the scheme administrator to enter the market to purchase permits whenever the permit price fell below a specified value. A floor price is incompatible with international trade in permits as it would effectively create an unlimited liability for the Australian scheme administrator.

Ceiling and floor prices would dampen the incentive for development of secondary markets. They would limit intertemporal and international flexibility in use of permits. The emergence of these markets and this flexibility are important in transferring risk to the parties best able, and most willing, to manage it, to stabilising price, and to providing market guidance on future prices.

13.2.3 Australia's preferred approach

In determining the preferred approach for Australia's mitigation effort, the primary policy objective must be to meet a specified trajectory of emissions reductions at the lowest possible cost. Policy must be designed to facilitate this transition to a

lower-emissions economy, with as little disruption as possible and at least cost to the overall economy.

Australian mitigation policy needs to be considered in the international context of action and commitments. The world is now some way down the track towards an international system based on emissions reduction targets, starting with developed countries. Regulatory approaches, carbon taxes, hybrid schemes and baseline and credit schemes would not be readily integrated with existing and emerging international arrangements that could provide Australia with lower-cost mitigation opportunities.

A well-designed emissions trading scheme (cap and trade) can be relied upon to constrain emissions within the specified emissions limit (or trajectory). Current as well as future prices are set by the market, without the need for bureaucratic clairvoyance in relation to prices or mitigation options and costs.

As with any policy intervention, an emissions trading scheme will involve transaction costs that represent a deadweight loss to the economy. A well-designed emissions trading scheme requires rules governing:

- the limit on emissions
- the creation and issuance of permits
- who must or can participate in the scheme
- the means by which permits are exchanged between buyers and sellers
- the timing and method of acquittal of obligations
- the consequences for non-compliance
- the treatment of sectors not covered by the scheme
- the roles of government and other bodies in operating the scheme.

With a well-designed and comprehensive emissions trading scheme in place, price signals will begin flowing through the economy reflecting the scarcity value of the emissions of greenhouse gases to the atmosphere. Consumers will begin modifying their behaviour and businesses will respond accordingly.

Conversely, poor design would put at risk the environmental effectiveness and the economic efficiency benefits that are the reason for establishing an emissions market (see section 13.3).

The superiority of an emissions trading scheme over a carbon tax depends on the former's good design. In Australia's circumstances, a well-designed emissions trading scheme is superior to a carbon tax. A carbon tax is superior to a poorly designed emissions trading scheme.

13.2.4 Understanding the impact of an emissions trading scheme

An emissions trading scheme will correct the major market failure associated with climate change by establishing the right to emit greenhouse gases to the atmosphere as a tradable commodity. It is the most direct instrument for securing Australia's emissions reductions, if properly designed and allowed to play its

role without extraneous interventions (for example, by attempts to control the permit price).

The supply side of the market is represented by the government-controlled issuing of permits in accordance with an agreed emissions reduction trajectory. As such, the Australian emissions profile is capped by the force of law. No further measures are required to control national emissions in covered sectors.

On the demand side are all the goods and services whose production or consumption results in the release of emissions. There are innumerable decisions by households and firms that, when summed, determine the economy-wide demand for permits.

The demand side of the market is given force by the government requiring emitters to acquit permits if they wish to release greenhouse gases to the atmosphere. In so doing, the government must have the administrative machinery to enforce such a requirement credibly.

A fully functioning market mediates between the variety and priority of wants of consumers and the productive capacity of the economy. The price of permits will be determined by the balance between demand for, and supply of, permits.

If the sum of all decisions across the economy implies that demand for emissions permits is in excess of supply, the price of permits will increase, and continue to increase, until demand is subdued and brought into line with the quantum of permits on issue.

A credible market will establish a forward price for permits that reflects expectations about the future demand for permits. The price rises at a rate of interest corresponding to the opportunity cost of capital.^{2,3} The whole price curve—the spot price and all of the forward prices, together—embodies the market's expectations of what is required to induce the necessary substitution of low-emissions alternatives for high-emissions goods and services, and for economising on the use of goods and services that incorporate high proportions of emissions.

The price curve provides fundamental stability to the market, with opportunities for hedging price risks, and adjusting quickly to new information. Any change in expectations in demand or supply or in the interest rate would see the spot and forward prices adjusting immediately.⁴

The economic effect of an emissions price

The emissions price flows through the economy in two ways.

First, it causes the substitution of higher-cost, low-emissions processes or goods and services for lower-cost established processes, goods and services. This former is a real cost to the economy as it involves the reallocation of resources to uses that would not otherwise have attracted them.

This substitution effect gradually decouples economic growth from its former reliance on processes and products with high greenhouse gas emissions. Even though the price of permits can be expected to continue increasing, as reflected by the forward price curve, the proportion of the economy exposed to this higher

cost will be ever diminishing. Once a product enters the market, technological and institutional improvements and scale economies are likely to lead to relative cost reductions over time.

The second way in which the emissions price will flow through the economy is by generating rents from the scarcity of the permits. This involves a transfer of wealth (mostly from households) to whoever receives the scarcity rents of the permits. This will be established emitters if the permits are simply given to them; or the government in the first instance, and then the beneficiaries of reduced taxation or increased public expenditure, if the permits are sold competitively.

On the basis that this major environmental reform—the introduction of an emissions trading scheme—is not meant to arbitrarily increase the proportion of the economy under the control of the public sector, the proceeds of the sale of permits should be identified for return to the community, either to households or to business. Demonstration that revenues from the sale of permits had been returned to the private sector in one way or another would neutralise what could otherwise become a rallying point for opposition to effective mitigation policies.

13.2.5 Is emissions trading the next great reform agenda?

The pervasive consequences of an emissions trading scheme make it a major reform of the Australian economy.

Although it is tempting to compare the mitigation challenge to earlier Australian programs of economic reform, we should exercise caution. Previous reforms—such as trade liberalisation, financial regulation and competition policy—were designed to raise incomes by allowing the allocation of resources to their most productive uses. By contrast, the climate change reform agenda must be focused on minimising the potential for loss of income after the introduction of measures to limit the release of greenhouse gases.

In any event, Australians are well placed to deal with the challenges posed by the introduction of an emissions trading scheme. The reforms of the past have made the Australian economy more open, market oriented and adaptable than at any time in its history. We have a good record in institutional design and in establishing genuinely independent agencies to implement those arrangements. In the case of an emissions trading scheme, we have the benefit of learning from schemes that have been implemented internationally, most notably, the three phases of the European Union's scheme.

As with all reform agendas, the commitment by government and the community must be ongoing and firm. Decisions must be made even in the face of unknown prospects for an international agreement and some uncertainty about how the domestic economy will respond.

13.3 Bungling Australia's emissions trading scheme

An emissions trading scheme imposes compliance costs on businesses and administrative costs on government. These costs represent a deadweight loss on the economy that can only be justified if the scheme enables the least-cost adjustment (in terms of resource allocation across the economy) to a quantifiable and verifiable commitment to reduce emissions.

If the necessary conditions of environmental effectiveness and economic efficiency cannot be satisfied, costs will rise due to the introduction of new sources of uncertainty into business transactions. In these circumstances, policy makers should consider alternative policy interventions, possibly on a temporary basis.

A broad-based emissions tax implemented as a transitional measure would be preferable under such circumstances. Chapter 14 describes an innovative interim measure of an emissions trading scheme but with fixed price permits in the early years. This approach would minimise the transition costs of moving to a genuine market-based policy at a later date.

13.3.1 Blowing the cap: the easy but meaningless way out

The easiest path for policy makers to avoid disturbing the status quo would be to lower the level of ambition for the emissions trading scheme. Giving in to well-organised interests by adopting weaker positions on the basic design of the scheme will place at risk the benefits that justify the implementation of a market-based mitigation policy and that make the case for using an emissions trading scheme rather than a carbon tax.

Exempting some sectors or particular greenhouse gases would distort the burden of reduced emissions and shift it disproportionately onto others.

Freely allocating permits to some emitters but not others safeguards the profits of the fortunate recipients while imposing even greater adjustment costs on other emitters and on the community.

Most damaging of all would be measures that rendered ineffective the credibility of the quantitative restriction (the emissions limit) upon which the entire emissions trading scheme is predicated. There are numerous compromises in the design of the scheme that could have this effect, directly or indirectly. These include:

- caps on the permit price resulting in the issuance of additional permits for as long as the price remained above the ceiling price
- poorly defined emissions reduction trajectories and vaguely defined conditions for changing trajectories, which would lend themselves to periodic pressure on the political system—poor design features of the system would make it difficult to resist these pressures
- non-compliance measures that failed to enforce the overall constraint on emissions (known as 'make good' provisions).

Such compromises, while seeming to help secure support at the time of introduction of the scheme, would undermine the policy objective of reducing emissions. This would erode business confidence when investment decisions are being made and cause the mitigation policies to impose costs on the Australian community for little or no environmental benefit. Our international credentials on this issue would be severely damaged—putting at risk access to the benefits of global cooperation as well as our ability to influence the outcome of international negotiations.

The most costly and damaging policy for Australia would be to implement a policy that was designed to appear meaningful, but was largely meaningless in application.

13.3.2 Withstanding vested interests

The emissions trading scheme needs to be free of ongoing disputation over key parameters. It will be costly if it provides opportunities for special interests to exert political pressure for favourable treatment—most notably, in permit allocation.

Not only does this represent a risk in terms of the potential revenue forgone, but it will raise the overall cost to the Australian economy. If there is a chance that political pressure will reap rewards in the form of special treatment, then the system will promote a large diversion of management resources, away from commercially focused profit maximisation towards rent seeking from governments.

Any scheme that promotes such behaviours by rewarding pressure must be viewed as an abject failure.

Nevertheless, an emissions trading scheme will, by design, alter pre-existing relationships within the economy. This will generate winners and losers.

Consumers who are willing and able to replace higher-emissions products with lower-emissions products will adjust relatively painlessly. Firms with less dependence on emissions-intensive production processes, or that have the ability to switch production processes quickly in order to minimise their exposure to a carbon price, may find that their market share and profitability increase. Firms that have less flexible capital structures could be faced with having to choose between passing on the price (and losing market share) or absorbing the price of emissions at the expense of profitability. All things being equal, such firms may face some loss of market value.

As with all programs of economic reform, mitigation policy must be forward looking. Policy interventions and the use of scarce resources should focus on improving future economic prospects rather than reacting to past decisions by governments or the private sector.

While it is not possible to foreshadow all the demands that will be placed on the revenue raised from the sale of permits, the case for compensatory payments to shareholders in firms that lose value as a result of introduction of the scheme is a low priority for a number of reasons.

First, it will be difficult or impossible to assess the effects of the emissions trading scheme on an individual firm's profitability as the counterfactual supply and

demand conditions in those markets cannot be observed. The potential information asymmetry problem would lead to disputes.

Second, there is no tradition in Australia for compensating capital for losses associated with economic reforms of general application (for example, general tariff reductions, floating of the currency or introduction of the goods and services tax) or for taking away windfall gains from changes in government policy (for example, reductions in corporate income taxes).

Third, alternative forms of assistance such as structural adjustment assistance that is targeted at the future competitiveness of firms (or in some cases, regions) is likely to provide a greater benefit to the overall economy than a backward-looking, private compensatory payment to existing emitters.

Fourth, this is a difficult reform, and a permit price that is high enough to secure levels of emissions within targets and budgets will have major effects on income distribution—including workers and communities dependent on emissions-intensive industries that may be unable to adjust readily to alternative employment. Directing scarce resources towards addressing these impacts will be a significant challenge and an unavoidable priority. There will also be large calls on the revenue from sale of permits for support of research, development and commercialisation of new low-emissions technologies, and for avoiding ‘carbon leakage’ through payments to trade-exposed, emissions-intensive industries.

Stationary energy, which in Australia is a particularly large source of emissions, is the dominant industry with expectations of compensation. This is the subject of further discussion in Chapter 20.

13.3.3 The dreadful problem of trade-exposed, emissions-intensive industries

Trade-exposed, emissions-intensive industries represent a special case. All other factors being equal, if such enterprises were subject to a higher emissions price in Australia than in competitor countries, there could be sufficient reason for relocation of emissions-intensive activity to other countries. The relocation may not reduce, and in the worst case may increase, global emissions. This is known as the problem of carbon leakage.

Policy makers are therefore faced with a truly dreadful problem. Shielding these industries from the effects of a carbon price either undermines attempts to limit national greenhouse gas emissions or increases the adjustment burden elsewhere in the economy. Moreover, it results in the paradoxical outcome of shielding our most emissions-intensive industries (with the exception of stationary energy) from the effects of the scheme; that is, low emitters feel the effects of the scheme, but high emitters do not.

Chapter 10 outlines the benefits of sectoral agreements in avoiding this problem, while Chapter 12 suggests that Australia will need to show global leadership in pursuing such arrangements. In the meantime, Australia is faced with implementing special domestic arrangements. These transitional arrangements

should be based on efficiency in international resource allocation and not on some false premise of compensation for lost profitability.

There can be no doubt that the arbitrary nature of such assistance measures will make them the subject of intense lobbying, with potential for serious distortion of policy-making processes. Their continuation for more than a few years would be deeply problematic. The establishment of comparable carbon pricing arrangements in countries that compete with Australia in global markets for emissions-intensive products is an urgent matter.

Policy makers would be better off abandoning an emissions trading scheme in favour of a broad-based emissions tax without exemptions if they felt unable to resist pressures on the political process for ad hoc and overly generous assistance arrangements for these industries.

13.3.4 Pandering to pet solutions

Detractors of market-based mechanisms often argue that additional emissions reduction measures (be they regulatory or programmatic) are required in order to reduce greenhouse gas emissions. They are wrong.

Unless private parties contravene the law without consequence, a comprehensive and well-designed cap and trade scheme ensures that emissions will decline in line with the reduction trajectory (the ‘cap’).

The very purpose of a market-based approach to mitigation policy is to enable producers and consumers throughout the economy to determine the most effective response to meeting a mandated emissions limit.

Programs and other regulatory interventions—whether federal, state or territory—that seek to reduce emissions from specific activities covered by the emissions trading scheme will not result in lower overall emissions. They will simply change the mix of mitigation activities that deliver the same, required level of emissions reductions. Such interventions presuppose that government officials, academics or scientists have a better understanding of consumer preferences and technological opportunities than households and businesses. This is generally unlikely and cannot ever be guaranteed.

Within the Australian domestic policy space, a variety of policies have been discussed or put in place by various levels of governments with the aim of reducing greenhouse gas emissions from sectors to be covered by an emissions trading scheme. While some are in place for historical reasons, other schemes are being considered prospectively. The most significant of these is the expansion of the Commonwealth Government’s Mandatory Renewable Energy Target (see section 14.8.1).

13.3.5 Don’t pick winners. Fix market failures.

For the emissions trading scheme to have the desired effect of driving new consumption behaviour and investment decisions, it must be well integrated within the broader economy. Barriers to change must be removed or minimised in order

that there may be an efficient economic response to the ever diminishing supply of permits.

Federal and state governments must avoid policies that skew investment decisions towards technologies that are currently in favour or consumption behaviours that are judged to be desirable. Existing policies—such as tax expenditures, and direct- and cross-subsidies—must be reviewed in light of the introduction of an emissions trading scheme.

Such reviews will need to extend beyond programs and policies that directly compete with the emissions trading scheme for emissions reductions. The aim should be to identify perverse incentives that might inhibit investment in low-emissions technologies or promote activities associated with high emissions.

Other policies operating alongside an emissions trading scheme can have no useful role in reducing emissions once the emissions trading scheme is in place. From that time, the only useful role for additional policies of this kind is to reduce the effect of market failures that have the potential to raise the economic cost of the structural adjustment process. Three market failures must be addressed by the relevant levels of government if the benefits of an emissions trading scheme are to be maximised.

First, there are market failures in the end use of energy, as a result of misplaced incentives, and externalities in gathering and analysing information about known technologies. Correcting these market failures would reduce energy consumption and lower the overall demand for permits. Government intervention would include mechanisms for subsidising the provision of information. Regulatory responses may be warranted if they are the most efficient means of correcting the market failure.

Second, the market failure associated with research, development and commercialisation of new technologies must be corrected. Policies are required that recognise that private investors are not able to capture for themselves the full social value of their innovations. There is therefore a need for high levels of public expenditure across a broad front, including:

- climate science
- the impacts of climate change (nationally, regionally and locally)
- technology responses to changing climatic conditions
- low-emissions technologies and processes (including energy efficiency)
- geo-, bio- and soil sequestration.

Public assistance must be introduced in different forms for different stages of the innovation process.

Third, governments must address the possibility of market failures associated with the external benefits from pioneering investment in the provision of network infrastructure related to electricity transmission, natural gas pipelines, carbon dioxide pipelines associated with sequestration, and transport infrastructure linked to urban planning. This may or may not require public expenditure.

These sources of market failure are addressed in chapters 17, 18 and 19, respectively.

Notes

- 1 The Greenhouse Gas Reduction Scheme (or GGAS) established by the NSW Government, which has been in operation since 1 January 2003, contains elements of a baseline and credit scheme (NSW Department of Water and Energy 2008).
- 2 This is because investors will be choosing between alternative investments, with an emissions permit being one possible investment. Investors will assess whether the long-term value of holding an emissions permit is higher or lower than the return from an alternative investment. This leads to selling or buying of emissions permits until a forward price curve emerges that causes the expected return from holding a permit to be equivalent to that on alternative investments. The price would therefore rise at a rate of interest corresponding to alternative investments available to holders of permits.
- 3 Incidentally, it is a common error to see a rising forward price curve for emissions permits as reflecting an increasing external cost of emissions as the volume of emissions rises over time. Later emissions do not impose greater costs. Rather, the rising price reflects the market's approach to optimise depletion over time of a finite resource (Hotelling 1931), in this case the resource being the atmosphere's capacity to absorb greenhouse gases without seriously adverse consequences.
- 4 Any new information that increased optimism about new, lower-emissions ways of producing some product, whether they were expected to become available immediately or in the future, would shift downwards the whole structure of carbon prices, spot and forward. Any new information that lowered expectations about the future availability of low-emissions alternative technologies would raise the whole structure of carbon prices, spot and forward.

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