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## Carbon pricing and reducing Australia's emissions

Update Paper **6**

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**Garnaut Climate Change Review – Update 2011**

**Update Paper six:**

***Carbon pricing and reducing Australia's emissions***

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## CARBON PRICING AND REDUCING AUSTRALIA'S EMISSIONS

### Key points

- It is in Australia's national interest to encourage the international community to take strong mitigation action.
  - The Copenhagen and Cancun agreement on holding temperature increase to below 2°C above pre-industrial levels meets that objective.
  - The form of current international agreement does not yet support deep international trade in emissions entitlements. In the interest of lowering the costs for the world, and itself, Australia should work to secure opportunities for trade in genuine abatement through bilateral, regional and multilateral forums.
- Australia should play its proportionate part in global emissions reductions.
  - As in 2008, Australia should be ready to calibrate its emissions reductions proportionately to a global effort directed at less than the 2°C (or 450 parts per million concentrations of carbon dioxide equivalent) objective.
  - The Australian Government and the Opposition have each committed themselves to reducing Australia's emissions by 2020 by at least 5 per cent (relative to 2000 levels), unconditionally, in the absence of any global agreement on emissions reductions. The target will need to be revised upwards over time in line with international action.
  - It is in Australia's national interest to play its part through domestic policies which minimise the costs to Australians.
- Economy-wide pricing of carbon is the centre piece of any policy designed to reduce emissions at the lowest possible costs.
  - The difference between the costs, and potential environmental outcomes, of market-based measures (carbon pricing) and regulatory interventions is large.
  - The effect of a carbon price on the economy remains modest, and the impact on most industries small compared to other cost rises and fluctuations.
- On balance, taking into account the history of policy discussion in Australia and internationally, and the desire for deep trade in entitlements, an emissions trading scheme, initially with a fixed (and rising) price, is the best instrument for long-term emissions reductions.
  - This model provides the benefits of credibility and steadiness in its early years, as industry and institutions build confidence and capability, with later trade in abatement allowing emissions reductions to take place where they are cheapest. It also provides substantial revenue.
  - The starting price should be between A\$20 and A\$30 per tonne of carbon dioxide equivalent, rising at 4 per cent (real) per annum.
  - The price would float (without caps or floors) in mid-2015 unless the independent regulator judges that there are insufficient international trade opportunities to secure liquidity and stability.

- Assistance should be provided to emissions intensive, trade exposed industries to the extent that they are disadvantaged in sales prices by other countries not having comparable carbon constraints, with:
  - an interim approach for three years based on a modified version of the former Carbon Pollution Reduction Scheme; followed by
  - a shift, in 2015, to a principled approach to assistance administered by the independent regulator receiving independent expert advice. Australia should seek to extend this approach through the international community.
- Wise use of revenue from a carbon price can reduce the cost to the economy, and promote productivity above what it otherwise would be.
  - The largest element of revenue (around half initially, rising to the large majority) should be applied to productivity-raising reform of the personal income tax system, focussing on low and middle levels of incomes. This will generate positive effects on income distribution as well as national productivity.
  - Short- to medium-term support for innovation in low-emissions technologies, to address market failures and lower the costs of transition to a low-emissions economy
- The scheme should be administered by an independent authority, taking important decisions on advice from independent expert bodies.

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# 1. Introduction

It is in our national interest for Australia to play its proportionate part in the world meeting what is now a goal that has been agreed by the international community: reducing global emissions to an extent that holds temperature increases to below 2°C. Australia has more to lose than any other developed country if this goal is not achieved.

Australia has naturally a highly emissions-intensive economy, currently with far higher emissions per capita than any other developed country. Most other developed countries now have falling or steady emissions but, largely as a result of the contemporary resources boom, our emissions continue to increase rapidly. The naturally high emissions intensity of Australian production would not be a particular issue if there were deep international trade in entitlements generating comparable carbon prices over much of the global economy: unavoidable emissions costs would be embedded in international product prices, and Australia may be a large exporter of emissions-intensive products, and a large importer of entitlements to emit greenhouse gases. But at present those opportunities are not available, and their absence damages Australian interests more than it damages the interests of other countries. We will still tend to be judged by the metrics in common use: emissions per capita, and proportionate reductions of emissions from some baseline. But it is more costly for Australia than other countries to reduce emissions and emissions per capita, at rates and to levels that seem normal in other parts of the developed world.

The “messy world” of climate change policy into which the world has passed after Copenhagen and Cancun establishes difficult circumstances for our country. It is difficult first of all because, while there are now many elements of a strong international agreement on mitigation (see Update Paper two *Progress towards effective global action on climate change*), they are not yet adding up to effective action to constrain climate change to an extent that would serve Australia’s national interest. They are difficult because they do not yet contain elements that are conducive to trade in emissions entitlements that would reduce the costs of Australia meeting what will be seen as our proportionate commitments to reductions in emissions. They are difficult because the absence of trade in entitlements, and the convergence of carbon prices with which it would be associated, will encourage unprincipled interventions in international trade that over time are likely systematically to discriminate against Australia as a large exporter of emissions-intensive products.

It is tempting for us simply to plead the special circumstances that make it too difficult to comply with international expectations on the standard metrics of emissions reductions in the absence of a strong international agreement. That would entrench a historical tendency for Australia to be a drag on international progress on reduction in emissions—a position that conflicts with our national interest in effective and strong mitigation. This would be damaging to Australia because it would provide a cover for others’ discriminatory trade interventions of various kinds. It would also be damaging for Australia because the apparent recalcitrance of any developed countries, especially of the largest emitter of greenhouse gases per person amongst developed countries, would be materially harmful to the global effort.

There have been constructive suggestions for seeking special rules that suit our circumstances. Certainly a “consumption basis” rather than a “production basis” for comparing contributions to global mitigation would have suited us better—a point that Geoff Carmody has made influentially over recent years (Carmody 2009). We stand out as a country with exceptionally high emissions per person in the goods and services that we consume as well as in those that we produce, and if emissions reduction targets had been specified in consumption terms we would still have been under pressure to change the way in which we use energy in general and coal in particular. But overall a consumption basis for comparing international effort would have been somewhat less problematic for us. Be that as it may, the days when it might have been possible to persuade the international community to a different approach have long passed. We can think it a pity that we were not more active in international diplomacy when these matters were settled, but that does not allow the history to be re-wound.

There is little chance of global agreement being reached and maintained if all rich countries do not play their proportionate part—the more so if the rich country, Australia, is the largest emitter per person in the developed world and the developed country with the most to gain from effective global mitigation. Climate change policy must be based on thinking a way out of the biggest “prisoners’ dilemma” the

world has seen, and the dilemma can only be resolved by explicit agreement, or by implicit agreement that each country on its own is contributing its share.

If one accepts that Australia must play its proportionate part—its contribution to mitigating climate change—and that share has been determined, the focus shifts to the most efficient and fair way of achieving that contribution.

Australian actions to mitigate climate change must satisfy three tests to be in the national interest. First, they must be a fully proportionate contribution to a global solution. Second, they must impose the least economic cost. Third, the costs of the domestic mitigation effort must be distributed equitably across the community.

This paper seeks to define policy that meets Australia's national interest. It is not calibrated to balance every opinion articulated within the Multi-Party Climate Change Committee, or to balance every interest affected by mitigation policy. There are two reasons for adopting this approach. One is that there is no reason to expect party and sectional interests to sum to the national interest. The second is that since party and sectional interests are inevitably in direct conflict on important points, no set of policies can ever satisfy all interests.

Given a national goal of reducing emissions entitlements, the national interest is served by meeting that goal efficiently (that is, at minimum cost); and equitably (that is by placing proportionately heavier burdens upon richer than on poorer citizens, or at least avoiding placing relatively heavy burdens upon the poor). There are likely to be points of conflict between efficiency and equity objectives, in which case the choices should be made transparently, and reflect community values on the appropriate trade-offs between the two large national interest objectives.

These simple elements of the national interest objective, efficiency and equity, and a trade-off between the two that is determined by national values (mediated by the democratically elected Parliament of the day) must inevitably be subject to a test of practicality. In the case of climate change policy, practicality requires acceptance that the path by which we arrived at the present situation constrains what is immediately possible. I will seek to be transparent when issues of practicality have influenced judgements about optimal policy in current circumstances. Here, as with the trade-off between efficiency and equity, the democratically elected Parliament must, in the end, arbitrate between competing perspectives.

There are two basic approaches to reducing Australia's emissions. One is by placing a price on emissions that reflects the costs that they impose on the rest of society—the global carbon prices that will reduce emissions to the extent required. The other is by regulation, through which firms and individuals are required by law to refrain from emissions-intensive activity to an extent that adds up to the required reduction in emissions.

The former, market-based approach imposes on individuals and firms a price that reflects the external costs of carbon emissions, so that they take them into account in their private decisions on what to consume and to produce. It causes consumption of every item to be discouraged if its production embodies a relatively high degree of carbon emissions and to be encouraged if it embodies emissions in relatively low degree. It causes production of every item to be discouraged if it is relatively emissions-intensive and encouraged if it embodies relatively low amounts of emissions for the value of the product.

The latter, regulatory approach requires interventions by Government to influence every consumption and production decision by individuals and firms, based ideally on careful calculations of the activities that can reduce emissions at the least social costs. To do this well, Government has to calculate a cost of carbon emissions, and introduce regulations that cause businesses and individuals to act as if they were subject to a carbon price: to constrain consumption of some goods and services and therefore to encourage consumption of others, and to encourage production of some goods and services and therefore to discourage the production of others.

The market-based relative to the regulatory approach requires many fewer decisions by Government and much less intrusion into private decisions. On information in relation to the reduction of emissions, the market approach requires one of two things. With an emissions trading system, there must be an

assessment of the total amount of emissions that can be placed into the atmosphere over a period of time, and the issue of permits to emit up to this total amount. Trade in permits then determines the appropriate carbon price. With a carbon tax, a price is set for a permit to emit that is expected to achieve the same reduction of emissions. The market-based approach requires all of the information that determined the recommendations on the targets for reducing emissions and the price of carbon in the Review.

The regulatory approach requires all of the information required by the market-based approach. It also requires a lot of information about individuals' and firms' responses to intervention by Government and on the welfare costs of those interventions.

There was for a while in the twentieth century a great contest of ideas, about whether market-based or regulatory approaches to managing the economy were more conducive to economic welfare. The regulatory approach went under the name of "central planning". The case for regulation depended on assessments of high transactions costs and instability in the market economy, on the capacity of Government to take a wide range of decisions more reliably than individual economic actors, and on the capacity of Governments to secure intended outcomes when they intervene directly to replace private by official decisions.

That contest of ideas was won decisively by the market economy. It was not won in theory. It was won by observing the results of predominantly market-based decisions and predominantly regulatory interventions. The outcome of the contest of ideas allows a significant place for interventions of some kinds, where this is clearly the most effective way of correcting for specific market imperfections. But it has left a presumption in favour of market-based decisions unless there is clear evidence that regulation would give better results in a particular case.

Putting a price a carbon isn't the whole climate change mitigation policy story. There are some other market failures relevant to adjustment to the changes in incentives associated with the carbon price. The most important of these are the benefits for other individuals and firms that are generated by one firms' innovation in low-emissions technologies.

Section 4 of this paper sets out rationale for some additional policies, in particular, supporting investment in research and development of low-emissions technologies, providing assistance to industry to correct a distortion resulting from an unpriced externality in some competitor countries, and providing direct assistance to households to overcome market failures.

In addition, placing a price on carbon in the manner recommended in this paper will generate a large amount of revenue. The revenue can provide the means to cut distorting taxes that reduce economic welfare.

The carbon price operating through markets leads to changes in decisions that have economic costs in the old calculus that took no account of the costs of climate change. But it is actually a less distorting and less economically costly form of taxation than many of the other ways in which Australian governments raise revenue. A judicious use of the revenue raised by pricing carbon can increase economic welfare to the extent that it is used to reduce highly distorting taxes.

The revenue from carbon pricing can also provide the public resources for encouraging a socially desirable level of innovation in low-emissions technologies. This will reduce the cost of reducing emissions. By using the carbon pricing revenue to switch away from taxes that are more distorting (even in a world of no climate change) than a tax on carbon and to fund innovation and so to assist businesses in making the transition to the world of carbon pricing we can substantially offset the costs of climate change mitigation on Australian economic welfare (see Update Paper seven for fiscal support for innovation, and Box 1 for the tax switch).

### Box 1: A better way to tax

As noted by Stern (2007), climate change represents the greatest market failure the world has ever seen. The case for action on climate change is clear. By putting a price on carbon, individuals and businesses take into account the costs of their actions that are borne by society at large. In and of itself, the introduction of a carbon price is a global economic reform where the benefits far outweigh the costs.

Public commentary surrounding carbon pricing is dominated by a discussion of the financial impacts and costs and rarely the benefits. Surprisingly, little attention has been given to the opportunities carbon pricing presents for tax reform. An important element of carbon pricing discussed extensively by one of the pioneers of climate change modelling William Nordhaus is the opportunity to improve the efficiency of the tax system through replacing highly distorting taxes by a price on carbon.

If the carbon constraints are imposed through taxes, and the revenues are returned by reducing taxes on other goods or inputs, then the increased efficiency loss from taxation can be mitigated, so that there is no net increase in deadweight loss. If the constraints under a quantity-based system are imposed by allocations that do not raise revenues, however, then there is no mechanism to mitigate the increased deadweight loss. This is an important issue, as the inefficiency losses can be as large as abatement costs (Nordhaus 2007, p.37).

This highlights another advantage of market-based measures over direct measures (such as regulation). Direct measures would not assure least cost abatement, and are therefore likely to lead to a bigger “tax” on households. Further, direct measures would not raise any revenue for recycling in the form of tax cuts that would be beneficial to productivity.

Before elaborating on what an efficient and fair economy wide carbon price policy might look like for Australia, it is worth re-visiting the changed context for pricing carbon and reducing emissions. This is the task of Section 2 of this paper. Section 2 explores the international and national carbon pricing developments including the climate change policy debate in Australia and its link to reforms of the Australian economy more generally. Section 3 outlines the benefits of a model for pricing carbon that includes a fixed price start to an emission trading scheme followed by a transition to full trading. Section 4 of the paper discusses the efficient and fair uses of the carbon price revenue that advances the national interest. Section 5 concludes with some thoughts on how to take policy forward within a constructive national debate.

## Box 2: A carbon price in perspective

Given the potential for reducing the deadweight costs of more distorting forms of taxation, some may think it a pity that we are actually talking about fiscal changes that are relatively small—much smaller, for example, than the switch from direct to indirect taxation associated with the introduction of the GST. The headline finding of modelling exercises on the imposition of a carbon price is that the economic impacts are modest. The Australian Government's analysis of its 2008 Carbon Pollution Reduction Scheme (CPRS) -5 scenario showed a one-off impact on prices (CPI) of around 1 per cent. This is not much more than a third of the size of the one-off rise in CPI of 2.8 per cent brought about by the introduction of the GST in Australia (Grattan Institute 2010a).

The economic impact of a carbon price is also likely to be moderate compared to the effect of rises and fluctuations regularly seen in exchange rates, petrol prices and interest rates.

- Throughout 2010 the Australian dollar to United States dollar exchange rate varied between 81.6 cents and parity (RBA 2011). An appreciation of a similar size over the next decade would have a considerably larger impact on the Australian economy than the introduction of a carbon price over the same period (Access Economics 2010).<sup>1</sup>
- The impact on the price of petrol of a carbon price in the range discussed in this paper would be about 5-7 cents per litre<sup>2</sup>, compared to typical weekly petrol price fluctuations of up to 13 cents per litre in some capital cities, and to the recent national average petrol price increase of about 25 cents per litre since September 2010.<sup>3</sup> Some perspective can also be gained from considering the recent increases in petrol prices associated, at least in part, with the current turmoil in the Middle East; in the 3 weeks to 6 March 2011, average petrol prices rose 7.9 cents per litre.
- The impact of the Government's proposed Carbon Pollution Reduction Scheme on the average annual households' cost of living in 2012-13<sup>4</sup> would have been A\$624<sup>5</sup> prior to assistance, with minimal ongoing inflation (CPRS -5 scenario). This compares with the effect of a rise in interest rates of 0.25 per cent on the average new Australian mortgage, which would result in an additional A\$565 of interest payments per year.<sup>6</sup>

Electricity prices fluctuate as a result of numerous factors; one is weather events and climatic conditions. For instance, the impacts of drought on hydro and coal-fired generators—in combination with record peak demands and other factors—caused average wholesale electricity spot prices in the National Electricity Market to rise to record levels in 2006-07 and 2007-08. Average annual increases of 35-85 per cent were experienced in some states (AER 2009). With wholesale prices comprising around 40 per cent of retail electricity prices, this was a significant contributor to the

<sup>1</sup> Analysis by Access Economics (2010) indicates that a 20 per cent exchange rate appreciation would lower real GDP by just over 5 per cent over 10 years, while based on the Australian's Treasury's (2008) CPRS modelling, the introduction of a carbon price would lower real GDP by 3 per cent over 10 years.

<sup>2</sup> Assuming a carbon price of \$20-\$30 per tonne of CO<sub>2</sub>-e and that 2.29 kilograms of CO<sub>2</sub>-e are produced from each litre of petrol (Grattan Institute 2010b).

<sup>3</sup> Fuel price fluctuations and national average price increase data taken from the Australian Institute of Petroleum (AIP) website: <<http://www.aip.com.au/index.htm>>.

<sup>4</sup> When the scheme was scheduled to move from a fixed to a floating price.

<sup>5</sup> Department of Climate Change and Energy Efficiency website, accessed 9 March 2011, <<http://www.climatechange.gov.au/government/initiatives/cprs/carbon-price-design/household-assistance.aspx>>

<sup>6</sup> Assuming new Australian mortgages average \$285,000 (ABS: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/5609.0Jan%202011?OpenDocument>).

subsequent rises in electricity prices for consumers.

By comparison, Australian Treasury modelling of the CPRS-5 scenario shows an average rise in wholesale electricity prices of 48 per cent (10 to 66 per cent across states) in the early years of the scheme (between 2010 to 2015) and an average rise in household electricity prices of about 20 per cent over the same period.

## 1.1 Recommendations of the 2008 Garnaut Climate Change Review

In the 2008 Garnaut Climate Change Review (the Review), I described Australia's mitigation effort as our contribution to keeping alive the possibility of an effective global agreement on mitigation. Though an emissions trading scheme may not be the best instrument to reduce emissions in every country, it was considered to be so for Australia. The judgement that an emissions trading system was better for Australia than a carbon tax was made on balance; a clean and well-administered carbon tax would be better than a distorted emissions trading scheme.

I proposed that Australia's emissions trading scheme should in any circumstances begin with a transitional fixed price period from 2010 to 2012, with permit prices rising each year by 4 per cent (real), from A\$20 in 2010 (2005 prices). This fixed price period was recommended to reduce uncertainty and to ease anxiety in the scheme's initial years. In circumstances in which there was no comprehensive international agreement on mitigation at the time of introduction of the scheme that allowed clear definition of Australia's emissions reduction responsibilities, and deep international trade in emissions entitlements, the fixed price would continue. The institutional arrangements would be in place to shift smoothly and swiftly to a floating price when international circumstances supported the change.

The emissions reduction goal should be Australia's proportionate share of an effective global mitigation effort. If the international community committed itself to reduce emissions so as to stabilise greenhouse gas concentrations in the atmosphere to 450 parts per million (ppm) of carbon dioxide equivalent—corresponding to what the Review identified as Australia's national interest—Australia's proportionate share would be to reduce emissions from 2000 levels by 25 per cent by 2020 and 90 per cent by 2050. If the international community committed itself to some less ambitious goal, Australia should still make a proportionate contribution. Pending and in the absence of an effective international agreement, Australia should commit itself unconditionally to reduce emissions by 5 per cent on 2000 levels by 2020. This could be seen as Australia's contribution to keeping alive the possibility of a strong, effective international agreement.

Specific design features of the emissions trading scheme recommended in the Review include:

- Broad coverage of sectors and greenhouse gases.
- Provisions for domestic offsets for the land sector pending its coverage by the scheme, and a recommendation to seek out, in a judicious and calibrated manner, opportunities for international trade in permits and links to other permit markets.
- Full auctioning of permits, no price ceilings or floors, and unlimited hoarding and limited lending of permits, outside the fixed price period. The permits, once purchased, could be used at any time beyond the fixed price period.
- Administration of the scheme by a well-resourced, independent institution—an independent carbon bank—because good governance is the only antidote against the many pressures that would be applied to the political system by special interests. The emergence of a strong and effective regulatory authority that was independent of Government would be important to the credibility of the scheme and therefore to the long term stability of the carbon market.
- Measures to remove distortions in resource allocation that could arise if firms with international competitors were subject to a different emissions price in Australia than in other countries. The Review recommended that, in the absence of a global agreement that generated similar carbon prices in all countries or sectoral agreements, transitional arrangements should be applied to relevant industries. These would provide assistance at levels that removed incentives to move

production and investment out of Australia when they would have remained here if all countries were applying a similar carbon price to Australia. Under the recommended approach, assistance would be paid for the gap between the uplift in world product prices expected with a global carbon price at the Australian level, and the product price for Australian producers without global carbon pricing. This approach was not based on compensation for lost profitability. To this end, the Review judged that between 20 and up to 30 per cent of permit revenue may need to be committed in the early years.

To remove regressive distributional effects of the emissions trading scheme, the Review recommended that at least half of the proceeds from the sale of all permits be allocated to households, focusing on the bottom half of the income distribution. The bulk could be passed through the tax and social security system, as much as possible in ways that encourage rather than deter labour force participation. A supplementary system of “green credits” could operate in the early years, to help low-income households fund investments in energy efficiency in housing, appliances and transport.

The Review observed that global adjustment to a low-emissions economy required a high level of investment in research, development and commercialisation of new technologies. To overcome market imperfections associated with the large benefits that one firm’s innovation conferred on others, which would lead to underinvestment in innovation by private entities, there should be substantial public fiscal support for these activities. The relevant effort was global, and all developed countries should contribute in proportion to their incomes and economic size. Australia’s “share” in an International Low-Emissions Technology Commitment would be about A\$2.8 billion once the arrangements were fully developed. This would be funded from permit revenues, and allocated to technologies in which Australia had comparative advantage in research and a national interest in deployment.

The Review noted that there could be requirements for structural adjustment assistance in the coal-based power generation regions. The best structural adjustment assistance would be pre-emptive—investment in alternative, lower-emissions activities in those regions. It was recommended that A\$1 billion in matched funding be provided for pre-emptive structural adjustment assistance to new investment in the coal-based power generating regions that may be under pressure to decline.

In terms of policies to reduce emissions, other than the emissions trading scheme, I suggested that there was limited scope for other complementary policies. These should be subject to rigorous scrutiny, and be introduced only when they clearly met two tests: they should lower the cost of meeting emissions reduction targets; and they should correct clearly defined market failures.

## **2. A new international and national context**

The Review said that strong and effective action on climate change was most likely and would be achieved at lowest cost within a comprehensive global agreement that allocated entitlements to emissions amongst countries, and allowed trade in entitlements. Countries that chose to participate in international trade would reduce the costs of meeting their commitments to reduce emissions. The Review noted that there were flaws in the established international framework that would need to be corrected—most importantly, the entrenched idea that developing countries would not be obliged to take action until all developed countries had substantially reduced their high levels of emissions. Australia should declare its commitment to play its proportionate part in an agreement calibrated to hold emissions concentrations to 450 ppm, or its proportionate part in any less ambitious agreement. Failing or awaiting clear rules and opportunities for trade, Australia should accept an unconditional commitment to reduce emissions moderately, to legislate an emissions trading scheme, and to operate that scheme with a fixed price.

We find ourselves in world that shares characteristics with a couple of the international mitigation scenarios identified in the Review, but does not line up precisely alongside any of them. There is a new international agreement to hold temperature increases to 2°C. Many countries, including all economies of substantial size, are committed to take strong action to reduce emissions well below business as usual. This is most impressive in the developing countries, which no longer are seeking in practice to hide behind the protections of the old division of the world between developed and developing countries. But it is a messy world, in which each country is declaring its own commitments to mitigation, and making commitments in ways that are not conducive to deep international trade in entitlements. It is also a world in which international cooperation has been complicated by the global financial crisis.

This has severely weakened most developed countries, and accelerated the geopolitical shift from developed toward developing countries. The major developing countries must now play central roles for any important international cooperation to be effective (Garnaut with Llewellyn-Smith 2009).

Australia, unlike most other developed countries, has emerged from the Great Crash with high incomes and employment and a reasonably if, in the circumstances, insufficiently strong fiscal position. After chronic underperformance over the first eight decades of the twentieth century, Australians' average incomes exceed those of the United States and most other developed countries (Garnaut 2010b).

This is a period of exceptional prosperity. The contemporary Australian prosperity is based on reform of economic policy and institutions through the 1980s and 1990s that decisively reversed the long-term decline in Australian productivity relative to other developed countries for a couple of decades from the mid-eighties to the end of the twentieth century. From the middle of the first decade of the twenty first century, these gains were augmented by an improvement in our terms of trade that is historically exceptional in its extent and longevity and that continues today. Australian incomes are being raised prodigiously by high commodity prices and immense investment in the resources sector.

The "resources boom" lifts average incomes and wealth and also Government revenue. The increase in world energy prices that raise incomes and wealth in the resources sector increase the cost of living of ordinary Australians. Through its effects on inflation in domestic costs, and in raising the exchange rate, the resources boom also places great pressure on the competitiveness of other Australian industries that compete in export markets and with imports—especially in manufacturing and education, tourism and the whole range of trade-exposed services industries. This explains why many Australians feel under economic pressure at a time of unprecedented prosperity for the economy as a whole.

The high terms of trade and the consequent resources boom are driven by the acceleration of growth in China and the developing world since the early twenty first century. Strong growth in the developing countries is likely to last for a long time; the current high terms of trade are not. High commodity prices induce high levels of investment that expand supply and eventually bring prices down, although in this case not down to the low levels of the last quarter of the twentieth century.

The Great Australian Prosperity of the early twenty first century has been accompanied by a Great Australian Complacency of the Early Twenty First Century. I first referred to this publicly half a dozen years ago, when rising incomes in a potentially sustainable productivity boom had been kept going for a while by an unsustainable debt-financed housing and consumption boom (Garnaut 2005).

The effective reform period of Australian economic policy ended with the tax reform with the GST at its centre that came into effect in 2001. There have been increasing signs of interest groups pursuing sectional objectives with little concern for the national interest and to great effect (Garnaut 2010c). This is one element in the twenty first century retreat of Australian productivity growth, to lower rates than in the long underperformance of the twentieth century. This is all the context of contemporary Australian discussion of climate change policy.

Australians are enjoying exceptionally, although temporarily, high prosperity. It is a good time to invest a small part of that unearned income in measures to protect the living standards of future Australians against climate change.

On the other side of the coin to the extraordinary lift in the incomes and wealth of owners of resource industry assets is downward pressure on the living standards of some other Australians—through increases in gas, electricity and petrol and diesel prices and a decline in the competitiveness of all other industries that compete with imports or on export markets. So it does not feel like a good time for many Australians, because the source of the recent increments in that prosperity—the resources boom and the lift in energy prices—is raising the cost of living of all Australians and reducing the incomes of all Australians competing in international markets for goods and services outside the resources sector.

This makes it a harder time than it would otherwise be to place extra burdens on people earning incomes outside the resources industries.

Also on the other side of the coin to the high incomes and wealth in the resources sector is exceptional growth in "business as usual" Australian emissions (see Update Paper three). The resources industries

that have been promoted by the boom are highly emissions intensive. The emissions associated with opening new coal mines and liquefying natural and coal seam gas for export are the main element in the recent large upwards adjustment of expected Australian emissions in 2020. The prosperity of the resources industries has increased the task and the cost facing all Australians in meeting minimum commitments to emissions reductions.

Examination of the two sides of the resources boom coin raises large issues of equity in adjustment to low emissions in the period ahead. If there were some risk of adjustment to a low-emissions economy temporarily easing growth in the most emissions intensive parts of the resources sector, this would be a good time to absorb it. This would moderately ease the economy-wide adjustments associated with the resources boom. It may avoid a little of the waste of resources associated with temporary contraction of industries producing tradeable goods and services outside the resources sector, which has to be reversed at high cost after the boom recedes.

At the same time, this is a difficult period for the political economy of reform. The role and confidence of special interests in the policy process has been enhanced by recent experience. The role of an independent centre of the Australian polity in the policy process, with focus on the public interest, has declined markedly since the extended period of productivity-raising reform in the late twentieth century. The balance between special and public interests in the policy process has returned to that of the unhappy days of “protection all round” and chronic Australian underperformance.

The political economy malaise of the early twenty first century introduces a special risk to policy-making on climate change. Policy based on myriad regulatory interventions, rather than general principles applied by independent institutions and implemented through market processes, is especially vulnerable to capture by special interests. The economic adjustment associated with carbon pricing to reduce greenhouse gas emissions itself has small economy-wide effects—much smaller than the removal of endemic protection or the introduction of the GST. A carbon tax can have favourable efficiency effects if used to reform highly distorting taxes but these are relatively small because the tax switch is relatively small. By contrast, a botched regulatory approach to reducing emissions, that unleashed the old proclivities of the Australian political process to respond to pressure from special interests by granting tailor-made favours, would not be small in its economy-wide effect. It could come to mark an historic and unhappy turning point in Australian economic policy and performance.

## 2.1 International developments

The Update is being conducted in a world that is uncoordinated in its steps to reduce emissions—but far from passive. Update Paper two sets out the large actions that are being taken in other countries to reduce emissions. There are clear and positive indications that countries are taking Copenhagen Accord pledges seriously. This is notable in the world's two largest emitters of greenhouse gases, China and the United States, as well as amongst the five hundred million high-income people of the European Union, the other European states, Japan, the Republic of Korea and other major developing countries. The actions are working towards the type of comprehensive global action required, although not at this stage in forms that support deep international trade in emissions entitlements.

The majority of Australia's major trading partners are taking action to reduce emissions—some, like China, even more ambitious action than the Review suggested would be an adequate initial commitment within an ambitious global agreement. The elements which are still lacking are binding commitments, countries' efforts adding up to a mitigation objective that will avoid the worst outcomes from unmitigated climate change, and a firmer basis for large-scale international trade in emissions entitlements.

The way the global approach to reducing emissions has played out has ramifications for Australia's own decisions for mitigation policy. Crucially, the messy—though active—“transition period” toward more complete global agreement seems longer, more complex and less certain in its end points than I had hoped in 2008. Nevertheless the possibility of such a messy world—although not one that was so active in mitigation—was anticipated in the Review. The “waiting game”, with an emissions trading system in which the price was fixed for an extended period, was introduced in anticipation of this possibility (Garnaut, 2008, p285).

## 2.2 The context for domestic reform

The global context and our nation's fiscal challenges and reform agenda will permeate all decisions in designing mitigation policy: selecting the type of intervention; developing a carbon pricing regime—including deciding the level for Australia's ambition, and the timing for making changes to the scheme; determining the use of revenue; and preparing Australia for larger steps in emissions reductions within the more efficient and ambitious global emissions reductions framework that will be required if we are to reach objectives that are in Australia's national interests.

History also matters. Australia's climate change policy debate has not always been a constructive one. This constrains what is possible in complex ways that, on the whole, increase the difficulty of the current task.

Following the release of the Review in 2008, domestic mitigation policy progressed quickly, with intensive work on a proposed carbon pricing policy. The Australian Treasury released its modelling of emissions reductions a month after the release of the Review (Australian Treasury 2008). Its headline findings—that with effective and strong mitigation, Australian and world incomes would continue to grow at only a slightly diminished rate—seemed not to penetrate into all corners of mainstream public consciousness, or the mainstream debate.

The history of the several attempts to legislate a Carbon Pollution Reduction Scheme in the last Parliament are on the public record.

The Carbon Pollution Reduction Scheme in its final form had many sound characteristics, and some that were problematic. Once the Government accepted the emissions reduction targets in their present form—extending to reductions of 25 per cent by 2020 in the context of an effective international agreement to hold emissions concentrations at 450 parts per million or lower—I expressed publicly the view that the legislation warranted support.

I expressed reservations about a number of details of the proposed scheme; the absence of principled justification for large payments to some electricity generators; the absence of consistently applied principle in decisions on support for emissions intensive, trade exposed industries; the absence of general fiscal support for innovation in low-emissions industries; the absence of an independent regulatory authority and the consequent vulnerability of the scheme to political pressure on changes over time in targets and assistance to trade-exposed industries.

Markets can collapse if their credibility is shaken excessively. This is all the more pertinent for markets that owe their existence solely to government decree, like a carbon pricing regime. In 2008, the Review warned that if it appeared that the rules of the carbon pricing scheme could be influenced by political pressure, then its stability and credibility could be undermined.

The challenge of carbon pricing policy has now been taken up by the Multi-Party Climate Change Committee (MPCCC) and 2011 has become a crucial year for climate change policy.

A major effort is required to restore a role for information and analysis in the carbon pricing debate.

Australia's mitigation policy must be designed to be effective for two scenarios. The first is today's messy world, in which there is substantial global mitigation, but not in a framework that allows emissions to be reduced at lowest cost and therefore not in a world that facilitates optimal ambition. The second is a world of quantitative targets and deep international trade in emissions entitlements. It is important for a strong global outcome that Australia engages effectively with, and plays its proportionate part in both scenarios.

Consensus was always going to be beyond reach on such an issue within the Australian political culture. It is, however, a realistic objective, to design policies that are geared to achieve mitigation objectives efficiently and equitably, with transparent premises, information and analysis. This allows transparent debate of proposed policies, and allows a Government to take decisions in the national interest with substantial if not unanimous public support. This will provide a credible basis for introducing and sustaining a carbon price in Australia.

### Box 3: Australia's experiment with other mitigation policies

Without a carbon price, other climate change policies and programs have proliferated in Australia. The Strategic Review of Australian Government Climate Change Programs (the “Wilkins Review”) published in 2009 concluded: “there are too many programs. Many are ad hoc or badly targeted.” It suggested Australia's climate change policy package was incoherent and failed to offer least cost mitigation (Australian Government 2008b).

Today, over 30 climate change mitigation policies are administered by the Australian Government, costing around A\$1 billion in 2010-11 (Australian Conservation Foundation 2011). While some policies have reduced emissions at reasonable cost, more have not. The cost of most major existing climate change policies, per unit of abatement, is far above that of any proposed carbon pricing scheme for Australia.<sup>7</sup> Australia's costly climate change interventions have embodied an arbitrary approach to redistributing property rights—and have not provided any revenue to alter, or correct, the effects of these measures on the distribution of income. More importantly, unlike a carbon price, they have generated no revenue to improve economic efficiency by removing distorting taxes.

Existing policies are not causing Australia's emissions to fall, despite enthusiastic participation by the community. The Australian Government's most recent forward assessments of Australia's emissions suggest the existing mitigation policies are hopelessly inadequate to meet even the lower end of our 2020 emissions reduction target range. Emissions under current policies are projected to rise by 24 per cent of 2000 levels by 2020, compared to the unconditional target proposed by the Review and accepted by the Government and Opposition in Australia of a 5 per cent cut (DCCEE 2011b; Garnaut 2008).

## 3. A carbon pricing regime for Australia

### 3.1 The model: fixed price start to an emission trading scheme

Only global agreement has any prospect of holding risks of climate change to acceptable levels.

As noted in the 2008 Review, and in Update Paper two, it is in our national interest that the global effort should endeavour to hold global emissions concentrations to 450 ppm. It is good for Australia that this goal has now been agreed by the international community at Copenhagen and Cancun expressed as an aim of limiting warming to below 2°C above pre-industrial levels.

Currently the global emissions reduction effort is too small to hold emissions concentrations to 450 ppm. We do not know when or even whether the international effort will be big enough.<sup>8</sup> While global action is undertaken in the messy world, it will be difficult to calibrate Australia's proportionate action.

In the 2008 Review, I recommended that should the circumstances arise in which we now find ourselves, Australia should introduce an emission trading scheme but begin with a fixed price period. We would then be ready to float the emissions permit price after 2012, when there were clear rules and opportunities for international trade in permits (Garnaut 2008, p.285, 350-1).

Several clear principles must guide policy if a carbon price is effectively and efficiently to drive the transition to a low-carbon economy. The principles are derived primarily from the objective of the policy—that is, to address the market failure of the unpriced externality of greenhouse gas emissions. As previously discussed, for the policy to be in the national interest other principles are relevant:

<sup>7</sup> See, for example, Australian Government 2010, Macintosh and Wilkinson 2010.

<sup>8</sup> Global emissions, and mitigation action, are discussed in detail in Update Papers two and three, respectively.

- Environmental integrity – confidence that genuine emissions reductions have been achieved.
- Cost-effectiveness – emissions reductions should be achieved at least cost to the community, by avoiding duplication and overlap with other policies, and using revenue from the scheme to reduce the costs of mitigation.
- The scheme should be swiftly revised in response to the recommendations of regular, transparent and independent reviews. Sound, independent governance will ensure the scheme moves to its optimal design over time.
- Autonomy – the scheme should minimise reliance on recurring judgements by government, and instead harness the efficiency of the market within an independently managed framework.

There are other important criteria in assessing options for carbon pricing models, including its administration and transaction costs, the ability to provide confidence for investors and participants, and the opportunities to support, and link to, existing and emerging international markets.

There are several models to price greenhouse gas emissions (or carbon). The major difference is that some models set limits on the quantity of emissions and allow the price to vary, while others set the price of emissions and allow the quantities to vary. That said, carbon pricing models share core features, including their use of a price signal and efficiency benefits over regulation. Most, but not all, generate Government revenue. Appendix 1 discusses the principles for assessing carbon pricing models, given the new context for decision making on mitigation policy, to highlight meaningful differences among models.

An emissions trading scheme with an initially fixed (and rising) price has some advantages. In the short term, a fixed price can provide steadiness, when a floating price would be volatile while the scheme remained the subject of fierce dispute and threats to repeal it. It would allow firms to become familiar with compliance under the scheme, and allow Australia to move towards a quantity constraint as knowledge of the scheme and confidence in its stability expanded. Such an approach has the added benefit of gradually building industry capacity, and establishing and testing necessary institutions and administrative infrastructure.

International trade in abatement is legitimate and an important element of an efficient global solution to climate change. The eventual transition from a fixed to a floating price as well as linking with other schemes will assist in allowing emissions reductions to take place where they are cheapest. One advantage of emissions trading over a carbon tax (or an emissions trading scheme with a permanent fixed price) is that it facilitates private international trade—otherwise trade in entitlements has to be conducted through a Government window. The Australian resource endowment and comparative advantage in emissions-intensive industries—strengthened by the resources boom—makes our country naturally an importer of permits and exporter of emissions-intensive products. We have fewer opportunities for low-cost abatement than are known with certainty than are present in other countries—although development of land-based opportunities may change this in future. With greater opportunities for trade in emissions entitlements, Australia can be more ambitious and make a larger commitment to global action at lower cost.

In implementing an emission trading scheme with a fixed price start there are two set of decisions to be made:

- 1) The starting price and how much the price rises by each subsequent year
- 2) The timing, conditions and manner of transition to full emissions trading.

In the following sections I discuss the factors influencing the setting of the starting price, recommend a starting price and subsequent rate of increase, and discuss the conditions for moving from a fixed to a floating price.

## 3.2 Setting a fixed price in a messy world

The first objective of Australian mitigation policy must be to support the emergence of a strong and effective global agreement. This must be kept in mind in setting a domestic carbon price. The price must be consistent with a proportionate commitment by Australia to the contemporary global effort to reduce emissions. It should contribute appropriately to Australia meeting the commitments to reduce emissions that it has made to the international economy.

The setting of the initial price should also put Australia on a path toward longer-term outcomes. We need to position our economy for the future mitigation challenge and a world of global action. We should ensure that we do not encourage arbitrary or redundant investments or divestments that make no sense in the carbon policy world that follows the fixed price.

### Credibility: meeting commitments and expectations

If Australia's carbon price is set too high—out of step with international action—there could be an unnecessarily costly transition. This is likely to raise doubts about the scheme's sustainability. Expectations that the scheme may be amended or abandoned will raise the supply price of investment to activities affected by it.

On the other hand, too low a price could impose transactions costs for no real gain. It would not raise the chances of reaching the goals of Australia and the international community. In the absence of a logical link to the larger objective, it would be difficult to establish credibility.

The range of community and business expectations is relevant here, based on the range of prices that has been canvassed publicly.

Since 2008, expectations surround carbon prices have not changed fundamentally. Options include those put forward by the Review in 2008 (A\$20/t carbon dioxide equivalent, in 2005 dollars, rising at 4 per cent per annum in real terms). The Garnaut Review proposals on prices were in line with what would have been required to achieve Australia's contribution to a moderately ambitious global mitigation effort, directed at 550 ppm of carbon dioxide equivalent, in a world with opportunities for comprehensive trade in entitlements. They include those that have emerged from other major modelling exercises—such as the modelling undertaken for the Australian Government's 2008 White Paper (ranging from a starting nominal price of A\$23/tonne carbon dioxide equivalent in 2010 for the CPRS -5 scenario, to a nominal price of A\$52 in 2013 for the Garnaut -25 scenario, and rising by a little more than 7½ per cent per annum in nominal terms).

It would be interesting to see how updated economic modelling would change the estimated international and Australian carbon prices. There are a number of factors that influence international carbon price projections including: international mitigation actions and associated technological developments; the underlying economic developments in both developed and developing nations; and commodity prices, particularly for energy intensive goods to name but a few. Within Australia, there are also a range of factors such as: the influence of the terms of trade and other structural forces affecting the pattern of economic development and developments in emission intensive sectors such as the electricity generation and transport sectors.

Australia's current policy settings and commitments are also relevant to a starting price. Australia has had an unconditional target to reduce emissions by at least 5 per cent by 2020 (relative to 2000 levels) since 2008. This target has bipartisan support. It became a commitment to the international community in Copenhagen in December 2009, and became part of a set of international agreements at Cancun in December 2010. Past modelling suggests that to meet this target Australia's carbon price would need to commence at around \$26 nominal in 2012.

Government targets allow unlimited permit imports, so Australia's domestic emissions could exceed its target. That is, the 5 per cent figure is a "net" rather than domestic emissions reduction.

Australia will need to be tighten its target in line with international action, hopefully to the levels that would be required by the international community making progress towards its declared goal of holding

temperature increase to two degrees. The starting point has to prepare us for later adjustment if and when it is required.

Explicit carbon prices in existing international markets and where economy wide carbon pricing policies are present are also relevant. Future linking and trade in entitlements will occur more smoothly if the gap between Australian and overseas carbon prices is not too great.

Recent overseas carbon prices range from around €12.40 (A\$16.95) per tonne carbon dioxide equivalent in the global offsets market, to NZ\$25.00 (A\$19.50) in New Zealand's emissions trading scheme (noting that for a transition period prices are effectively halved, given two-for-one compliance obligations, see Box 5.) to around €15.00 (A\$20.50) per tonne carbon dioxide equivalent in the European Union Emissions Trading Scheme.<sup>9</sup> Forecasters from Point Carbon and Barclays suggest that California's emissions trading scheme will start with prices between US\$13-16 (A\$12.95-15.95) per tonne carbon dioxide equivalent in the first few years, rising to US\$75 (A\$74.75) in 2020, when free permit allocations drop and auctioning dominates permit allocation.<sup>10</sup> This is consistent with prices suggested in the short term in proposed Californian legislation.<sup>11</sup>

Another indication of suitable, and credible, prices for carbon is provided in economic analyses that guide regulatory decisions in the United States, where a systematic approach has been taken to these issues. In the United States, the Environmental Protection Agency (2010) recommends that economic assessments use a social cost of carbon of US\$21 (A\$20.9) per tonne carbon dioxide rising over time to US\$26 (A\$25.90) in 2020, and US\$33 in 2030 in 2007 dollars equivalent to A\$32.90).<sup>12</sup> In the UK, this price is higher, with non-traded investments advised to consider £26 (A\$41.65) per tonne carbon dioxide equivalent to be a suitable cost of carbon.

#### Box 4: Recommending a carbon price in the UK

The case for an open, dynamic and adaptive approach to domestic mitigation decisions is recognised in other jurisdictions. For instance, in developing recommendations for its country's short- and medium-term carbon budgets, the UK's Committee on Climate Change considers implications of the 2050 target and appropriate contributions by the UK to required global emissions reductions in 2020, European Union targets for emissions reductions to which the UK is already committed, and a bottom-up sectoral analysis of feasible emissions reductions and likely costs (UK Climate Change Committee 2008). Considering a number of conditions, including projected prices for offsets and European Union emissions trading scheme allowances, the Committee forecasts a carbon price of £40 (\$A64.05) per tonne carbon dioxide equivalent in 2020 in their central case for analysis of carbon budgets.<sup>13</sup>

<sup>9</sup> Westpac, Carbon Update: Australian edition 26 November 2010. Converted at exchange rate on date of publication of estimate, as at 26 November 2010.

<sup>10</sup> Point Carbon, February 2011, <<http://www.pointcarbon.com/1.1501850>>. Converted at current exchange rates, as at 11 March 2011.

<sup>11</sup> See: <http://www.arb.ca.gov/regact/2010/capandtrade10/capv1appa.pdf>

<sup>12</sup> Converted at current exchange rates, as at 11 March 2011.

<sup>13</sup> See: <http://www.theccc.org.uk/pdf/TSO-ClimateChange.pdf>

## Considering the mitigation efforts of others

Could domestic ambition be calibrated to the near-term climate change policies of other countries, as indicated by their implicit<sup>14</sup> or explicit carbon price?

The first thing to be said is that precise comparison is difficult.

The Productivity Commission's work on the effective carbon prices that result from a range of emission reduction policies will be informative. It will also underline the conceptual and empirical difficulty of comparisons.

This raises in a different context the cautions from Frankel (2007) about basing international agreement on comparable carbon pricing.

There are many and serious difficulties with determining implicit prices, and comparing them between countries or industries. Policies often have opaque or multiple objectives, and it is difficult to decide which should be fed into the calculation. An implicit carbon price cannot be precisely calculated for some policies, including energy efficiency and research and development assistance. Some different types of costs cannot easily be combined.

Nevertheless, an independent and transparent assessment of developments internationally can enhance understanding of global action. It will indicate action being taken by other countries to reduce emissions. As data availability and quality improves over coming years, and with more time, comparisons will improve.

As discussed in Update Paper two (*Progress towards effective global action on climate change*), there are several proposed measures of commensurable effort. There are difficulties with each of them.

Some advocate "comparable pain", as measured by the economic cost of mitigation measures relative to the size of the economy, as a suitable measure. This could see countries calibrate policy effort to achieve similar outcomes in terms of GNP cost. However, modelling of comparative GNP impacts is highly uncertain, and any version would be disputed.

Another approach is to compare relative reductions in emissions against a benchmark, including percentage reductions, or declines in emissions intensity, from a base year. As Update Paper two makes clear, this is the path down which the world is proceeding. In deciding upon Australia's level of ambition, we must recognise that we will mainly be judged by a measure of this kind. But it is a particularly difficult measure for Australia in the absence of opportunities for large-scale trade in entitlements.

These several considerations will need to be taken into account in setting an Australian price. It should be high enough to put us on a path to meeting our commitments to the international community. It should be within the range of established international carbon prices. Australia will need to explain to the international community that its own circumstances place limits on the reductions in emissions in the absence of opportunities for large-scale trade in entitlements.

### 3.3 Australia's starting price and rate of increase

The starting point and the rate of increase of a carbon price will need to balance the several considerations outlined above: Australia's contribution to global goals; our existing commitments domestic credibility and others' climate change mitigation policies and associated implicit carbon prices.

These considerations suggest a starting point for Australia's carbon price in the range of A\$20 to A\$30 per tonne carbon dioxide equivalent in 2012.

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<sup>14</sup> The implicit price of policies must be estimated, using information on the amount of emissions abated (relative to a counterfactual) and the total costs associated with that abatement.

Prices to ensure the optimal depletion of a finite resource—in this case, the atmosphere's limited absorptive capacity—will increase over time at the rate of interest (Hotelling (1931)). It is my assessment that a mature market would come to apply something like an interest rate of 4 per cent in real terms—2 per cent representing the risk-free real rate, and a risk premium of about 2 per cent. It is appropriate to simulate the likely market movement by raising the fixed price of emissions by 4 per cent per annum in real terms. This rate of increase has a sound conceptual basis, and is now widely accepted (Garnaut 2008, Australian Government 2008).

### 3.4 The shift: moving from a fixed to floating price

It is important that investors be provided with clarity about when and the conditions under which the transition to a floating price will occur. To support a smooth transition to a floating price, the necessary institutions and supporting infrastructure should be established from the beginning of the scheme. It is important to specify rules for the scheme as soon as possible, including on arrangements for auctioning permits, and for acceptance of offsets and international permits. Having this framework agreed, understood and embedded alongside a fixed price will build confidence in the transition, and allow rapid and smooth movement to a floating price when the time is right.

#### Timing of the shift

It has been suggested that the following conditions might be considered to be relevant to the timing of a shift to a floating price:

- Development of global agreement. If sufficient countries (weighted by significance in the international economy and trade) take on emissions targets in the medium- and long-term. Reaching a shared judgement on progress on this measure is difficult, as highlighted by recent debates over whether international developments justify a move to Australia's 15 per cent conditional emissions reduction target—a matter which will be discussed in the Final Report of the Update.
- Opportunities for trade. These may exist in substantial quantities, liquidity and stability in advance of the kind of global agreement envisaged in the Review. They could be nurtured through a regional agreement with neighbouring countries that are complementary to Australia in their opportunities economically to reduce emissions below their proportionate international commitments. A regional market would need to be underpinned by levels of ambition that sensibly prepare each member for proportionate contributions to a global agreement, and in the short-term by commitments that are proportional to comparable countries' commitments. Trade with New Zealand, Japan, Korea and Indonesia, and potentially Papua New Guinea, Timor Leste and the South Pacific may be relevant. Trade with the European Union and parts of North America may become relevant, although each of these may be competitive with rather than complementary to Australia's role in international trade in emissions entitlements.
- The establishment of credibility and stability of the domestic scheme. The desire to build confidence during a period of political uncertainty is one reason for starting with a fixed price, and this role is completed when the domestic polity has accepted that the scheme is here to stay. Pricing at auction for future use would be a significant indicator of confidence in the longevity of the scheme, as would the curve of future prices in forward markets for permits (see below).

Judgements about whether the above conditions had been met would have subjective elements. It would be difficult for participants in the market to assess when the transition might occur. There is a risk that uncertainty would encourage destabilising pressure on the decision-making process by interests that stood to gain or to lose from delay in transition to a floating price.

On balance, there are advantages in fixing the date of transition in advance, and in working to ensure that adequate opportunities for credible international trade in entitlements are available by the time of transition. The Review Update proposes that a definite date for the transition be agreed, and it favours three years, that is, in the middle of 2015, unless the independent regulator on expert advice judges that the opportunities for international trade in entitlements are not sufficient to support a liquid and stable permit market.

A firm target for reductions of emissions over time will need to be established in advance of the movement to a floating permit price. Australia's current unconditional target for 2020, or a more ambitious target judged at the time to be appropriate or negotiated in establishing a regional market, would be the initial determinant of the price path in the market. Independent Reviews of the target should occur regularly, on a pre-announced, firm timetable. The process and institutional arrangements for such a review are important. The Update suggests that the governance arrangements and a process similar to that employed by the UK Government in setting its emissions reduction targets should be adopted. In the UK, the Climate Change Act 2008 mandates an emissions reduction target for 2050, and the processes for setting interim carbon budgets. The Act requires the Government (through its Secretary of State) to take into account the advice of the independent Committee on Climate Change (established under the Act, see Box 4), along with any representations made by other national authorities. The Committee's input includes advice on whether the 2050 target should be amended, and on the level for interim carbon budgets. The legislation requires that if the Government sets the carbon budget at a different level from that recommended by the Committee, the Secretary of State must also publish a statement setting out the reasons for that decision (UK Government 2008, section 9). In an Australian scheme, an independent committee, similar to the UK Committee on Climate Change, would provide similar recommendations on targets to Government, with the resultant decision guiding the activities of the independent regulator.

This is analogous to the arrangements in place for monetary policy in Australia, where the authority is given operational independence in setting and adjusting monetary measures consistent with meeting overall policy objectives publicly specified by the Government. As with monetary policy, and in the UK, the Government could retain power to override operational decisions of the independent authority, provided that a statement is made to Parliament within three months outlining and explaining its decision. This could be combined with accountability arrangements whereby the head of the authority periodically appears before a parliamentary committee. In any case of adjustment, a new target would be announced promptly after the receipt of the independent advice, and legal adjustments made with effect no later than two years after the scheduled date of the review.

From the commencement of the scheme there should be some sale by auction of undated permits for use after the first three years (the years of the certain fixed price). Immediate payment would be required. This would encourage the development of a forward price curve, and forward physical market. The sale of undated permits for future use amounting to around 5 to 10 per cent of the current year's volume may be appropriate. This establishment of private assets the value of which depend on the continuation of the scheme will help to reinforce political commitment to the scheme. (This point is made in another context by McKibbin and Wilcoxon 2008).

There is good reason to expect sufficient trade to be present to switch from a fixed to floating price in 2015. In the remote circumstance that this is not the case, the independent body should examine the case for continuing the fixed price arrangements, taking into account this issue along with other relevant factors.

### Box 5: The transition period in New Zealand's Emissions Trading Scheme

The New Zealand Government has set a target for greenhouse gas emissions reductions of between 10 and 20 per cent below 1990 levels by 2020, conditional on a global agreement, and a 50 per cent reduction target for 2050 (NZ MfE 2010a). New Zealand's principal policy response to climate change is the NZ emissions trading scheme, which commenced in 2008. The scheme has an incremental approach to sectoral coverage over the period to 2015.

The scheme has a transition phase from 1 July 2010 to 31 December 2012, to provide a gradual period of adjustment to emissions trading (NZ MfE 2010b). During this period:

- Emitters<sup>15</sup> are required to submit only one allowance (or permit) for every two tonnes of carbon dioxide equivalent emitted (2-for-1)<sup>16</sup>
- Participants are allowed to purchase and use for compliance an unlimited number of fixed-price permits for NZ\$25 (A\$19.50).<sup>17</sup>

The combined effect of these measures is to cap the price of permits at NZ\$12.50 (A\$9.75).

This transition softens the start of the New Zealand scheme by reducing and capping compliance costs, while allowing liable parties to gain experience in trading and managing liabilities. The transitional period also appears to be effective in promoting genuine price discovery, albeit with a safety net. Buyers and sellers have engaged in the market, with healthy forward trading to the end of the transition period. This should reduce the chance of sudden shocks or volatility when the shift is made to a full floating market.

Though legislation has transitional arrangements expiring in 2012, New Zealand's Climate Change Issues Minister indicated in April 2010 that should there be no progress on climate change action in key countries and regions, including Australia and the United States, New Zealand will be unlikely to proceed with the 2013 step-up to a full obligation for liable entities and coverage of additional sectors (MediaWorks NZ 2010; New Zealand Government 2010a). In this circumstance, an indefinite continuation of the transitional arrangements appears likely.

There is a legislative requirement that a review of the scheme be undertaken at least once every five years. The current review, to report in July 2011, will consider the design of the NZ emissions trading scheme, its shift from transitional arrangements and planned changes to coverage. The terms of reference prevent the review from considering whether an emissions trading scheme is the most appropriate response to climate change for New Zealand (New Zealand Government 2010b). By ruling out this aspect of the market for further debate, the terms of reference remove any doubt about the continued existence of the emissions trading scheme, which in turn reduces uncertainty in the investment environment.

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<sup>15</sup> Except the forestry sector.

<sup>16</sup> The World Bank (2010) predicts that NZ will meet its Kyoto target, even with the transitional arrangements.

<sup>17</sup> Converted at current exchange rates, as at 11 March 2011.

## Box 6: Price floors

Governments and scheme administrators can set a lower limit—a floor—on the price of floating permits in an emissions trading scheme. There are several ways to do this. A Government or scheme administrator can set a minimum (or reserve) price at permit auctions, entering the market to buy back permits if required, or requiring liable entities to pay an extra fee when surrendering permits (Wood and Jotzo 2009).

Price floors can provide extra investment certainty for low-emissions technology developers and investors, and also to investors in long-lived assets, like energy generators. Price floors could also allow emissions to be reduced beyond the targeted level in the event that emissions reductions turn out to be cheaper than anticipated (Grattan Institute 2010c).

Because price ceilings and floors limit the emergence of secondary permit markets, and because they limit inter-temporal and international flexibility<sup>18</sup> in the use of permits, the 2008 Garnaut Climate Change Review Final Report concluded that the introduction of such controls would, on balance, be damaging to an Australian emissions trading scheme. On balance, the case against price floors (and ceilings) remains sound.

## 3.5 Interaction of a carbon price with offset markets

It is highly desirable that the application of the carbon price be as broadly based as possible. Broad coverage reduces the total cost to Australia of meeting our mitigation targets, because it provides an incentive for emissions reductions in all sectors, and results in the greatest access to low-cost abatement.

However, full coverage of the land sectors from the beginning of a scheme is impractical and in the circumstances undesirable, as described in Update Paper four (*Transforming rural land use*). The Review suggests that ahead of coverage, the sector should be provided with incentives to reduce emissions through an offset program. The Government's proposed offset program, the Carbon Farming Initiative (CFI), is a good step towards providing the necessary incentive for mitigation in land sectors—in both Kyoto Protocol-compliant, and non-Kyoto Protocol activities.

It is important to realise the potential of the land sector to provide large-scale abatement at low cost. In the short term, there is unlikely to be substantial demand, especially for non-Kyoto offsets, from the voluntary and international markets.

It is necessary and desirable for offsets credits to be integrated with the emissions trading scheme. The Land sector offsets may interact with the emission trading scheme in the following way:

- liable entities could purchase Kyoto offset credits directly, to meet all or part of their liability; and
- non-Kyoto offset credits could be purchased by the regulatory authority, to a certain volume or value, using some revenue from the sale of emissions permits.

A limit to both interactions, especially in the fixed price period is desirable for budget neutrality purposes and to ease anxieties about the undermining of the abatement effort. In the early years, the generation of offsets from the land sector will be rising from a low base.<sup>19</sup>

<sup>18</sup> It should be noted, however, that recent research by Jotzo and Wood (2010) demonstrates that price floors, if implemented through an extra fee (or tax), can be compatible with international trade in emissions entitlements.

<sup>19</sup> In the early years of an emissions trading scheme, while the price is fixed and there is no trade in permits, the purchase of Kyoto offset credits by liable parties will equal a quantity of emissions permits that are not sold by the regulatory authority; the greater the sale of land-based Kyoto offsets into the scheme, the less the net government revenue available for efficiency-raising tax cuts, support for innovation and other purposes. The scheme's necessary commitment to neutrality of budget outcomes therefore suggests some limit on

A limit of 4 per cent in 2012, rising by 0.75 percentage points per cent a year to 10 percent in 2020 is suggested for permits used by liable entities to acquit their responsibilities through the use of Kyoto – compliant offsets. A limit of 2 per cent in 2012, rising by 0.25 percentage points per cent each year to 4 per cent in 2020 of the total permit revenue is suggested for purchase of non-Kyoto credits by the regulatory authority. These limits to acceptance of Kyoto-compliant offset permits from liable parties, and for the purchase of non-Kyoto credits by the regulatory authority are arbitrary. They will allow strong growth in and high levels of sale of land-based offsets.

Consistent with the Carbon Farming Initiative and the proposals in Update Paper four, firm administrative arrangements would ensure that credits were only provided for genuine and permanent abatement. Non-Kyoto offset credits could also be sold in the Australian and international voluntary markets, ahead of their recognition as eligible international abatement under an updated global agreement.

After the transition to a floating price, the limit to purchase of Kyoto-compliant offsets by liable parties should be examined at the next formal review of the scheme. The limits on both Kyoto and non-Kyoto credits would be removed upon full coverage of land-based activity under the scheme, at which point offsets arrangement would become redundant. As discussed in Update Paper four, the land sector has the potential to make a considerable contribution to the Australian abatement effort.

## 4. Revenue from a carbon price

Market based mechanisms, such as the emission trading scheme detailed in this paper, are the central element of a set of policies that will secure large reductions in Australia's emissions at the lowest cost to the Australian economy. An important additional benefit of a market based mechanism over regulatory measures is that it can collect revenue in a way that is more efficient than some existing taxes, for use in raising productivity or promoting equity.

Regulatory measures to achieve a similar amount of emissions reduction will raise costs but not the revenue to offset the increased costs. There will be no revenue to remove distorting taxes and offset the regressive effect on income distribution. There will be no revenue to support innovation in low-emissions technologies. There will be no revenue to support trade exposed industries although their costs will have increased.

While at first it may seem appropriate to direct revenues from a carbon price to all businesses and households that will be affected by this adjustment, this and the manner in which revenues are directed should be considered carefully. We can substantially reduce the potential cost to the economy by ensuring revenues from a carbon price are applied to their most productive uses, whether or not these are directly related to the raising of revenue through the carbon price.

The use of revenues is, however, one area in which the Australian history of climate policy discussion may constrain contemporary policy choice.

Efficiency and equity objectives would be well served by placing all of the revenue into reducing distorting taxes on households or firms. A large amount of revenue could be used to reduce personal income tax rates and social security withdrawal tapers at the lower end of the income distribution. This could be the kind of tax and social security reform envisaged in the Australia's Future Tax System (Henry) review (Australian Government 2009a). Such an adjustment would increase incentives to participate in the labour force at a time when Australia faces shortages of labour and inflationary pressures. In addition to the reduction in deadweight economic costs associated with the reduction in disincentives for labour force participation, it would also go a long way to correct regressive tendencies associated with people on low incomes spending relatively high proportions of their incomes on emissions-intensive goods and services.

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purchases of Kyoto-creditable permits by liable entities. Note, that this assumes the cost of liable entities' in-house abatement is higher cost than land sector abatement.

There would be residual regressive effects of carbon pricing for households who have no income that would benefit from reduction in income taxes. These tendencies have been reduced by recent adjustments to indexation arrangements that ensure that recipients of pensions and benefits are protected from disproportionate increases in the prices of particular goods and services that they consume in unusually high proportions (Australian Government 2009d; ABS 2011; Macklin 2011). Any additional inequities would need to be corrected by limited and targeted adjustments to social security indexation and support for energy-saving household investments.

There is a strong case for returning some of the carbon revenue to the business sector in support of innovation in emissions-reducing technologies.

For the rest, it may be that the means of returning revenue from carbon pricing to the business sector that does most to promote efficiency and to raise economic output is to cut distorting taxes. Again, the Henry Review provides an agenda of possibilities.

There is a case for returning some of the revenue as assistance to trade exposed industries. How would a general company tax cut compare in its economy-wide effects with providing a comparable amount of potential revenue as assistance to emissions intensive, trade exposed industries? The economic case for transitional support for trade-exposed industries is akin to the limited case for anti-dumping protection for import-competing domestic industries against foreign suppliers which temporarily reduce export prices below the cost of production. The support for trade exposed industries may not have as large a positive effect on national income as the use of similar amounts of revenue to reduce more distorting general forms of taxation. Nevertheless, the history of the carbon pricing policy discussion in Australia and in other countries which have introduced economy-wide prices on carbon elevates the priority of substantial transitional support for trade-exposed industries. I accepted in the Review and accept now that revenue will be provided to trade exposed and emissions-intensive industries, rather than to general reductions in business taxation.

There is a case for assisting the trade exposed industries to an extent that offsets the effects on product prices of other countries having carbon constraints that impose lower costs than Australia's.

The Update proposes the following package of measures:

- General assistance to most households through targeted efficiency-raising reforms in the tax and transfer system. This would be the vehicle through which most of the assistance to households would be provided, accounting for nearly half of the revenue value of permits at the commencement of the scheme rising to the great majority of revenue by the end of the first decade.
- Targeted energy-efficiency assistance to address the regressive income effects of a carbon price on low-income households which receive little support from efficiency-raising tax reforms.
- Transitional assistance to address the distortion in emissions intensive, trade exposed industries, that arises from the absence of a comparable carbon constraint in some of Australia's competitors.
- Targeted structural adjustment assistance for any regions that are vulnerable to large-scale loss of livelihood as a result of the implementation of a carbon price.
- Short- to medium-term support for innovation in low-emissions technologies, to correct market failures and to reduce the costs of transition to a low-emissions economy.
- Reforms to promote a smooth transition of the energy sector.
- The linking of Carbon Farming Initiative Kyoto offset credits to the emissions trading scheme and the purchase of non-Kyoto land sector abatement credits by the independent regulatory authority.

## 4.1 The revenue profile

The introduction of a carbon price through an emissions trading scheme (with a fixed price start) raises revenue for the public. A carbon price of A\$26 per tonne carbon dioxide equivalent would generate around A\$11.5 billion in potential revenue from the value of permits in 2012-13 (Australian Government 2009b).

The amount of revenue collected rises with the carbon price, but decreases with emissions. The revenue from a carbon price is expected to rise in the short to medium term as the price increases and as additional sectors are covered. In the longer term, the revenue from a carbon price will decline as a result of steady falls in emissions eventually overcoming the rise in permit prices.

After the early years, expenditure on all recipient categories other than households is likely to decline over time. In a world in which competitors have adopted comparable constraints on carbon emissions, transitional assistance to trade-exposed industries will no longer be required. Support for innovation can be provided through general rather than climate policy related mechanisms after the first decade. After the first decade, it is likely that most if not all of the revenue from the scheme can be returned to households through efficiency-raising tax reform.

## 4.2 Assisting households and tax reform

### Promoting growth and improving living standards of Australians: tax reform

A carbon price has some short-term negative effects on productivity growth and incomes—although less than regulatory approaches that secure similar reductions in emissions. The modelling for the 2008 Review and the Australian Treasury in 2008 pointed to the growth of the economy through to the middle of the century accumulating to a few percentage points of national income lower by the middle of the century. The modelling for the 2008 Review showed that if the Australian reduction in emissions were made in the context of an effective and scaled global effort, this loss of annual income would have been recouped and more by the end of the century as a result of reduced costs of climate change—even if the value of insurance against exceptionally bad outcomes, and non-market values, were ignored completely. The modelling also placed no value on welfare after 2100.

The modelling ignored the benefits to productivity and incomes that could be secured by judicious use of the revenue from the carbon price. Carbon price revenue can be used to improve the tax system through reducing tax disincentives to work. For example, modelling has found that targeted tax reform could offset a substantial share of the modest reduction in rates of growth in incomes that is expected in the decades immediately following the introduction of a carbon price.

In broad terms, analysis suggests that this effect could be in the range of one third to one half of the macroeconomic impact of introducing a carbon price without targeted tax reform in the first 10 to 15 years, falling to 10 to 20 per cent of the impact by 2050 as carbon prices increase and emissions decline (Hatfield-Dodds 2007).

Existing taxes (including income tax, savings tax and indirect taxes) reduce incentives for some people to participate in the workforce.<sup>20</sup> The introduction of a carbon price to reduce emissions—and even more for regulatory measures that reduce emissions by a comparable amount—without a reduction in other taxes, would result in less growth in real wages, thereby reducing work incentives further.<sup>21</sup> Using the revenue from a carbon price to reduce existing distortionary taxes can offset this compounding effect:

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<sup>20</sup> Low-income earners are typically more sensitive to tax rates than high-income earners and research suggests that partnered mothers and single parents are particularly sensitive to the impact of their effective tax rate in deciding whether to undertake paid work.

<sup>21</sup> The impact depends on the price rises of the goods consumed following the introduction of a carbon price, rather than those of the old basket of goods measured by the CPI. It also depends on the way the government recycles the revenue (for instance, a reduction in fuel excise would reduce the price impact of a carbon price).

... a tax mix change package can reap the efficiency dividend of correcting the external cost market failure without aggravating distortions caused by existing taxes (Freebairn 2011, p12).

Of course, where emissions reductions are secured through regulatory measures there is no possibility of compensatory reductions in distorting taxation.

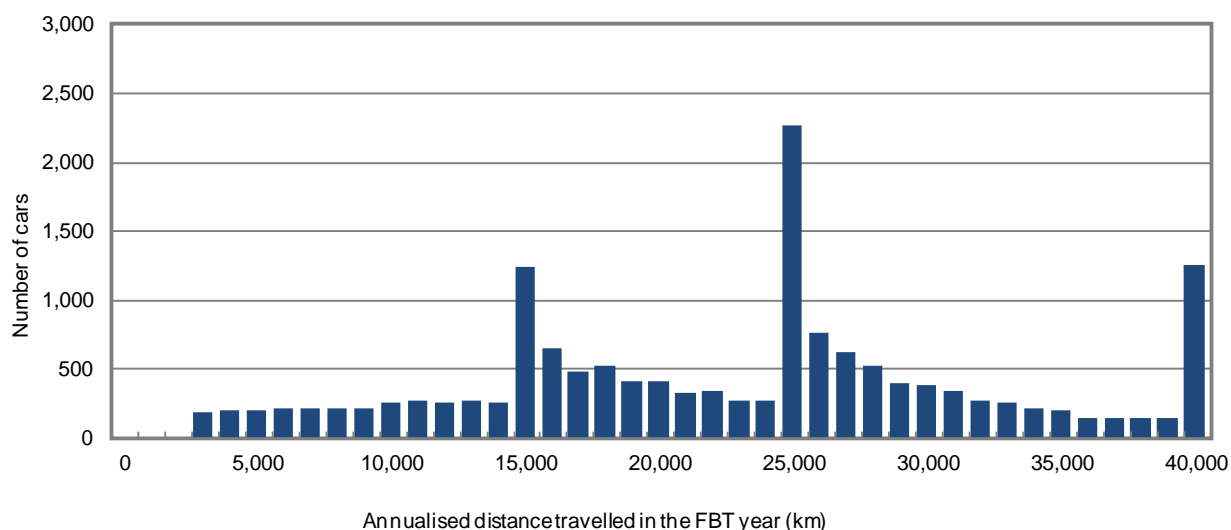
### Petrol costs and tax reform

There have been considerable concerns about the distributional effects of increases in petrol prices associated with carbon pricing, particularly for those living in outer-suburban and regional areas. It is not obvious to me at the moment how these effects can be simply compensated at reasonable transactions costs. For the future, Government's could consider regionally differentiated adjustments to one or more budgetary matters. In the meantime, I suggest an expedient that has efficiency, equity and environmental advantages over the simple passing on to petrol users of the initial carbon price impact. The increase in petrol prices following the introduction of a carbon price would be offset through a one-off reduction in petrol excise. The cost of this would be covered by reform of the fringe benefits tax arrangements related to private vehicle use. The fringe benefits arrangements were identified as being highly distortionary by the *Australia's Future Tax System* review (Australian Government 2009a). Under the fringe benefits tax arrangements, the taxable value of a car's fringe benefit falls at specific intervals as the distance driven increases. This arrangement encourages more driving than would otherwise be the case and therefore greater emissions. This can be seen in Figure 1 in the bunching just above the concessional intervals: 15,000km, 25,000km and 40,000km in a year. Removing this incentive for overuse of motor vehicles would have a small, favourable effect on reducing emissions.

The extent of the fringe benefits tax distortion compared to a reduction in excise in line with the impost of a carbon price can be illustrated by the following example. To drive an additional 1,000km to cross the 15,000 km fringe benefits tax threshold would incur an additional carbon cost of only around A\$5.50, but the same behaviour could reduce the fringe benefits tax liability by over A\$1000 in some cases.

This expedient preserves the objective of fiscal neutrality defined by the Multi-Party Climate Change Committee, but is paid for outside the revenue generated by the introduction of a carbon price.

**Figure 1: Number of vehicles by kilometres travelled, 2007-08 fringe benefits tax year**



Source: SG Fleet Australia 2009

## Box 7: Measures identified in the *Australia's Future Tax System* review

As noted in the 2008 Climate Change Review:

Alongside high employment, the most important guarantor of equity through a period of changing relative prices and structural change is the general social safety net, comprising social security arrangements and provision or funding of health or educational facilities. Australia is relatively well endowed in these respects, and will have opportunities to improve income transfer arrangements following the completion of the Henry Tax Review. Adjustments to the social security and taxation systems provide an opportunity for effective responses to the negative income distribution effects of an emissions trading scheme (Garnaut 2008, p 386).

The *Australia's Future Tax System* review, released in 2010, sets out a blueprint for reshaping Australia's tax and transfer system to meet the challenges of the twenty first century and enhance its economic and social outcomes.

The *Australia's Future Tax System* review ranked a selection of federal, state and local taxes according to the harm they impose on the welfare of Australians. This ranking highlights the areas where reform would be most beneficial. Within each category, however, the impact varies between taxpayers. For instance, a tax on labour income harms participation more for single low-income earners with children than for dual high-income earners without children.

A carbon price will make these taxes even more costly, particularly those on income. As such, the benefits of tax reform increase in the presence of a carbon price. Further, with a carbon price, the ordering and priority for reform changes.

### Supplementary measures that provide environmental benefits

The *Australia's Future Tax System* review advocated that consideration be given to avoiding unintentional adverse impacts of the tax and transfer system on the environment:

Potentially, the tax system can play a greater role in promoting sustainable policy outcomes, by influencing the incentives that lead to environmental degradation. An equally important consideration is to ensure that settings within the tax and transfer system do not unintentionally produce adverse environmental incentives or conflict with the broader environmental goals of regulatory and other policy measures. In some cases, existing tax and transfer settings are inconsistent with broader environmental objectives (Australian Government 2009a, p 10).

The fringe benefit tax arrangements for cars are an example of this.

The *Australia's Future Tax System* review advocated a number of changes to state and local taxes, which could possibly have a useful effect on Australia achieving its mitigation objective. For example, some of the most damaging taxes are those on insurance. Taxation of insurance contributes to under-insurance and therefore inadequate protection from risk. This has an important connection to climate change; more poorly functioning insurance markets make it more difficult to protect against the risks of extreme events as well as catastrophic consequences of climate change.

### Assisting the most vulnerable through transfer payments

Protecting the most vulnerable is critical to the success of the carbon price. The proposed reform of income taxation efficiently addresses equity concerns for most taxpayers. For households with little or no income, the transfer system provides a general social safety net. The transfer system insulates the most vulnerable from structural change to a large degree because payments rise at least in line with prices (as measured by the Consumer Price Index). So even if the rest of the economy suffers a negative shock that reduces real income, benefits automatically increase for the most vulnerable. However, indexation is not perfect.

Indexation may not reflect exactly the price increase that consumers face, for two reasons. First, indexation is measured on a typical basket of goods. Consumers with different levels of income consume different baskets of goods. Analysis conducted in 2008 suggests that the Consumer Price Index will rise by 1.1 percentage points following the introduction of a carbon price at A\$23 per tonne of carbon dioxide equivalent in 2010, whereas the prices faced by households with the lowest incomes (those in the first income quintile) would rise by 1.3 percentage points (Australian Treasury 2008, p 190). Second, the Consumer Price Index does not take into account the change in goods consumed that results from the introduction of a carbon price. As consumers are expected to switch away from relatively emissions-intensive goods (such as electricity) following the introduction of a carbon price, indexation may overstate the price rises faced by households.

Recipients of pensions and benefits face higher prices before they receive a higher payment. This is due to a lag in the availability of data<sup>22</sup> and in the timeliness of adjustment. For instance, the indexation of the pension and Newstart Allowance lags price increases by between 3 and 9 months. The indexation of Youth Allowance lags price increases between 6 and 18 months. Vulnerable people may find it difficult to bridge this gap. The Government could bring forward indexation of benefits to correspond to the introduction of a carbon price, while smoothing down indexation later to avoid overcompensation. This approach was adopted to assist the vulnerable when the Goods and Services Tax was introduced.

Care needs to be taken in changing social security arrangements that there is no exacerbation of existing high marginal effective tax rates.

It is important that assistance not be tied to the amount of household electricity consumption, because this would provide a disincentive for households' to improve efficiency in response to the price signal.

Pensioners are a particularly vulnerable group as many are unable or are reasonably disinclined to supplement their transfer payment by working. Focus here should be on preserving assistance to those on the full-rate pension. Pensions typically rise in line with wages (as a benchmark applies to ensure that they do not fall below a fixed share of Male Total Average Weekly Earnings). Generally, wages rise more than prices. But in periods of high inflation, prices could rise more than wages, and so pensions increase by the greater of the two (where prices are measured by the greater of the Consumer Price Index or the Pension and Beneficiary Living Cost Index, which more accurately reflects changes in the cost of living for pensioner and other low income households). However, over time (when wages return to growing faster than prices) pensions revert to the same fixed proportion of wages that they would have received in the absence of the high inflation. In order to preserve their real income (compared to what it would have been in the absence of a carbon price), assistance should be delivered through a supplement, the real value of which is preserved over time via price indexation, as was the case with the introduction of the GST.

### Assisting the transition for disadvantaged low-income households through energy efficiency

As noted earlier, additional measures will be required to ease the transitional cost of structural adjustment for disadvantaged low-income households. Some low-income households face challenges in adopting energy saving technologies that reduce running costs, energy consumption and emissions. For example, they may face higher costs of borrowing or insufficient savings to allow the purchase of energy-efficient appliances. Information on the financial benefits of such appliances may be incomplete or difficult to access (information barriers). Even if they have the finance and information, they may not choose to change their behaviour if they do not receive all of the benefits directly, for example, if they are renting (principal-agent problem). These issues will be discussed in detail in Update Paper eight.

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<sup>22</sup> The Australian Bureau of Statistics has announced that it would progress a recommendation to produce more frequent (monthly rather than quarterly) estimates of the Consumer Price Index if funding becomes available (ABS 2010).

### Box 8: The role of a carbon price in changing relative prices

Prior to the introduction of a carbon price, the prices consumers pay for many goods do not reflect their true social cost. All other things being equal, more emissions-intensive goods impose a higher cost on society, through climate change impacts, than less emissions-intensive goods. The carbon price is meant to reflect these social costs. By raising the price of more emissions-intensive goods relative to less emissions-intensive goods, over time, consumers will spend more on the latter and less on the former. Moreover, producers will have an incentive to lower the emissions content of the goods they sell.

Without assistance—and if we ignore the considerable social benefits that a carbon price would bring—a carbon price by itself would make consumers worse off. With the same budget and preferences as before, but facing higher prices, they can now afford to purchase fewer goods overall. But a carbon pricing mechanism provides government with a source of revenue, which it can use to reduce the impacts of a carbon price on consumers.

It is sometimes suggested that providing households with assistance would cancel out the benefits of introducing a carbon price. They suggest, wrongly, that if we impose a carbon price on a household worth \$100 and then provide that household with \$100 worth of assistance, nothing has changed. The important point is that the carbon price, even with assistance, has altered the relative prices of more and less emissions-intensive goods and services. High-emissions goods are now relatively more expensive than low-emissions goods, so demand for the former will fall, while demand for the latter will rise.

For example, electricity prices—being relatively emissions-intensive in current circumstances—will rise with the introduction of a carbon price. A household facing a higher electricity bill has an incentive to reduce its electricity consumption over time. When the household receives money from the Government—through, for instance, a tax cut—to cushion the impact of higher electricity prices, there is no reason why it will spend all of this assistance on electricity. The household can be expected to spend the tax cut on a range of goods and services, now guided by prices that reflect the social costs of emissions. Regardless of the assistance, electricity is still relatively more expensive than before, so electricity consumption can be expected to fall over time.

The success of a carbon price in altering the relative prices of more and less emissions-intensive goods depends crucially on the nature of the assistance provided to households. If assistance is directly linked to the consumption of relatively emissions-intensive goods (for example, rebates on electricity bills affecting the price of electricity at the margin), then it will remove the incentive for the household to switch away from more emissions-intensive goods and towards less emissions-intensive goods. A tax or social security adjustment, as outlined in Section 4, would not discourage households, now facing relative prices that reflect the social costs of the goods they consume, from lowering their emissions.

## 4.3 Emissions intensive, trade exposed industries

### The case for assistance to emissions intensive, trade exposed industries

The Review outlined the case for transitional assistance to emission intensive, trade exposed industries—those industries whose emission are high per unit of output and who are highly exposed to international competition.

There are two propositions upon which this case is built.

First, imposing a carbon price in Australia ahead of similar carbon constraints in our trade competitors could result in some movement of emission intensive, trade exposed industries from Australia to other countries that impose less of a carbon constraint. This could result in an increase in global emissions—in the event that the activity moves to a country that uses a more emissions-intensive production process than Australia. This is the universally recognised environmental risk of carbon leakage. This

risk is difficult to quantify precisely. Analyses in Australia, Europe and the United States<sup>23</sup> consistently suggest that the risk is real, but exaggerated significantly in popular discussion (see Appendix 2). Though the fears of the risk of carbon leakage are overblown, such fears remain a powerful obstacle to the introduction of effective mitigation policies the world over.

Second, if Australia were to impose a cost on carbon emissions through a price on carbon or through other means such as regulation, which preceded or exceeded that of countries that are the hosts to major competitors, this could cause Australian production to contract below the level that would eventuate if our competitor countries faced a similar cost. Such a loss in productive capacity would be inefficient and costly to regain at a later date when a global carbon cost was in place.

Accepting these two propositions suggests a number of features to the assistance that may be offered to the emission intensive, trade exposed industries.

First, assistance will be of a transitional nature pending comparable carbon pricing in the rest of the world. Second, assistance should only compensate for the inefficient distortion arising from an uncoordinated global start to emissions reduction.

This means that assistance to all firms should be withdrawn once a harmonised global price—or its equivalent—is in place. Some countries may continue to assist specific sectors and to create distortions even after a harmonised price has emerged. Such counter-subsidising would contribute to a destructive, reinforcing cycle of protectionism. It is important for Australia to work with other countries to secure international application of sound principles, to avoid continuing distortion.

Assistance provided to emission intensive, trade exposed industries to correct for undesirable and inefficient outcomes should not be confused with providing support to industry for the loss of profits or asset value arising from the introduction of a carbon price in Australia. Any fall in asset value stemming from the internalisation of the carbon externality (through pricing carbon) creates no greater case for compensation than other government reforms to reduce other externalities, such as the introduction of measures to discourage smoking or control the use of asbestos (Garnaut 2010a), lead in petrol or tighter safety or general environmental requirements.

Assisting emission intensive, trade exposed industries beyond an efficient level has significant adverse distributional consequences. Shielding emission intensive, trade exposed sectors from a carbon price can redistribute the cost of emissions reductions to other sectors of the economy. The analysis undertaken in the 2008 Review confirmed that shielding of emission intensive, trade exposed industries results in higher output from those industries, resulting in higher electricity prices and costs of other sectors. Arbitrarily high assistance payments to emission intensive, trade exposed sectors risks undermining Australia's ability to mitigate, and delaying effective global action to address climate change. Shielding also promotes the redistribution of costs among the shielded sectors, with labour and capital diverted from more competitive to less competitive emission intensive, trade exposed firms (Australian Treasury 2008). These costs are significant, and an unprincipled or persistent approach to emission intensive, trade exposed industry assistance would result in long-term damage to the prospects of Australia's broader economic reform agenda (see Section 2).

## The context for assistance

The Review proposed three approaches to avoiding the environmental and economic costs associated with firms contracting, or constraining growth in production, more than they would in a world of global carbon pricing. The Review suggested, in order of priority, but in tandem:

- Pursuing a comprehensive global agreement that delivered similar carbon costs among countries, in order to avoid the risk of carbon leakage and therefore the need for assistance. This result is most likely to flow from a substantial number of countries accepting binding targets (whatever the basis of those targets) and allowing trade in entitlements;

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<sup>23</sup> See, for example, Grattan Institute (2010), European Commission (2010), EPA (2010) and Australian Treasury (2008).

- Establishing sectoral agreements that place emission intensive, trade exposed industries on a level playing field; and
- Temporarily providing careful and principled domestic assistance measures to emission intensive, trade exposed industries (described in Chapter 14 of the 2008 Review).

Progress on all fronts has been slow and inadequate. The progression of global or sectoral agreements has not been sufficient to avoid the need for the temporary domestic assistance.<sup>24</sup>

The Update continues to support the three-pronged approach set out above. However, based on global and domestic policy developments, and practical considerations regarding data availability, the Update has further refined the Review's recommendations. The Update recommends a progressive approach to implementing, refining and removing the emission intensive, trade exposed assistance package.

## An approximate approach to transitional assistance

The urgency of the mitigation challenge means that a carbon price will be implemented in Australia before all necessary data for the principled approach can be collected, verified and analysed. Having an approach of some rigor in place to address the competitiveness distortion is important; without it, competitiveness concerns will complicate implementation of a domestic carbon price. An approximate approach is necessary while the appropriate institutions are building their capacities to apply the rates based on the principled approach defined in the Review (see below).

The Government's original proposal in its Carbon Pollution Reduction Scheme Green Paper, later developed in the White Paper, is arbitrary and approximate. However, it has the merit of having been worked out in detail and at one stage having been widely accepted within affected parts of the business community (Australian Government 2008a). Significant public and private resources have been expended in developing assistance for emission intensive, trade exposed industries on this basis, and institutional capacity has been developed to support emission intensive, trade exposed assessments. The Green Paper/White Paper framework has been shown to be workable, with some legitimacy and credibility within industry. Over 100 businesses have closely engaged with Government in providing data and input (some confidential) to develop activity definitions and baselines that have since been published. It also embodies a principle that is important for maintaining incentives for reducing emissions: allocations of assistance are based on average emissions intensity for an industry rather than on the emissions intensity of a single firm. Therefore, during the transitional period as data are collected and analysed to support the preferred approach, the Update considers it appropriate to commence with a modified Carbon Pollution Reduction Scheme-style assistance arrangement as the interim assistance approach for a defined period of three years.

One obvious but important modification is recommended to the existing Carbon Pollution Reduction Scheme proposal: removal of the "global recession buffer".

There is now no case at all for the upward adjustment of rates of assistance that was introduced as a buffer against the aftershocks of the global financial crisis. That is, rates for moderately emissions intensive industry assistance should be 60 per cent (not 66 per cent) and highly emissions intensive industries should be assisted for 90 per cent of their obligation (not 94.5 per cent). Assuming a carbon price starting at around A\$26 per tonne, these rates of assistance effectively result in emission intensive, trade exposed industries facing a carbon price for their emissions of between A\$2.60 and A\$10.40 per tonne of carbon dioxide equivalent.

In steel, for example, these assistance arrangements would mean that the average carbon cost per tonne of steel would be around A\$5.<sup>25</sup> This represents around two thirds of a per cent of the value of the final product. This post-assistance carbon cost is tiny compared with recent increases in the cost of

<sup>24</sup> International progress on mitigation is discussed in Update Paper three, and work on sectoral agreements is summarised in Appendix 2 to this paper.

<sup>25</sup> Assuming two tonnes of greenhouse gases are emitted for every tonne of steel that is manufactured by the blast furnace basic oxygen steelmaking process (Interview with BlueScope Steel CEO Paul O'Malley, available here: <http://www.asx.com.au/asxpdf/20090817/pdf/31k3pl9zflmvys.pdf>)

iron ore and metallurgical coal. According to a recent study, along with scrap and other metallic raw materials, iron ore makes up around 30 per cent of the input cost of steel (Grattan Institute 2010b). Export iron ore prices increased by more than 80 per cent during the calendar year 2010 to around A\$128, and subsequently rose to around A\$134 in early 2011.<sup>26</sup> Metallurgical coal, a key input of steel production, rose in price by about 34 per cent over the same period.

The Carbon Pollution Reduction Scheme's development, and revisions, occurred in the context of the Great Crash of 2008. In the event, Australia weathered the Great Crash relatively well, and the argument for the Government's "global recession buffer" has disappeared.

It is worth noting that the scheme is generous in comparison to the European Union Emissions Trading Scheme.<sup>27</sup> The Carbon Pollution Reduction Scheme proposed an annual decline of 1.3 per cent in the rate of assistance. This would result in assistance levels of around 54 and 81 per cent for moderately and highly emissions industries in 2020 (Australian Government, 2008a). The rate at which assistance is withdrawn is well short of the likely growth in emissions from emission intensive, trade exposed industries. The proportion of free permits directed towards emission intensive, trade exposed assistance could be expected to increase considerably over time.

Based on Australian Treasury modelling, the White Paper suggested that a decline in assistance of 3 per cent per annum would be able to keep the share of the permits allocated to emission intensive, trade exposed industries broadly constant to 2020 (under the CPRS -5 scenario). The comparison of treatment of emissions intensive, trade exposed industries under the European Union and proposed Australian scheme is instructive (Box 9). The European Union scheme is significantly less generous than the Government's Carbon Pollution Reduction Scheme. Policy for the upcoming phase of the European Union emissions trading scheme applies a cap to the total free allocations—around 29 per cent of all permits, for the industrial sector, of which emission intensive, trade exposed industries are a large sub-section (Bloomberg New Energy Finance 2010).<sup>28</sup> The Australian proposal suggests emission intensive, trade exposed assistance rise with increasing production—including from new producers—leading to allocations to emission intensive, trade exposed industries rising from around 25 per cent of the total permit volume, to up to 35 per cent by 2020 (Australian Government 2009b).

This underlines the critical importance of moving to a principled approach after a short transitional period. The persistence of the arbitrary arrangements beyond three years would be damaging to the Australian economy. Any delay beyond three years in movement to the principled approach would need to be accompanied by substantial modifications to the transitional arrangements.

## The principled approach to transitional assistance

Without principles or total quantity constraints, there is no logical limit to emission intensive, trade exposed industry assistance. The principled, preferred approach to transitional emission intensive, trade exposed assistance is set out in section 14.5.4 of the 2008 Review and in Box 10 below. Once data are available, this method will allow the appropriate amount of assistance to be calculated. Even given likely data limitations in early years, it will be much closer than any alternatives—and more accurate than the interim approach set out, above.

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<sup>26</sup> Australian Bureau of Statistics trade data.

<sup>27</sup> The Australian Government (2008) suggested two reasons for emissions intensive, trade exposed industry assistance: to reduce the risk of carbon leakage, and to "smooth the transition of the economy to the introduction of a carbon cost". The second rationale is impossible to test against facts, and experience to date has shown the difficulty in distinguishing between genuine transitional assistance and handouts to rent seekers.

<sup>28</sup> It is unclear whether this cap will be binding in early years.

### Box 9: Emissions intensive, trade exposed industry assistance in the European Union Emissions Trading Scheme

In the upcoming phase (Phase 3, commencing in 2013) of the European Union Emissions Trading Scheme, Europe will provide assistance to many of the same industries that will qualify for assistance under an Australian pricing regime, including under the proposed Carbon Pollution Reduction Scheme.

There are some major differences in the proposed assistance programs, including the following elements:

- Assistance rates – benchmarks upon which allocations are based in the European Union are at set 100 per cent of the 10 per cent best practice (lowest emissions) producers. Australia's assistance benchmarks under the proposed Carbon Pollution Reduction Scheme are 94.5 and 66 per cent, respectively, for highly- and moderately emissions intensive industries, based on industry average emissions.
- Scope of assistance – the European Union assistance does not cover indirect emissions from electricity, but the assistance proposed under the Carbon Pollution Reduction Scheme applied to both direct and indirect emissions.
- Quantum, or cap, on assistance – the European Union Emissions Trading Scheme allocation appears bounded by the industrial sector emissions cap<sup>29</sup>, which may be around 29 per cent (Bloomberg New Energy Finance 2010). In the proposed Carbon Pollution Reduction Scheme, there was no cap on assistance; it was to rise in line with production from emission intensive, trade exposed industries.
- Decline, or withdrawal of assistance – The European Union assistance package requires that sector allocations be adjusted to fit within the sectoral emissions cap (see previous point). Allocations to trade exposed industries in the European Union will decline, in line with the European Union-wide emissions cap, at a rate of 1.74 per cent per annum. The proposed Carbon Pollution Reduction Scheme saw emission intensive, trade exposed industries assistance decline at 1.3 per cent per annum.

More stringent allocative benchmarks, combined with no assistance (in general) for electricity, and the planned cap on total quantum of allocations is likely to mean European Union emission intensive, trade exposed industries receive less assistance than the emission intensive, trade exposed industries under the proposed Carbon Pollution Reduction Scheme design, and under the modified Carbon Pollution Reduction Scheme style approach described in this Update Paper.

Sources: Australian Government (2011), European Commission (2011).

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<sup>29</sup> It is unclear whether this cap will be binding in early years.

### Box 10: Mechanisms of the preferred approach to emissions intensive, trade exposed industries

Under the principled approach, eligibility as an emission intensive, trade exposed activity should not be arbitrary or uniform across industries. Eligibility thresholds should be defined in terms of uplift in the unit price (in percentage terms) each year. This would see only products expected to increase by a percentage above a threshold (for example, 3 per cent) receive assistance.

The rationale for emission intensive, trade exposed assistance is to correct for the distortion that results from the failure of Australia's competitors to implement a comparable carbon price. Thus, assistance should address the 'gap', above a threshold, between the outcomes for emission intensive, trade exposed industries as a result of Australia implementing a carbon price, and the outcomes for emission intensive, trade exposed industries had the whole world acted.

Assistance would be paid (credit given) for the gap between the world product prices expected with a global carbon price, and without global carbon pricing.

The independent regulatory authority would administer the principled approach. It would receive advice from a well-resourced, independent agency with high analytic capacities and operating characteristics similar to the Productivity Commission. The independent regulatory authority would calculate expected price uplift factors regularly (at a minimum, yearly) through a transparent and consultative process. The assistance to eligible enterprises would be funded from permit sales revenue. The process used by the Productivity Commission in inquiries on protection issues is a suitable model.

The benefits of this principled approach are considerable. It has the great advantage that assistance is automatically reduced as carbon constraints and the cost of overcoming them are increased in the rest of the world. It should prevent the admittedly limited extent to which there may be carbon leakage. It avoids inefficient adjustments of Australian, or overseas, industry. Compared to the more approximate approach discussed above, it retains a stronger price signal, and the full incentive for Australian industry to reduce emissions in line with Australia's low-emissions transition. Assistance by industry sector under the principled approach should be calculated from the commencement of the scheme, alongside the implementation of the approximate approach described above. As the data collection and analytical approach improve over time—including through internationalisation, as discussed below—these calculations will become increasingly detailed and rigorous. In the first year, calculations should be made transparent, and public, though details for all industries and competitors may not be available. This will be an opportunity to invite feedback, and refine the methodology and data sources. In the second and third years, full information will be closer.

Accurately determining, for each industry, the distortion created by the failure of our competitors to price carbon similarly to Australia is intricate and time consuming. During and since 2008, the Review has received feedback that this principled approach is the right one to address the emission intensive, trade exposed industry distortion, but difficult to implement in practice. The challenge is obtaining voluminous, high quality data on producers' costs and emissions, in a relatively short time.

The disciplined approach to thresholds for eligibility for emission intensive, trade exposed industry assistance described above will make demands for data more manageable, but it is still a daunting information requirement. Priority should be given to data collection and analysis on emission intensive, trade exposed industries likely to be at the greatest competitive disadvantage, and the largest drain on assistance: aluminium, alumina refining, petroleum refining, cement, and iron and steel. These together were likely to account for about 70 per cent of emission intensive, trade exposed industry assistance under the Government's proposed Carbon Pollution Reduction Scheme.

An independent agency such as the Productivity Commission should be responsible for developing the principled approach, and providing advice to the independent regulator. It will need to determine when full information and rigor in the calculations allows for the implementation of the approach to replace interim arrangements, and recommend rates of assistance (calculated on this basis) to the independent

regulator. The regulator will be bound to consider these recommendations. The process for this important set of decisions will be considered further in the Final Report.

The independent agency should be supported by an advisory committee that includes technical specialists who are accustomed to working on global pricing models within the main emission intensive, trade exposed global companies, including major multi-nationals, advising on methodology and data sources. This would be particularly helpful in approaching calculations of producers' costs.

The reports of the expert independent agency and the independent regulator should be made public. There is no need to publicly identify data for individual firms. It can be provided through a third party, and used without identification in calculations, so there is no issue of confidentiality.

Under this principled approach, amounts of assistance are likely to decline over time because it will be self-correcting in response to rises in other countries' carbon prices. At an appropriate time, the independent agency should advise if the movement to comparable global carbon pricing had proceeded so far that there was no longer economic justification in the national interest for this assistance. At all stages, the independent agency, like the Productivity Commission, would regularly and transparently assess the efficacy and consequences of rates of assistance. Close consultation with industry in this assessment is recommended.

### International institutional and practical arrangements

The collection and analysis of necessary data can be accelerated through international cooperation. As the same assistance arrangements would be of benefit to every country tackling the dreadful problem in regard to its own emission intensive, trade exposed firms over the next few years, an international approach would ensure globally efficient outcomes, while making the assistance regime more stable domestically. International cooperation will overcome financial and human resourcing constraints that may face a country undertaking the exercise alone. Institutions such as the World Trade Organisation or the OECD are well placed to lead this exercise. The European Union has shown an interest in it. The involvement of the World Trade Organisation is important because of the threat to open trading rules that accompanies the introduction of carbon pricing policies.

Countries could contribute data and human resources to the international effort, through their relevant trade, industry, statistical and environment protection agencies; Australia's contribution could be primarily through an institution with the characteristics of the Productivity Commission.

There is potential to encourage the provision of data in developing countries through "fast start" financing, by directing it to projects where data collection and dissemination is a condition of international support, or where capacity building for emissions inventories and monitoring, reporting and verification data is an objective. At the same time, the push for a global mitigation agreement will increase pressure for data collection, and measurement reporting and verification by all major emitters.

### Additional industry assistance

There is also a case for structural adjustment assistance for the workers and communities of coal-based regions. For a case to be made for public support on those grounds, it must be shown also that such measures can cost-effectively improve the efficiency of the adjustment process.

## 4.4 Innovation: stimulating the technology transition

There is a strong case for allocating a portion of the carbon revenues to fund low emissions innovation over the short to medium term.

The Update supports the allocation of a substantial annual commitment from carbon price revenue to innovation support. Based on global calls for larger support for innovation, a commitment ramping up to between A\$2-3 billion per annum—as recommended in 2008—for policies across the innovation chain is appropriate.

The additional support for innovation should be designed to coincide with the introduction of the carbon pricing scheme. In the short to medium-term, there will be a substantial amount of pre-existing funding for innovation support that is yet to be fully expended, the new and more generous business tax credit

for general research and development will be introduced, and there will be a need to establish strong and independent governance arrangements to ensure the most effective use of new funds. For these reasons the Review supports a proportion of revenue being provided to innovation that increases over a number of years, to its peak. Support for innovation is transitional; in the long-run, this allocation can be reduced as technological breakthroughs are made and the social returns to such investment gradually diminish.

The rationale for innovation support alongside a carbon price, determination of the quantum of funding required and the most appropriate approaches to delivering support for basic research and development, and demonstration and commercialisation are discussed further in Update Paper seven.

## 4.5 Energy security

There have been some energy security concerns about how the carbon price will affect emission intensive generators and the instability this might prompt in electricity contract markets.

Update Paper eight will examine the case for transitional assistance in the energy sector to promote energy security. It will examine, the excellent market reforms in the National Electricity Market in recent decades which have ensured that the risks to physical energy security are low if not negligible with the National Electricity Market being a self-correcting market in terms of physical supply. It will also discuss possible reforms to existing regulatory arrangements to encourage contract market stability and further promote confidence in physical energy security.

## 4.6 Land-based offsets

As discussed in section 3.5, there is a strong case for allowing businesses covered by the emissions trading scheme to meet part of their liabilities by purchasing Kyoto-compliant Carbon Farming Initiative offsets. There is also a case for the purchase of non-Kyoto land sector offset credits by the regulatory authority, using some carbon price revenue. The case is strongest in the early years, ahead of a floating price and coverage of the land sector, and ahead of broader international recognition of land sector abatement activities.

As discussed earlier a limit of 4 per cent in 2012, rising by 0.75 percentage points a year to 10 per cent in 2020 is suggested for permits used by liable entities to acquit their responsibilities. A limit of 2 per cent in 2012, rising by 0.25 percentage points each year to 4 per cent in 2020 of the total permit revenue is suggested for purchase of non-Kyoto credits by the regulatory authority.

To provide a clear incentive to encourage abatement activity in the land sector, the commitment of revenue for this purpose should be legislated, and must not be subject to change during this period.

# 5. Conclusion

Climate change presented a diabolical problem from the time of its first appearance on the policy agenda. It is no surprise that Australia and the world are finding it difficult.

This is the fourth time that Australia has moved towards economy-wide carbon pricing. Each time, the retreat of economy-wide action did not mean the end of climate change mitigation policies. An array of regulatory interventions took their place, with little effect on emissions but larger effect on the Australian standard of living.

Economy-wide carbon pricing is back on the Australian agenda for two good reasons. First, the climate change problem is real and large. Second, it is better to make our contribution to a solution by using efficient and low-cost policy instruments than expensive policies which unnecessarily reduce the Australian standard of living.

The climate change problem can only be solved if all countries with economies of substantial size make proportionate contributions. International cooperation on this scale requires international agreement. This at first sight makes success unlikely. Perhaps at second sight as well. The international community, like Australia with its domestic climate change policies, is making multiple attempts at policy.

Remarkably, the international community is now making progress. I set out some details in Update Paper two. Most importantly and surprisingly, we have broken the lock of “special and differential treatment” agreed by us all at Rio de Janeiro in 1992 and Kyoto in 1997, which had threatened to delay essential action by the large developing countries until it was too late. There is an international agreement, formalised in Cancun in December, that takes us a long way forward on global reductions in emissions.

All developed countries have accepted targets for reducing emissions. Major developing countries have taken large steps towards cutting emissions below the growth trajectories that they had been following.

The United States Government is moving seriously to meet its target of reducing emissions from 2005 levels by 17 percent by 2020 (16 percent from 2000). Following the loss of control of the House of representatives, the Obama Administration is seeking to achieve its goals through federal regulatory interventions, supplementing a plethora of state and local measures.

The United States Government is adopting a relatively expensive approach to reducing emissions because it has no choice. Some Australians make that an argument for Australia following America in adopting relatively expensive means of reducing its emissions.

That reminds me of how eminent Columbia University economist Jagdish Bhagwati used to characterise a common argument for protection: “Beware. I will keep shooting oneself in the foot until you stop shooting your own feet”.

If we are clever, we can apply mitigation policies that have relatively little effect on the rise in living standards in the years immediately ahead, while contributing our proportionate part to international action that provides substantial protection for the Australian standard of living in the more distant future.

The alternative is to suffer a major setback to productivity and the rise in living standards—now, from expensive mitigation policies; or later, as we face the consequences of failure of the international mitigation effort.

The international community having come so far on a massive project that is in Australia's national interest, the most foolish position of all would be for us not to play our proportionate part. This is recognised in the emissions reductions targets of the Government and the Opposition.

Some participants in the Australian policy discussion are saying that we should do little because we are a small player in the international game. To be sure, we do not have the influence of the United States, or the European Union, or China. But all of us look over our shoulders at what others are doing. Those of us who would prefer that we hung behind bring to account the case of every laggard. When others have looked over their shoulders at Australia in the past, we have provided them a reason for lagging behind.

That is not a clever position for the developed country that stands to be damaged most by unmitigated or weakly mitigated climate change. By adopting the policies presented in this paper, Australia would not be getting ahead of others in the overall cost of policy action, and it would no longer be lagging behind in the substantive contribution to the reduction in emissions.

For Australia, good mitigation policy must deliver on several objectives. It must be credible in the face of what science tells us is necessary, as well as in response to public and business expectations. It must meet what we have committed to do, domestically and internationally. It should contribute our proportionate part in resolving the international prisoner's dilemma. It must prepare Australia for its role in a more ambitious and demanding global agreement.

This Update Paper presents a package of policies that meets these objectives—which makes sense for the future, for our place in the international community and, separately, for Australia alone. We can, at the same time, play our part in a global agreement and introduce policy reform that is in the national interest.

As I said in 2008, no mitigation policy solution will seem optimal, or acceptable, to everyone. That is certainly true of this package. Indeed, this is partly because it is designed to be right for Australians as a whole.

This Update paper is an interim report on a policy package, which can provide a basis for discussion. The Final Report at the end of May can consider responses to these proposals.

The carbon pricing regime will evolve. It may not be perfect from the outset, but clear rules, and good governance and institutions will move us towards the most optimal design over time.

There is an historic opportunity in the availability of revenue from a carbon price. The revenue can be used first of all for reform of the personal income tax system. Some can be used for complementary support for households, for developing new sources of rural income, for encouraging the more rapid technological innovation that is now required, and for assisting the competitiveness of Australian industry in an economically efficient way. A regulatory approach to mitigation carries all of the costs of carbon pricing and much more, without providing the fiscal means of their amelioration. This Australian Parliament this year will be deciding more than whether it will make a contribution to climate change mitigation. It will be choosing whether it continues with market-based policies that support continued growth in productivity and incomes; or descends into a regulatory mire, surrounded by all the political economy interventions that gave Australia for eight decades the lowest productivity growth of all the developed countries.

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## Appendix 1: Assessing carbon pricing models

There has been an active and creative discussion amongst Australian economists on optimal approaches to reducing emissions. No contributions favour regulatory mechanisms as the central elements of policy. There has been some support for carbon taxes over an emissions trading system. But in practice, a carbon tax must face all of the dilemmas of an emissions trading system on setting parameters and assisting trade-exposed industries. Geoff Carmody's advocacy of consumption-based approaches might usefully have been part of early international consideration of the issues; its concern for Australian trade-exposed industries not to be placed at a competitive disadvantage is taken up in a way that allows for other countries' policy action in the principled approach to assistance that is discussed above. Warwick McKibbin's advocacy of an independent regulatory authority with governance characteristics similar to an independent central bank has been influential in my recommendations. John Freebairn and John Quiggin have played an important role in bringing the discussion back to the fundamentals of taxation and public finance. From these fundamentals, we recognise that the overall welfare effects depend on the way that the revenue from carbon pricing is used.

There is an opportunity to use carbon revenue to replace more distorting taxation. Frank Jotzo's recent contributions take account of the history and entrenched positions of players in the policy-making process. The Australian economics profession is concerned about the potential for unprincipled allocation of assistance to interests that are affected by the scheme to impose economic costs that are large in comparison with the unavoidable costs of an efficient approach to emissions reduction. The Australian Treasury modelling of the Carbon Pollution Reduction Scheme in 2008 suggested that Australian national income was affected little by whether or not trade-exposed industries received assistance. The same cannot be said for the effects that unprincipled assistance might have in unleashing another episode of the Australian enthusiasm for tailor-made assistance in response to political pressure. It was that enthusiasm that gave us high protection and chronic underperformance on productivity growth in the first eight decades of our Federation.

### Principles for assessing carbon pricing models

There are several models to price greenhouse gas emissions (or carbon). Some models set limits on the quantity of emissions and allow the price vary, while others set the price of emissions and allow the quantities to vary.

While there are important differences, all the carbon pricing models discussed in this section share core features.

- All aim to reduce emissions by changing the behaviour of individuals and companies in response to a price signal. By increasing the price of more emissions intensive products and services relative to less emissions intensive products and services, carbon pricing can shift consumer preferences towards products and activities that contribute less, or not at all, to climate change.
- All have significant advantages over regulation. The differences in efficiency and cost between the various carbon pricing models are minimal compared to the differences between carbon pricing and regulation.
- All apply a price to emissions – though models vary on which emissions are priced, and at what point in the economy the price is applied. All can potentially apply to one or many sectors and one or more greenhouse gases.
- They all share some basic requirements, including institutional and administrative arrangements needed for monitoring, reporting, verification, compliance and enforcement mechanisms.
- Many but not all generate Government revenue that can potentially be used for example, to encourage the development of low-emissions technologies, provide transitional assistance to those most affected by a carbon price, or reduce other distortionary taxes (see section 4 in this paper).

See the Australian Government (2011) for a discussion of the carbon pricing models that have featured in the Australian debate in the past few years.

## Appendix 2: Emission intensive, trade exposed assistance: context

### The need for a global agreement, sectoral solutions or transitional assistance

Section 10.5 of the 2008 Review noted that an international agreement supporting international trade in entitlements would move the world towards comparable carbon pricing and remove any justification for support for emissions intensive, trade exposed industries. Failing its development, it proposed an approach to establishing global sectoral mechanisms to price carbon in specific emission intensive, trade exposed industries. Such an approach was put forward as a second-best arrangement. Failing the second best arrangements, and in industries in which no such arrangements were established, it defined a principled approach to domestic assistance arrangements for emission intensive, trade exposed industries (Garnaut 2008). This principled approach forms the basis of recommendations within this Update paper.

### Sectoral approaches

Since 2008, some progress has been made through different international fora on international sectoral agreements for emission intensive, trade exposed industries. The High-Level Advisory Group on Climate Change Financing (AGF) final report—presented to the United Nations Secretary-General in November 2010—discussed the use of carbon pricing instruments in the international transport sector (international aviation and shipping) to generate funds to support adaptation and mitigation in developing countries. Mechanisms discussed included a fuel levy/emissions trading system for maritime bunker fuels, and either a fuel levy/emissions trading system or a passenger ticket tax for the aviation sector (UNFCCC 2010).

At the same time, proposals to reduce emissions from international transport sectors have been considered by the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO), but no current proposals for a levy or any other type of market-based measures are in play in either organisation (Garnaut 2011).

There has also been some progress under the European Union Emissions Trading Scheme (EU ETS). The Directives that govern the European Union Emissions Trading Scheme allow for credits from potential future sectoral mechanisms established in other countries to be used in the European scheme.<sup>30</sup> Such mechanisms could help European Union Member States meet their obligations under the European Union Emissions Trading Scheme and provide an avenue to overcome leakage concerns.

However, just as progress in the international negotiations has not been sufficient to avoid the need for some assistance to Australian emission intensive, trade exposed industries, progress on global sectoral agreements for emission intensive, trade exposed industries has not progressed enough to represent an immediate solution.

### Assessing the extent of the risk of leakage

Carbon leakage is universally agreed to be an undesirable outcome of pricing carbon. 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. The effect could be an increase in global emissions (Garnaut 2008).

Several studies over the last few years have assessed the likely extent of carbon leakage under different carbon pricing models and under different carbon prices. Broadly speaking, these studies have found that the likelihood of carbon leakage and the case for assistance to prevent carbon leakage, while still real, has largely been exaggerated in the public debate.

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<sup>30</sup> See Decision No 406/2009/EC and Directive 2009/29/EC.

As noted in the Australian Treasury (2008) modelling and reiterated by the Grattan Institute (2010b), a number of non-carbon price factors influence industry location choices. These include access to skilled labour, legal and political stability, access to resources, and quality of infrastructure. While carbon leakage risks cannot be quantified with certainty, it is likely to be less of a risk than public discussion suggests.

## Australia

In Australia's Low Pollution Future: The Economics of Climate Change Mitigation, the Australian Treasury (2008) explored the impact of shielding Australian emission intensive, trade exposed industries. The possibility of carbon leakage could be explored in these modelling scenarios because they employed a gradual approach to the expansion of emissions trading across countries, which allowed for the potential for industries to relocate.

The Australian Treasury's results showed little evidence of carbon leakage generated by the 2010 starting prices in the CPRS -5 and CPRS -15 scenarios<sup>31</sup>—starting at A\$23 and A\$32 per tonne of carbon dioxide equivalent in nominal terms respectively. The modelling did find, however, that impacts<sup>32</sup> begin to occur at emissions prices roughly double that under the CPRS -5 scenario. This led the Australian Treasury to conclude that fears of carbon leakage may have been overplayed and that assistance to emission intensive, trade exposed industries under the Carbon Pollution Reduction Scheme would serve to assist such industries transition to a low-carbon economy more than prevent carbon leakage (Australian Government 2008a; Australian Treasury 2008, page 170).

The Grattan Institute (2010b) analysed the impact of a A\$35 per tonne carbon price on several emissions intensive industries in Australia, focusing primarily on the issue of carbon leakage. The Institute concluded that the risk of carbon leakage is relatively small—only 2 of the 8<sup>33</sup> industries studied presented a carbon leakage threat—and that much of the protection proposed for emission intensive, trade exposed industries under the Carbon Pollution Reduction Scheme was unnecessary or incorrectly targeted.

The report found that alumina refining, LNG production and most coal mining<sup>34</sup> would remain internationally competitive at a carbon price of A\$35 per tonne. Thus, assistance would not be needed to prevent carbon leakage in these sectors. Steel and cement were found to be at risk of carbon leakage, with production potentially moving to countries with equal or slightly more emissions-intensive production processes, resulting in an increase in global emissions. The authors of the report argued that this justified some form of assistance. The report found that there may be sufficient incentives for the aluminium industry to move offshore at a carbon price of A\$35 per tonne. Also it might slightly bring forward the closure of oil refineries that were already likely to close in the medium term because of uncompetitive scale. However, because aluminium in particular would probably move to countries with lower emissions-intensive production processes, assistance should be provided to affected workers and regions and not aimed at shielding the industries from the carbon price or preventing their relocation.

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<sup>31</sup> Under the Treasury's CPRS -5 scenario, Australia's targets are 5 per cent below 2000 levels by 2020 and 60 per cent below 2000 levels by 2050. This is consistent with stabilisation at 550 ppm CO<sub>2</sub>-e in 2100. Under the CPRS -15 scenario, Australia's targets are 15 per cent below 2000 levels by 2020 and 60 per cent below 2000 levels by 2050. This is consistent with stabilisation at 510 ppm CO<sub>2</sub>-e in 2100.

<sup>32</sup> Either firm relocation or a change in the emissions and output from trade exposed, emissions intensive industries.

<sup>33</sup> Coal mining was included in the analysis, but is not an trade exposed, emissions intensive industry as defined under the Carbon Pollution Reduction Scheme

<sup>34</sup> Coal mining is not a trade exposed, emissions intensive industry according to the definitions used under the Carbon Pollution Reduction Scheme

### Box 11: Prevention of carbon leakage: the Grattan Institute approach

Based on static analysis of impact of carbon price on costs and competitiveness, the Grattan Institute proposed providing assistance to Australian producers only when impacts are likely to result in a significant distortion in decisions about plant locations. That is, their assistance response is based on the premise that the only objective is to prevent carbon leakage—shifts of Australian production to more overseas locations with equal or worse emissions intensity. It does not explicitly consider the economic rationale: that industry may contract more than is efficient, that is, more than they would in a world in which competitors faced a comparable carbon price.

As discussed in section 4.3 and in this Appendix, the likelihood, or otherwise, of carbon leakage is difficult to anticipate precisely. Thus, any assumptions about the risk of carbon leakage, at a sectoral level, are a highly contestable basis upon which to calculate levels of assistance.

Where assistance was supported by the Grattan Institute—for cement and steel—it recommended that this be provided through a border tax adjustment rather than free permits. This is because these two industries are largely import competing, and where free permits might inhibit a switch to less emissions-intensive substitute products or processes. It also avoids the economically undesirable outcome of assisting Australia's least profitable and most emissions-intensive industries simply to avoid global emissions increases in the short term. The Grattan Institute analysis does not consider how regular reviews might amend assistance targeting, or rates, in light of the evolving global environment. The 2008 Review expressed serious reservations about broader adjustments.

Source: Grattan Institute 2010a, 2010b

## United States

The United States Environmental Protection Agency in December 2009 analysed the effect of a carbon price of US\$20 (A\$19.90)<sup>35</sup> per tonne on international competitiveness and carbon leakage in energy intensive, trade exposed industries in the context of the cap-and-trade emissions trading scheme that would be established by the House-passed Waxman-Markey bill (H.R. 2454). The study found that without the industry assistance provisions in the bill, the increase in production costs in emission intensive, trade exposed industries would range from less than 0.5 per cent to a little more than 2.5 per cent. This translates to annual carbon leakage in the order of only 10 Mt carbon dioxide equivalent (Environmental Protection Agency 2009).

## Europe

In May 2010, the European Commission released a paper analysing the costs, benefits and options of moving the European Union's reduction target for 2020 from 20 per cent to 30 per cent below 1990 levels (European Commission 2010). The paper also assessed the risk of carbon leakage in the European Union Emissions Trading Scheme. It estimated that the under the 20 per cent target, with other countries implementing their low-end Copenhagen Accord pledges, production losses in the European Union would be less than 1 per cent. With a move to the 30 per cent target, production losses remained limited—increasing by only a further 1 per cent. The analysis assumed that current measures, such as access to international credits, banking of allowances and free allocation to emissions-intensive sectors remain in place under the European Union Emissions Trading Scheme.<sup>36</sup>

<sup>35</sup> Converted at current exchange rates, as at 11 March 2011.

<sup>36</sup> Free issuance was the predominant method of permit allocation in the first two phases of the European Union Emissions Trading Scheme, with Member States only allowed to auction up to 5 per cent of allowances in Phase I (2005-2007) and 10 per cent in Phase II (2008-2012). Phase III (2013-2020) will see auctioning become the primary form of allocation for non-traded industries. Sectors

A study by the UK Carbon Trust (2010) also found the risk of carbon leakage in Phase III of the European Union Emissions Trading Scheme to be low. Indeed, the study found that under the current European Union Emissions Trading Scheme Phase III targets to 2020, and without any free allocation or assistance, less than 2 per cent of total European Union emissions (30Mt carbon dioxide equivalent) would be likely to leak abroad. While this average figure is low, the report found that for a few specific sectors—such as steel, cement (particularly clinker production) and aluminium—the risk of leakage is greater, requiring specific measures to account for the lack of a carbon price in some competitor countries.

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deemed at risk of carbon leakage, however, will receive assistance set at 100 per cent of the carbon intensity benchmark of the top 10 per cent most efficient installations in each sector.