Options for pricing emissions in Australia

A SUBMISSION PREPARED FOR THE SENATE COMMITTTEE FOR THE SCRUTINY OF NEW TAXES

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Executive summary

There are strong arguments, based both on self-interest and on ethical considerations, for Australia to implement a price on emissions at an early date, particularly with a view to fostering greater international collective action on reducing greenhouse gas (GHG) emissions.

To date, Australia has struggled to implement a price on GHG emissions. The Carbon Pollution Reduction Scheme (CPRS) was unwieldy and unnecessarily costly. Moreover, the almost exclusive focus by the Government and Garnaut on a cap and trade approach has largely precluded a debate on other options. In particular, focus on the supposed emissions certainty provided by the CPRS (which in itself is misleading) has meant that other policy options have received lesser consideration.

We say supposed emissions certainty because with international trade of permits (as proposed under the CPRS), the level of Australia's domestic emissions would vary with the international carbon price and there would be no certainty over domestic emissions. The emissions cap would only determine how many permits Australia would import from overseas to meet any abatement shortfall (see Section 2.2.3).

The inordinate focus on short term emissions certainty (both domestically and in international negotiations) by the Government and Garnaut ignored the inherent trade-off between emissions and carbon price certainty (and acceptance of abatement targets). To draw an analogy, investment decisions consider risk *and* reward: interest on a bank account is certain (low risk) but this comes at a cost as long-term returns are generally lower than could be obtained in riskier investments such as shares. If the investment horizon is short-term then certainty may be a priority but in the longer-term, risk may be more tolerable as variations even out. The comparison here is that the public, taxpayers and industry may be willing to accept greater abatement cuts in the longer run if this is paired with less rigidity over emissions levels in the short-run. This probably explains, in part, why options that deliver more costly abatement but do not deliver emissions certainty (such as Renewable Energy Targets) have been in operation for some time now yet an emissions cap has still not been accepted in Australia. This trade off probably also explains why nations with the greatest potential variability in emissions levels (countries such as China and India which, like Australia, produce a larger volume of emissions than they consume) have favoured intensity based policies over rigid emissions targets. This could allow the pursuit of larger emissions cuts with reduced economic risk from failing to meet a rigid target. While there is often concern that this will not deliver emissions certainty, as with sharemarket investments, there is a likelihood that under these less rigid schemes the delivered abatement could in fact *exceed* the target of a more rigid scheme.

In work it conducted in 2009 for the Coalition and for Senator Xenophon, Frontier Economics demonstrated how alternative approaches could greatly improve on the economic and environmental outcomes proposed by the CPRS.

Frontier Economics' proposal is that if broader consensus for a carbon price is lacking then the process of pricing emissions could be introduced by applying an emissions price (of some form) to the electricity sector initially. This is an appropriate starting point given that:

- it is the single largest emitting sector
- there are minimal issues regarding possible 'carbon leakage', which added significant complexity (and possible opposition) to the CPRS
- there is an advanced understanding of abatement opportunities available in this sector, hence minimal uncertainty
- electricity sector investments are capital intensive and very long-term. Given the long lead-time for new investments (3-5 years), carbon policy uncertainty – while currently very low - will eventually result in rising electricity costs due to the uncertainty alone

Narrower scheme coverage initially may theoretically increase the reliance on offsets or permit imports to meet a given target, though this will not increase costs to covered sectors if we have international trade of permits or a price cap.

The benefits of broader coverage also need to be weighed against the costs, particularly if this greatly increases the complexity of the scheme and reduces chances of acceptance (from taxpayers, industry and the public). For example, the CPRS proposal included coverage of transport, agriculture and emission intensive trade exposed industries (EITEIs). This coverage created many other issues (particularly risk of carbon leakage) that led to compensation arrangements which reduced the chance of substantive abatement from these sectors (minimal benefit). It also increased uncertainty for participants and arguably increased opposition to the scheme as a whole. Part of this was arguably due to a false perception that much of the compensation was a transfer (windfall gain) to industry, whereas in most cases it actually represented a partial refund of new taxes paid by industry. In contrast, while the extended Renewable Energy Target may result in higher cost abatement than a broad carbon price, the narrower coverage provides greater certainty and increased acceptance, which means that it is already delivering abatement. Similarly, the Queensland Gas Scheme and the NSW GGAS scheme (more targeted policies) are already delivering abatement.

The EU ETS commenced with narrower coverage than the CPRS, which arguably resulted in wider acceptance and has allowed for subsequent expansion. While some of the design features of the early EU ETS have been characterised as limitations by some commentators, these could alternatively be viewed as necessary paths to introduction and acceptance of a carbon price.

At the very least, some form of delivering certainty for investments in baseload capacity should be considered for the electricity sector. While the cost of uncertainty is not currently significant, the long lead time for new electricity sector investments means that this cost will begin to rise if policy uncertainty continues.

One option for introducing a price on emissions in the electricity sector is to implement an intensity-based scheme as a transitionary measure. An intensity-based scheme is one which charges for all emissions above a certain intensity baseline/benchmark, and subsidises producers that emit below this baseline. The intensity-based scheme provides exactly the same incentive for substitution from higher to lower emissions intensity generation ("supply side abatement") as a carbon tax or a cap and trade approach. This will drive 90% of abatement in the electricity sector, and a material increase in electricity prices is not required to deliver this. The main difference is that a tax/cap and trade imposes a charge on all unavoided emissions, whereas the intensity based scheme only charges for those at the margin (above the target). This means that a tax/cap and trade results in far greater increases in electricity prices, which is mostly a transfer to Government that delivers minimal additional abatement. In an environment where electricity prices are already rising due to other causes, we see this as a critical impediment to acceptance of a carbon price and achieving consensus.

The lower electricity price effect has a number of advantages. One is that it attenuates adjustment costs for households and firms without the need to resort to lump sum transfers. Moreover, the lower price effects mean that the effect of the scheme on employment decisions and investment decisions of firms is less severe. It also means that competitiveness and carbon leakage concerns for sectors that use electricity intensively are attenuated. Because of the relatively inelastic nature of electricity demand in the medium to short term, the fact that electricity prices are lower than under an emissions tax or a cap and trade approach is not expected to have a material impact on the level of emissions ("demand-side abatement"). In any case, there are numerous energy efficiency measures in place or under development which will deliver this saving without a price increase. Over time, as the intensity target is tightened, the electricity prices under an intensity-based scheme will converge to those that would result under an emissions tax or a cap and trade approach. It also means that any potential uncertainty around emissions levels from the sector (which is minimal) falls over time. As the emissions intensity of supply falls, there is an effective 'decoupling' of electricity demand and emissions, and any variance in emissions caused by varying energy demand falls to zero.

Once emissions pricing has been implemented in the electricity sector, it should be possible to expand the coverage of emissions pricing to other sectors. The application of an intensity-based approach to the electricity sector is compatible with the implementation of either an emissions tax or a cap and trade approach to the economy as a whole as permits would be fully fungible if coverage were expanded later.

1 Introduction

1.1 Context for this submission

Frontier Economics is pleased to respond to the invitation extended by the Senate Committee for the Scrutiny of New Taxes to present a submission on the issue of emissions pricing. Frontier Economics has prepared this submission entirely at its own cost, with the intention of making a contribution to the debate on this crucial public policy matter.

1.2 About Frontier Economics

Frontier Economics has been involved in climate change policy for the last decade. It played a central role in designing and implementing the NSW Greenhouse Gas Abatement Scheme (GGAS) in 2001-2 – the world's first mandatory broad based emissions trading scheme (ETS). Frontier Economics has also undertaken a number of studies regarding the implementation of emissions reduction policies. These include a joint study with AGL and the World Wildlife Fund in 2006. More recently, Frontier Economics has provided extensive analysis and commentary of emissions pricing proposals under the CPRS. In 2009, it undertook work for the Coalition and Senator Xenophon that reviewed the operation of the CPRS and presented alternative policy options.

1.3 Structure of this submission

This submission is structured as follows:

- Section 2 uses the building blocks of the economics of emissions pricing to develop a framework to evaluate policy options for emissions pricing in Australia.
- Section 3 applies this framework to policy options, and sets out a recommended approach.

2 Framework for assessing emissions reduction policies in Australia

2.1 The context and rationale for emissions reduction policies in Australia

Australia is particularly exposed to the negative consequences of climate change. The large majority of its population lives in coastal areas that will be exposed to an rise in sea levels. Much of its agricultural activities are located in zones that are predicted to become unviable or only marginally viable. Its ecosystems and biodiversity are fragile and are reported to have limited tolerance to changes in climatic variables. On this basis Australia would have a clear interest in actions to stabilise atmospheric concentrations of Greenhouse Gases (GHG's) at 'safe' concentration levels. By 'safe levels', we mean ones in the range of 350-450 ppm, that are consistent with no more than a moderate level of warming according to the majority of climate scientists.

The benefits to Australia, in terms of avoided damages, will only materialise if there is global collective action to stabilise GHGs. This is because Australia's emissions account for too small a share of global emissions to make a difference to climatic outcomes.

Because the benefits of stable atmospheric concentrations of GHG's have public good characteristics (i.e. they cannot be provided to any one country without being provided to all, and the enjoyment of these benefits by one country does not diminish the possibility of others enjoying them), efforts at collective solutions are plagued by free-rider problems. Cooperative and enforceable solutions will take time to evolve, particularly when further complications relating to geopolitics are thrown into the equation. This explains the repeated failures, at an international level, to conclude binding and enforceable treaty mechanisms that are effective at tackling GHG emissions.

Because cooperative solutions usually evolve through reciprocity, Australia can play its part in bringing about such a solution by committing to GHG reductions, even if this means acting in advance of some other emitters. Since Australia has one of the highest levels of per capita emissions, and has reaped considerable economic dividends from its untrammelled ability to emit in the past, there is a ethical argument for Australia to be an early contributor to global action on climate change. This ethical argument complements the inherently self interested arguments – that stem from the factors set out above - that Australia has in kick-starting a global effort at stabilising GHGs.

In our view, these two arguments – one based on self interest, one based on ethics – are the main ones favouring early action by Australia on climate change.

Other arguments are far less convincing. These include the notion that there may be some inherent competitive advantage to be gained, particularly in the area of 'clean technologies', by pricing emissions. In our view this conflates the gains from abatement with the gains that may arise from a clean technology industrial policy. The benefits of the latter need to be properly evaluated. It is likely, for example, that Australia stands to gain from the deployment of such technologies in other markets that have much greater potential for scale effects, which would in turn reduce the cost of their deployment in Australia. This is likely to be the case with solar energy, for example; although Australia has excellent climatic conditions to deploy/utilise solar power, this does not necessarily equate to any competitive advantage in the manufacturing of solar panels.

The overall context and rationale for mitigation policy have an important bearing on the way policy should be designed within Australia. In particular, if Australia is to implement emissions pricing ahead of collective global action to do so, it will need to manage some of the particular adjustment issues that are likely to arise as a consequence. The following sub-sections of this paper set out some of the policy dimensions that need to be taken into account when considering the implementation of mitigation policies in Australia.

2.2 Issues in implementing emissions reduction policies

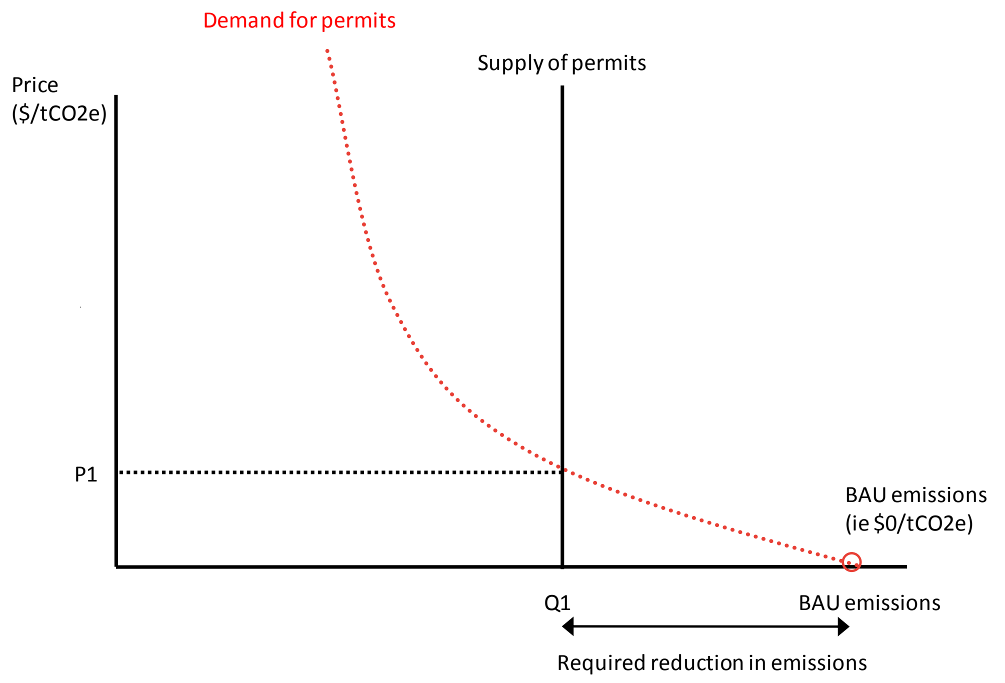
2.2.1 Environmental efficacy

Policies that seek to reduce GHG emissions aim to substitute emissions intensive production and consumption patterns with less emissions intensive ones. But this substitution can be brought about in different ways. In particular, schemes that set an explicit price on emissions do so in one of two ways:

- By setting the price directly, as is the case with a tax on emissions, and allowing the quantity of emissions reductions (relative to business as usual) to be determined by the amount of abatement that can be supplied at that price. The amount of abatement supplied at a given price will reflect the cost of supplying an extra unit of abatement, which in turn reflects the abatement technology available to an economy
- By setting a quantitative cap on emissions, and allowing the price to be determined as a function of the demand for abatement (i.e. the reduction in emissions relative to business as usual) and the supply of abatement opportunities

Figure 1 depicts how emissions pricing works.

Figure 1: Emissions pricing

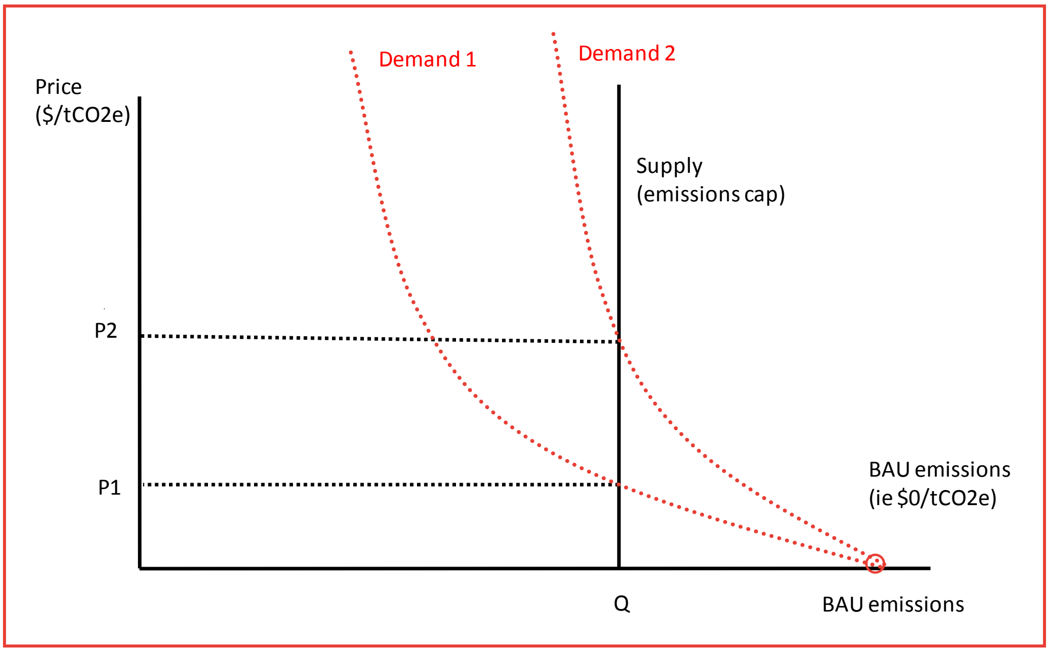


The quantity of emissions under Business as Usual (BAU) is marked on the simple example in Figure 1, where the carbon price is zero. The vertical axis depicts the price/cost per tonne of emissions, while the horizontal axis represents the quantity of emissions. Emitters may take actions to reduce emissions, though these actions are costly. If a carbon price is introduced, emitters will prefer to take action to reduce their emissions if the cost of doing so is less than the carbon price. As such, demand for permits is downward sloped: demand for permits falls as the carbon price rises. Conversely, emitters take greater action to reduce emissions as the carbon price increases. The demand curve for permits is also known as a Marginal Abatement Cost Curve (MACC).

Q1 represents a reduction in emissions relative to business of usual. If the Government sets a cap on emissions of Q1, then the price of the tonne of emissions is given by P1. Similarly, the Government could set a price of P1, which given demand for emissions will yield an overall emissions target of Q1.

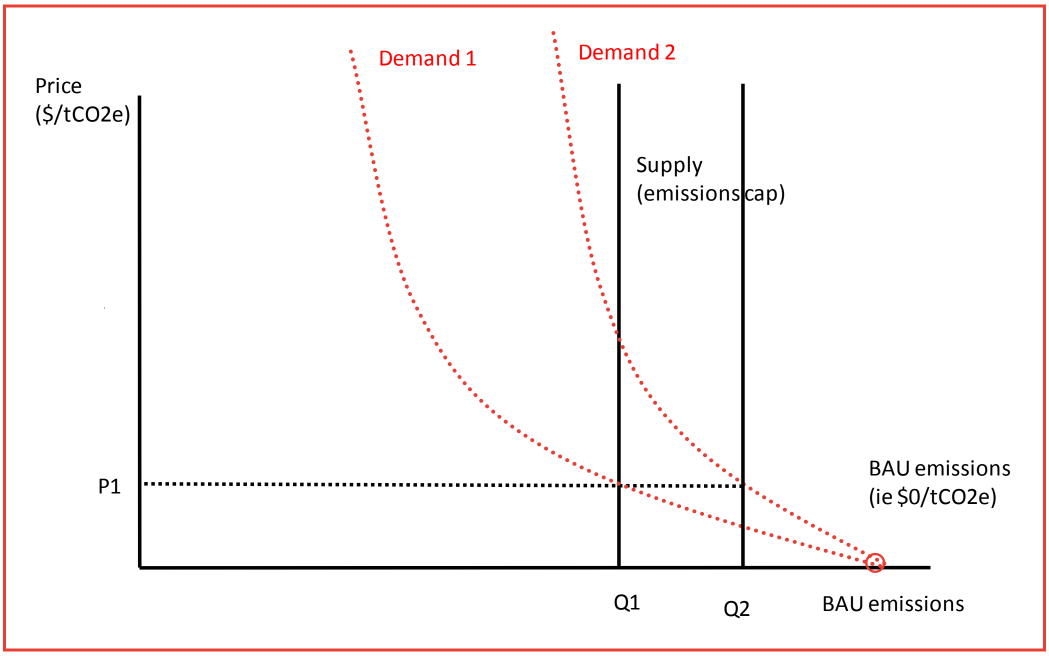
Suppose now there was an increase in the demand for permits. This could come about for several reasons. For example, it could be that economic growth is faster than expected. It could also be that abatement technologies prove more costly than anticipated, or it could represent narrower scheme coverage (more limited abatement options). Figure 2 depicts the outcome when there is a binding cap on emissions and demand increases. The carbon price will increase for a given emissions cap (from P1 to P2).

Figure 2: Increased demand for permits under a fixed emissions cap



The outcome for a similar scenario in which the Government fixes the *price* of emissions (P1) is depicted in Figure 3. We see that the increased demand for permits translates into a higher quantity of emissions (Q2) (i.e. a lower level of abatement relative to business as usual).

Figure 3: Increased demand for permits under a fixed emissions price.



This example is only applicable to a 'closed economy' without international trade. This assumption is relaxed in Section 2.2.3.

On the face of it, one of the implications of this discussion is that policymakers need to choose between certainty in the price of emissions over a given period of time (while allowing the quantity of emissions reductions to vary), and certainty in the quantity of reductions over a given period of time (while allowing the price to vary).

Proponents of a cap and trade approach have argued that their approach provides certainty regarding the extent of abatement that can be achieved in any period of time, and that this is important in terms of GHG stabilisation objectives.

However, this argument suffers from two problems. One is that the benefits of fixing the quantity of emissions and allowing the price to vary, relative to the alternative of fixing the price and allowing the quantity to vary, depends to a great extent on whether variations in quantity or variations in price carry greater costs. Because the environmental damages of GHG gases are a function of the *stock* of GHG gases in the atmosphere, rather than variability in the *flow* of GHG emissions in any time period, the costs of some variability in the quantity of emissions in any time period are relatively small. By contrast, fluctuations in price over a given period of time can carry substantial costs, to the extent that they create uncertainty in investment. We deal with the issue of investment certainty in the context of emissions pricing in Section 2.2.4 below.

The second problem stems from the first. Because of the problems caused by fluctuating emissions prices, most Governments that have favoured ca and trade approaches have considered active intervention that would stabilise prices by changing the cap on emissions. Under the proposed CPRS, the Government favoured capping the price of emissions above a certain amount. It also allowed for unlimited imports of permits, which would have in effect meant that the cap and trade scheme reverted to a fixed price scheme once the international permit price became binding. This would mean that there is no certainty over domestic emissions (this is explained in Section 2.2.3). The European Union's ETS came under strong pressure for intervention to raise the price of permits (through buy-backs of permits) when the price fell during the GFC.

The broad conclusion from is that the ability to achieve a hard quantitative target in emissions reduction is not a particularly good indicator of the extent to which a scheme is effective from an environmental standpoint. Moreover, the ability to achieve hard targets says little about whether such schemes are able to achieve environmental objectives in an economically efficient way (i.e. at lowest cost). In order to assess the latter, other considerations are needed.

2.2.2 Economic costs of GHG schemes

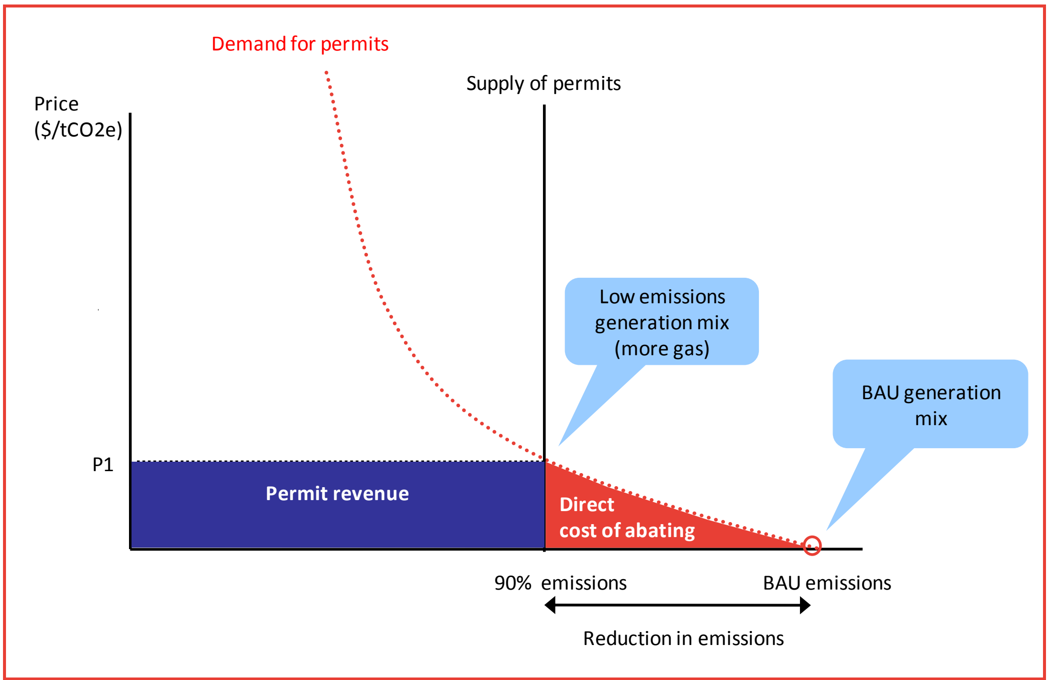
Direct and indirect costs

It is important to distinguish between the cost to reduce emissions and the tax or permit revenue generated (see Figure 4 below):

- the **direct cost** is the resource cost of reducing emissions (e.g. generating electricity from higher cost gas rather than coal)
- the **permit revenue** is the revenue generated by an emissions trading scheme or carbon tax. This is a charge on emissions than *are not* avoided. If the revenue is collected by the Government, this is a transfer from those bearing the price of emissions to Government. There may be further transfers from Government to society depending on how the Government chooses to use ('recycle') this revenue

The differences are depicted in Figure 4 below.

Figure 4: Permit revenue versus cost of abatement



The total costs to an economy that result from GHG schemes reflect the direct costs of abatement as well as indirect costs associated with the collection and use of tax revenue (not depicted on this diagram). The direct resource costs will depend on the technologies for abatement that are available to an economy.

Initially, the permit revenue will be much larger than the resource cost as abatement will be only a small portion of total emissions. This in turn implies that the costs of collecting and using these revenues will be a major part of GHG scheme costs in the initial period. The distinction between costs and transfers is discussed further under Section 3.3.2.

The indirect costs associated with permit revenue reflect a variety of factors. Basic public finance theory suggests that pricing things that are socially harmful is preferable to taxing labour or investment. The former is a socially useful form of taxation while the latter is distortionary, in that it induces less employment and/ or investment than is otherwise the case. However, even taxes on socially harmful activities or products can have economic costs. In the case of emissions, recall that permit revenue is generated by pricing emissions that are not avoided. This price or tax on emissions then flows through to the prices of goods and services, to an extent that depends on market structure and demand elasticity. To the extent that these flow-through effects raise the prices of goods and services across the economy, they can have an effect on employment and investment decisions, particularly if they amplify the distortions caused by existing taxes on labour and investment.

This is sometimes caused the 'tax interaction effect'. The tax interaction effect can be addressed either by reducing the flow-on effect of permit pricing on other prices, and/ or cutting existing distortionary taxes (perhaps by using revenue from permit pricing to finance these cuts). The tax interaction effect is separate to issues of competitiveness and carbon leakage, which we discuss separately.

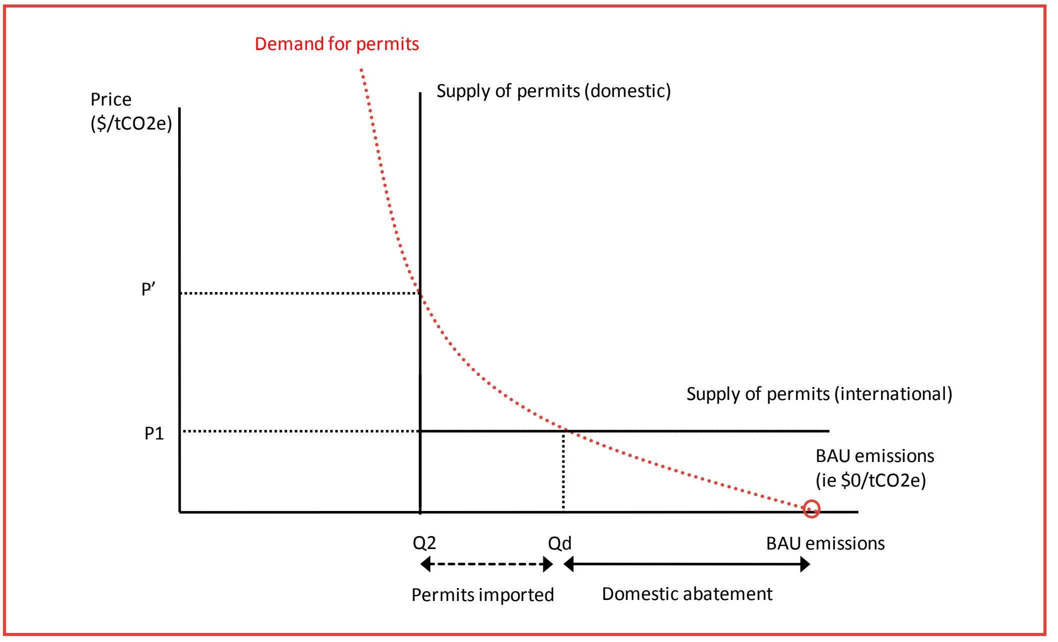
There are also costs that may stem from the use of permit revenue. These costs would arise to the extent that permit revenue is used to finance discretionary Government spending that has weak economic justification.

2.2.3 International linkages

The discussion above assumes a closed economy i.e. that all abatement is 'produced' from domestic sources. However, it is also possible for Australia to access abatement opportunities overseas, as proposed for the CPRS. The price of this 'imported' abatement will be the world price for emissions. Since Australia accounts for a very small share of emissions globally, we can assume that it will be a price taker on international emissions markets i.e. decisions made by Australia regarding GHG abatement will not have an effect on world prices.

The impacts of introducing international linkages can be depicted through Figure 5.

Figure 5: Emissions price and domestic abatement – with international trade

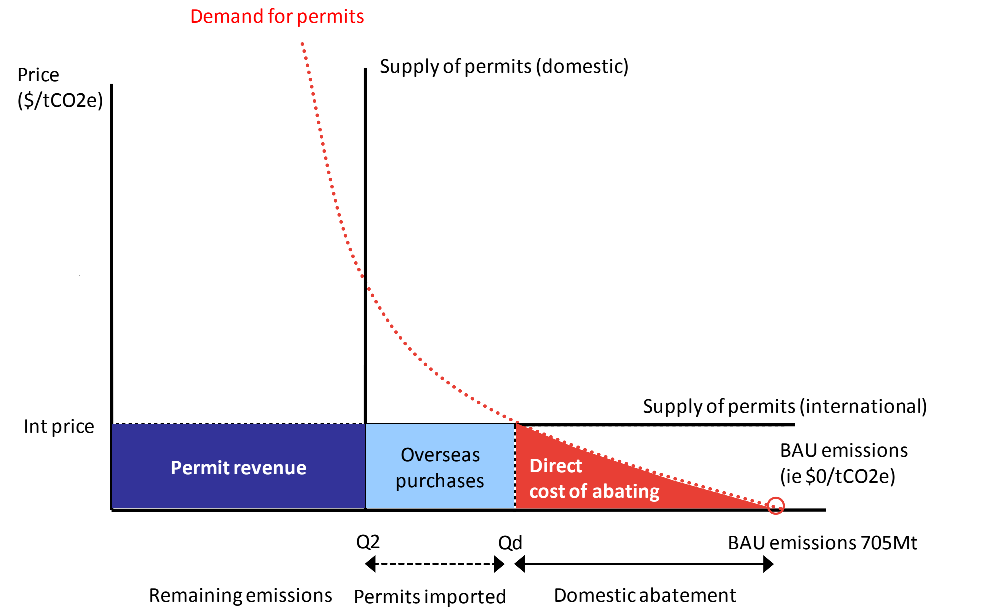


If the Government sets a target of Q2, then given an international emissions price of P1, Australia's domestic emissions will be Qd (i.e. greater than the emission cap of Q2). Domestic abatement is represented by BaU less Qd, and the quantity of permit imports is Qd less Q2. The price P' represents the emissions price that would have obtained in the economy if the reduction target of Q2 was pursued without allowing for international trade. We see that this is a substantially higher price than the international price.

The implications of international linkages for permit revenue and abatement are summarised in Figure 6 below. With international trade in permits:

- There is a transfer of permit revenue from Australia to overseas (light blue). This is the auction revenue that is foregone. Resources are used to finance the acquisition of permits from overseas
- The international market will set the carbon price and Australia will be a price taker in this market. In this case, Australia will in effect have a flat price on emissions i.e. a tax. With international linkage, Australia's domestic emissions (Qd) will be set by the international carbon price (hence there is no certainty over domestic emissions, even under a cap and trade). Any change to the emissions 'cap' (Q2) will only change how many permits that Australia will commit to import. This also applies to any other (smaller) country setting a domestic target which allows for unlimited permit imports. Note also that narrower scheme coverage (a shift upward in the demand for permits) may increase domestic emissions, though the target of Q2 could be met through increased permit imports or other offsets (it will not increase the costs to covered sectors)

Figure 6: Permit revenue and abatement with international trading



There has been some debate regarding the desirability of whether to allow permit imports, and if so to what extent. The modelling produced by the Government to support the CPRS assumed unrestricted access to permits at the international price.

The main argument in favour of international permit trade is a variant of the standard argument of the gains from international trade. That is, permit trade allows a country to access the cheapest mix of abatement from domestic and foreign sources. If all countries priced emissions uniformly at the prevailing international price, this would lead to low cost abatement for the world as a whole. From a domestic point of view, cheaper abatement can carry economic benefits to the extent that it mitigates the tax interaction effects referred to in Section 2.2.2.

The main arguments against international trade (or in favour of limiting it) relate to the verifiability of abatement opportunities accessed overseas. This reflects weak governance in many of the jurisdictions that could be 'exporters' of permits, and the lack of progress on international arrangements for monitoring and verification. There are also added concerns that international permit trade may foreclose the development opportunities of poorer countries, by locking them into supplying abatement (rather than pursuing options that have a higher development potential but that reduce abatement potential). Finally, some argue that international permit trade limits the development of "green industries" at home.

In our view, the arguments that find fault with international trade do not amount to a conclusive case for prohibiting or severely restricting it. The issue of verifiability, for example, is analogous to the question of product safety in, say, certain types of household goods, or freedom from pests in respect of agricultural goods. The fact that some products are unsafe is not an argument against trade *per se*. Rather it is a case for restricting trade in those products that do not meet a specified standard. When it comes to international permit trade, Australia could establish certain criteria that allow it to designate legitimate sources of imported permits. Something similar is evident in voluntary markets, where different grades of abatement standards have evolved and prices reflect the relative quality of abatement. Australia could also match this by supporting efforts to develop the capacity of poorer countries to measure and verify abatement opportunities, as well as to identify what abatement opportunities are consistent with their wider development goals.

The argument that international trade in permits reduces the scope for the development of green industries is in effect an argument for green infant industry protection. It carries all the standard costs of infant industry protection, augmented by the fact that it increases the cost of abatement to Australia. To the extent there is a case for supporting the development of low emissions activities, this should be done through the provision of subsidies directed at specific market failures (such as in R&D); and by ensuring that there investors are provided with a degree of certainty regarding emissions prices.

2.2.4 Investment certainty

The success of GHG emissions reduction programmes depend to a great extent on their ability to stimulate investment in low emissions technologies, many of which will be new and require substantial amounts of research and development (R&D). There are many factors that will influence whether such investments take place on a sufficient scale. One of these is the existence of market failures effecting innovation. This could require the use of subsidies directed at R&D.

Another important factor affecting investment is certainty surrounding key policy parameters, particularly the price of emissions. The reason this is important is that where investments are irreversible, uncertainty will increase the option value of delaying investment (or alternatively, investors will require greater returns to compensate them for liquidating the option of waiting).

Certainty is critical to electricity investment: if a carbon price is introduced then investors will likely favour gas for new baseload capacity; if a carbon price is not introduced then coal will continue to be the most cost effective choice for baseload demand. Given that power sector investments are hugely capital intensive and long term, the potential cost of a wrong decision means that investors will delay investments in baseload capacity until there is policy certainty. Given the long lead time for new power sector investments (3-5 years) uncertainty over policy will affect the markets for several years after policy is 'finalised': even when investors decide to build, capacity will not be immediately available.

The cost of this uncertainty is an empirical question and depends on the need for new baseload capacity. The sooner that new baseload capacity is required (and the larger the requirement), the greater the cost of policy delay. The implication of this is that any other policy that reduces the requirement for new baseload generation capacity will reduce the cost of uncertainty in emissions pricing: energy efficiency measures, and the Extended Renewable Energy Target (eRET) both reduce this cost.

One way of modelling the cost of uncertainty is to compare estimates of Long Run Marginal Costs (LRMC) under a scenario in which there is policy certainty (i.e. investors know the price of emissions and there is no delay to baseload investment) with one in which there is uncertainty (i.e. an emissions price is introduced at a later date and baseload investment is delayed). For the purposes of illustration, we suppose that a price on emissions is introduced in 2014, and that this is known by 2013.

In order to isolate the effects of uncertainty, it is necessary to also take into account the fact that there is currently an excess of baseload capacity in the NEM – this mitigates the costs of uncertainty. It is also necessary to take into account the effect o renewable schemes such as eRET, which reduce the requirement for baseload generation. When we take these factors into account, our modelling suggests that uncertainty until 2013 increases LRMC by around 4.1% in 2020 relative to the "no-uncertainty scenario". The true figure is likely to be lower since this does not account for the effect of energy efficiency schemes on baseload generation. Furthermore, this is the cost to consumers as distinct from the total cost. Much of this would be a transfer (gain) to existing generators and the actual cost would be much less.

While the costs under these scenarios are relatively small, the costs would increase if there were further delay. As a result, there is merit in reducing these costs through the implementation of an emissions price for the electricity sector. Despite this, the costs of delay are likely to far less costly that the costs that would arise from introducing a poor policy.

2.2.5 Competitiveness and carbon leakage

Both competitiveness and carbon leakage issues reflect the possibility that Australia would undertake emissions reduction commitments when its trading partners do not, or only undertake weak commitments. The underlying concern is that this will lead to a contraction in activities that would have been otherwise efficiently undertaken in Australia. By 'efficient' we mean that Australia would normally have a comparative advantage in these activities if emissions were to be priced across all trading partners. The implication is that under asymmetric reduction commitments and the incomplete application of an emissions price across trading partners, trade and investment flows are directed by the relative stringency of emissions reduction policies rather than the actual emissions intensity of production. Even if global emissions fall, there can be welfare losses if the costs of emissions reduction are higher than they might have been had these reductions occurred in countries with lower abatement costs but do not undertake reduction commitments.

While competitiveness concerns are linked to carbon leakage concerns, not all competitiveness concerns are carbon leakage concerns. It is possible for there to be a loss in competitiveness without having carbon leakage. In these cases, it is important to understand in what sense the loss of competitiveness is a public policy issue. It is an efficiency issue if the loss of competitiveness reflects a departure from the broad pattern of comparative advantage that would be expected to prevail had trading partners implemented reduction commitments and had there been an international market for permits. It is an adjustment or distributional issue if the loss of competitiveness reflects a decline in those sectors that are simply less viable in an 'emissions-constrained world'.

The difference is of importance to public policy since in the former scenario there is a case for policy intervention that acts on relative prices, while in the latter the focus should be on smoothing adjustment. The difficulty is that it is not necessarily easy to distinguish between the two, which in turn can expose policy making to capture and rent seeking behaviour.

One of the difficulties in managing schemes to offset competitiveness and leakage effects relates to sunset provisions: i.e. the conditions under which they should terminate. Most schemes have termination conditions that are predicated on comparable action being undertaken by trading partners. The difficulty with this is that:

- What constitutes comparable action is left undefined, giving considerable scope for discretion (and, potentially, capture by vested interests) in the operation of the scheme
- It is not necessary for trading partners to undertake the same reduction commitments before carbon leakage and competitiveness cease to become an economic issue (in the sense of reducing domestic and global welfare, as opposed to the welfare of selected groups)

We note that the electricity sector is not trade exposed, hence these issues only arise indirectly (for electricity consuming industries) if coverage is limited initially.

2.2.6 Consumption versus production emissions

Differences in the nature of a country's emissions can also influence policy decisions. The ratio of emissions consumed to emissions produced affects the risk associated with committing to firm emissions targets (which are based on production emissions). Countries that consume higher emissions than they produce (net importers) face less risk when committing to binding targets, since targets only consider production emissions. Countries that produce more emissions than they consume (net exporters) face greater risk in committing to targets restricting production emissions.

There are different levers associated with reducing production and consumption emissions. A reduction in the emissions intensity of production will reduce emissions for a given level of future growth. Alternatively, reduced consumption of emissions intensive products will also reduce emissions (for a given level of emissions intensity).

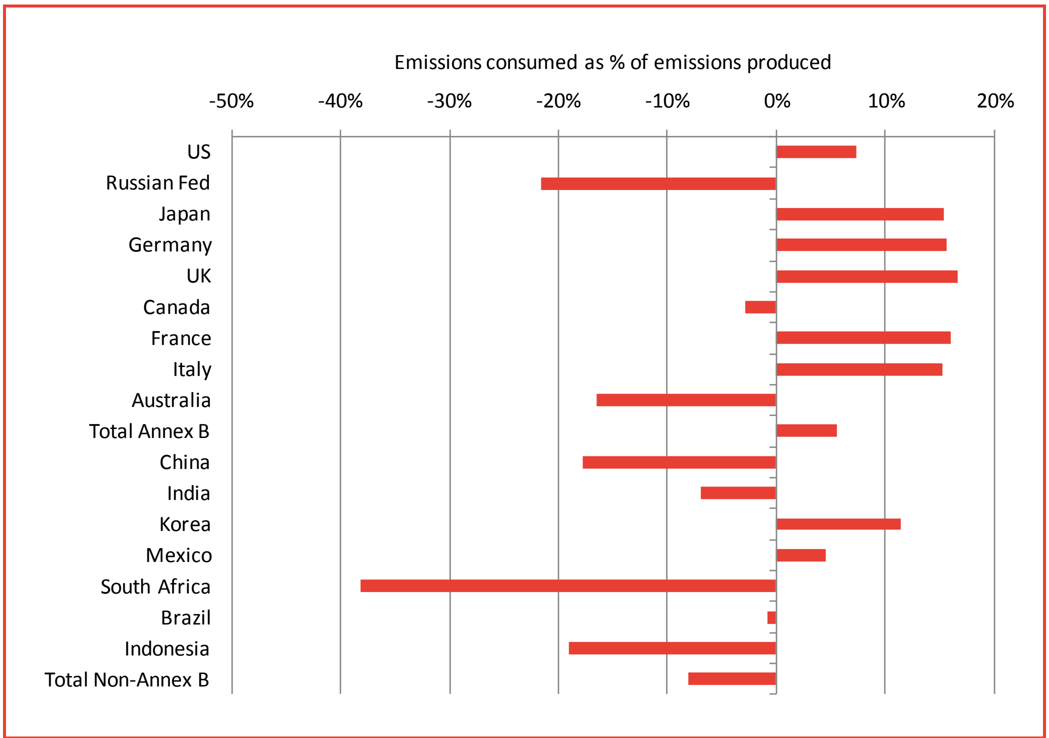
Industry will have incentive to reduce production emissions so long as there is a relative difference in emissions liability. This incentive is the same whether producers are liable for all of their costs, or whether intensity targets are used. This is consistent with the notion of 'clean growth'.

Consumption emissions may be reduced (potentially) as a result of an increase in final prices which aims to discourage consumption of more emissions intensive goods. In practice, most demand for energy intensive products (especially electricity) is relatively insensitive to prices, hence most gains will be achieved on the production side or through complementary measures to reduce demand.

Unlike most developed nations, Australia's production emissions are significantly larger than consumption emissions (Figure 7). Countries with a positive ratio (to the right of 0%) consume more emissions than they produce, and conversely. In other words, most of the emissions that Australia produces are contained in export goods that are consumed in other nations. This is typically more common for developing nations and reflects Australia's comparative advantage in natural resources. Since Australia exports a significant share of the emissions it produces and is a generally a price-taker in global markets, this makes it extremely difficult to reduce or control emissions through reduced consumption, hence our view that the focus of Australia's efforts should be on reducing the emissions intensity of production until other nations take action to reduce their consumption.

Since Australia is a small, open, emissions intensive economy, imposing costs unilaterally on emissions intensive trade exposed industries (EITEI) will not change global prices, and hence they will not change global consumption emissions (or consumption of Australia's exported emissions). As such, there would appear to be more value in reducing the emissions intensity of Australian production rather than reducing Australian production ("clean growth"). This would be consistent with the reasons for China and India proposing intensity targets.

Figure 7: Emissions by production/consumption



Source: Peters and Hertwich, CO2 Embodied in International Trade with Implications for Global Climate Policy, Environmental Science and Technology *(2009)*

2.2.7 Adjustment effects

Competitiveness and carbon leakage issues are one aspect of adjustment effects. More generally, there are likely to be transitional effects as an economy adjusts from a higher to lower emissions intensive modes of consumption and production. These adjustment effects can take a variety of forms:

- Distributional effects arising from price changes. For example, poorer households will be particularly affected by price increases in items for which demand is inelastic (such as electricity)
- Regional effects. These arise because the emissions intensity of economic activity varies by region, as do the opportunities for deploying low emissions technologies and abatement opportunities that are likely to be rewarded by pricing emissions. There may be difficulties in relocating labour from one region to another, which can imply at least temporary unemployment in some regions. The amplitude of regional effects will also depend on whether that region is generally growing or contracting economically

2.2.8 Governance and administrative issues

Adjustment effects, and concerns related to carbon leakage and competitiveness, create extra challenges from the point of view of GHG scheme governance. Many of these centre around the use of Government revenue, particularly revenue raised by pricing emissions. The administrative costs of managing these revenues, not to mention the costs associated with the use of these funds for sub-optimal purposes, add to the overall costs of GHG schemes.

3 Appropriate policy choices for Australia

3.1 High level policy options

3.1.1 Overview of scheme types

There has been no shortage of options for Australia to consider in regards to pricing emissions, even though the Government discussions (including the Garnaut Review) have essentially focused on a cap and trade mechanism. Options include:

- A cap and trade option, as proposed by the Government through its CPRS
- A flat tax or price on emissions
- A hybrid approach combining the two, as proposed by Professors McKibbin and Wilcoxen
- Intensity-based approaches, which as their name indicates are predicated on setting an emissions intensity baseline and pricing emissions above this baseline and subsidizing reductions in emissions below this baseline

Table 1 provides a brief overview of these different options. It provides some brief observations regarding the operation of these alternatives *vis a vis* the main issues that were discussed in Section 2 of this report.

Table 1: High level policy options

	Cap and trade	Tax	McKibben Wilcoxen	Intensity based approach
Summary description	Sets cap on emissions. Permits must be acquitted for emissions. Emitters bear costs of all emissions that are not avoided	Sets price of a tonne of CO2e. In practice, likely based on a view of abatement target and working out price associated with this. Emitters bear costs of all emissions that are not avoided	Fixed number of long-term permits reflecting total abatement commitment. Government issues unlimited short term permits at fixed price in response to demand If there are no long term permits this scheme becomes tax	Emissions intensity benchmark set for sector output. Emitters liable for emissions above the benchmark. Low emitting firms effectively receive net subsidy, high emitting effectively firms pay net tax (though this is achieved via tradeable permits).
Variability in prices of quantity of emissions	In principle, price varies while quantitative cap is fixed. If international trade is introduced, mix between domestic and imported abatement will vary.	Quantity of emissions can vary if emissions growth differs from expected growth and price remains fixed.	No quantitative limit on number of short term permits (effectively caps the price of long-term permits – the same as an ETS with a price cap)	Baselines set as a function of desired abatement target. As with tax, actual quantity of emissions can vary if emissions growth differs from expected growth
Direct resource costs of abatement	As described in section 2.2.2 – a function of abatement opportunities and costs	As described in section 2.2.2 – a function of abatement opportunities and costs	As described in section 2.2.2 – a function of abatement opportunities and costs	As described in section 2.2.2 – a function of abatement opportunities and costs
Revenue from pricing emissions	All unavoided emissions are priced. Permit revenue can be transferred through cash payments ("recycling") or through permit allocations	All unavoided emissions are priced. Permit revenue can be transferred through cash payments ("recycling")	All unavoided emissions are priced. Permit revenue can be transferred through cash payments ("recycling")	Unavoided emissions are priced only above the baseline. Less scope for discretionary recycling – transfers from producers to consumers are internalised in the scheme

	Cap and trade	Tax	McKibben Wilcoxen	Intensity based approach
Indirect costs associated with emissions pricing	Tax interaction effects because of flow through effects on final goods prices. Potential inefficiencies associated with discretionary transfers to offset price effects and to achieve other recycling objectives.	Tax interaction effects because of flow through effects on final goods prices. Potential inefficiencies associated with discretionary transfers to offset price effects and to achieve other recycling objectives.	Tax interaction effects because of flow through effects on final goods prices. Potential inefficiencies associated with discretionary transfers to offset price effects and to achieve other recycling objectives.	Muted tax interaction effects reflecting charging for emissions above baseline – this lowers the price of the final product (e.g. electricity) relative to cap and trade. Weaker demand side substitution signals because of lower prices of goods (can be supplemented with energy efficiency measures). Supply side abatement incentive remains the same.
International permit trade	Will have practical effect of converting cap and trade to a tax. Emissions cap will determine mix of domestic and “imported” abatement, and extent of payments to overseas suppliers of abatement	Binding emissions price will be the lower of the international price and the domestic price. Supply of abatement opportunities in Australia determines demands for permits, which in conjunction with international price determines mix of domestic and imported abatement	No international trade in permits. In practice, permit price equalisation occurs through negotiation of short term permit price.	Lower of international emissions price and domestic price will apply to emissions above the baseline. Mix of domestic and imported abatement determined by same factors as tax

	Cap and trade	Tax	McKibben Wilcoxen	Intensity based approach
Investment certainty	Under a pure cap and trade with no international trade, volatility in prices contributes to investment uncertainty. Uncertainties due to possible revisions of target. Greater certainty if international trade is allowed.	Price setting allows for greater investment certainty.	Long-term permit price intended to send signals for efficient investment by reflecting abatement commitments and market expectations about actual emissions profiles and abatement opportunities. If distributed to firms, long term permits can act as a hedge. Fixed permit prices over short term intended to reduce costs of short term volatility.	In the absence of international trade, allows for smoothing of price by allowing faster emissions growth when demand is greater than expected, and contracting emissions when demand is lower.
Competitiveness and carbon leakage	Producer subsidies through permit handouts or cash subsidies tied to production ("shielding" - a form of intensity based scheme). Border tax adjustments	Producer subsidies through permit handouts or cash subsidies tied to production ("shielding" - a form of intensity based scheme). Border tax adjustments	In principle, managed through setting of short-term permit prices. In practice, needs to mediate leakage and competitiveness concerns of all participating economies.	Baselines can be set to take into account shielding for trade exposed sectors.
Adjustment effects	Exposure to the impact emissions price has on final goods and services	Exposure to the impact emissions price has on final goods and services	Exposure to the impact emissions price has on final goods and services	More muted given that unavoided emissions are charged above the baseline; reducing impact on final prices of goods and services

	Cap and trade	Tax	McKibben Wilcoxen	Intensity based approach
Administrative and governance issues	Management of discretionary transfers/ recycling to offset effects of emissions price on competitiveness/ leakage and adjustment effects (including complications setting baselines).	Management of discretionary transfers/ recycling to offset effects of emissions price on competitiveness/ leakage and adjustment effects. (including complications setting baselines).	Because short term prices need to mediate between priorities at national level (e.g. adjustment versus environmental objectives), and between countries, can impose significant administrative costs (not dissimilar to pure cap and trade with periodic revisions) May need to reset prices if a participant reneges from the deal (akin to resetting short term cap under cap and trade)	Requires establishment of intensity baselines

3.1.2 Scheme comparisons

A number of observations can be made about these different schemes:

- There is no 'pure' scheme. For example, both cap and trade and a carbon tax approach are likely to need to use emissions intensity baselines to deal with competitiveness and leakage issues
- There is a much greater affinity between cap and trade schemes and carbon taxes than is usually recognised. For a start, a cap and trade scheme with permit imports will essentially act as a carbon tax, with the tax rate set at the international price (see Section 2.2.3). Secondly, both cap and trade and carbon tax schemes charge for all unavoided emissions. The indirect costs associated with this (particular the tax interaction effect, see Section 2.2.2) will thus be the same for both. Both will also raise similar issues of adjustment, and the requirements to meet these adjustment effects
- The direct resource costs (i.e. the resources required to produce a given level of abatement in Australia – see Section 2.2.2) of all four schemes are similar. The price of emissions is the same for all schemes with perfect foresight and equivalent abatement, though they deal with uncertainty differently. The indirect costs of the intensity based approaches are lower than those of cap and trade and tax based approaches with lump-sum recycling of tax revenues. This is because the intensity-based approaches do not charge for all unavoided emissions but only those above the baseline. The pass-through effects of the emissions price on the prices of goods and services are thus lower
- The adjustment effects are less severe under the intensity based approach. However, the flipside to this is that price signals for consumption and production decisions from the final price of goods (as distinct from the price of emissions) that may affect demand side abatement are diminished. The extent to which this is a problem depends on the degree to which domestic demand side abatement driven by price signals is a likely prospect.
- All schemes face various governance and administrative challenges

In our view, the main distinction that is worth exploring is that between intensity-based approaches on one hand, and a cap and trade or carbon tax approach on the other hand. The reason for this is that the intensity approach differs from the other two in terms of the indirect costs (while having the same direct abatement resource costs). As explained in Section 2.2.2, these indirect costs are likely to be substantial in the early stages of a GHG abatement scheme (and more particularly, substantially greater than direct abatement costs). This is because unavoided emissions will be greater than emissions abated.

3.2 Intensity-based approaches

3.2.1 Scheme mechanics

Figure 8 presents a simple example of a relatively high emitter (producer 1) and a relatively lower emitter (producer 2), each producing the same good. In the absence of an emissions price, neither emitter pays anything for these emissions. Note that total emissions are a function of the total number of goods produced (and consumed) and the emissions intensity of production. Hence it is possible to reduce emissions by (a) reducing consumption (reducing output from Producer 1 and Producer 2) and/or (b) reducing the emissions intensity of production, for example decreasing production from Producer 1 and increasing production from Producer 2.

Figure 8: Simple example – cost impact on different emitters

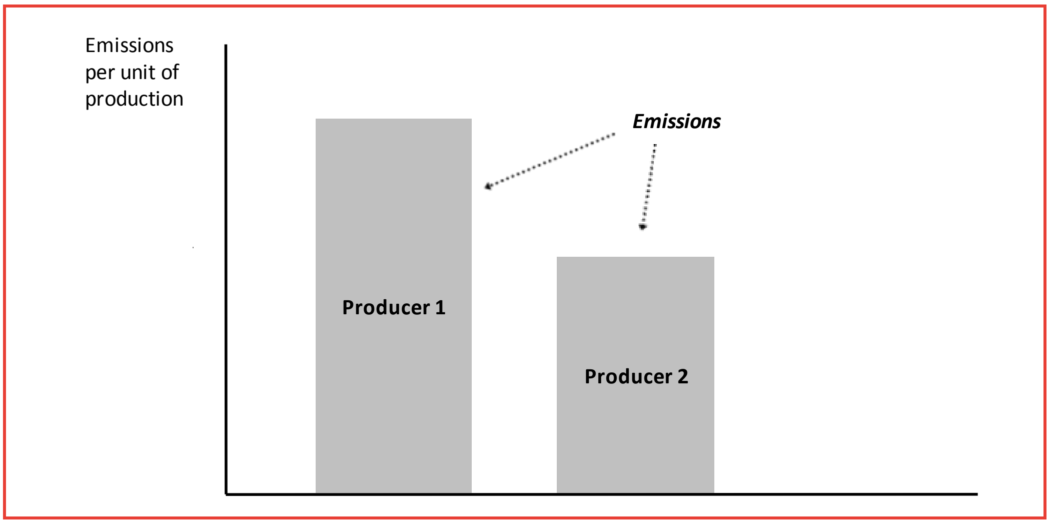


Figure 9 presents the effect on each producer where an emissions price is introduced and all permits are auctioned. Both producers see an increase in their costs, though the costs of the higher emitter increase by a larger amount. If these producers are price setters in the market then the price of the product will rise. Each producer would receive the same increase in price, so the margins of the higher emitter will be reduced relative to the low emitter. This should encourage increased output from Producer 2 and decreased output from Producer 1. This reduces overall emissions for the same number of goods produced, hence a reduction in overall emissions intensity. This is a reduction in production emissions. There may also be a reduction in consumption in response to the increased prices; hence a reduction in overall goods produced. [1]

Figure 9: Simple example – cost impact of full auctioning

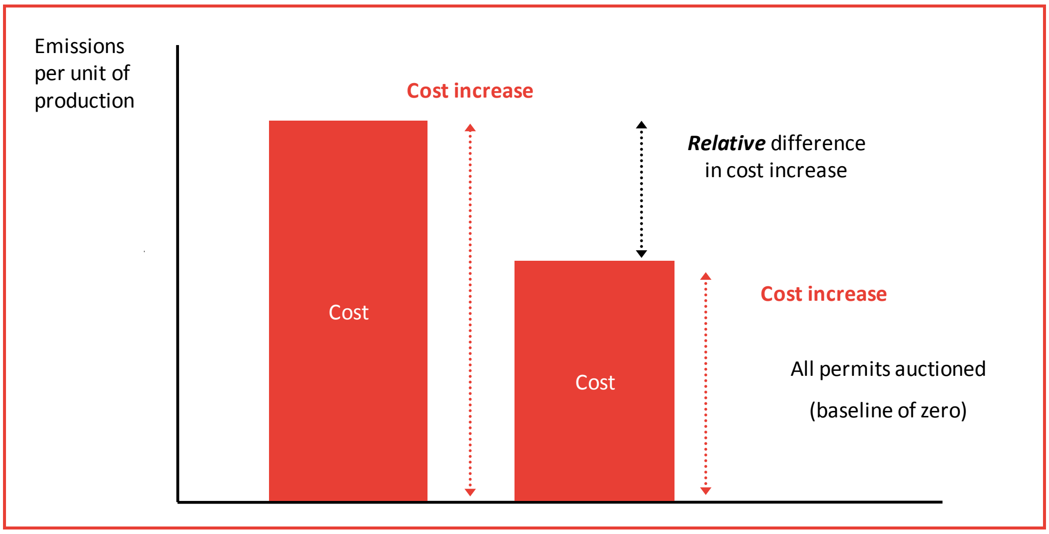


Figure 10 presents the case where permits may be allocated up to a baseline number of permits per unit of production. In this example, the baseline is below the emissions of each producer. Each producer is liable only for their emissions above the baseline. The increase in costs for each producer is less than in the previous example, hence the price effects (assuming they are price setters) will be less pronounced. Importantly, the relative change in costs is exactly the same as in the previous example; hence the incentive to substitute production from the high emitter to the low emitter is just as strong. The revenue accruing to the permit distributor (i.e. the Government) is less in this example, but then so is the need to compensate consumers for any price increase.

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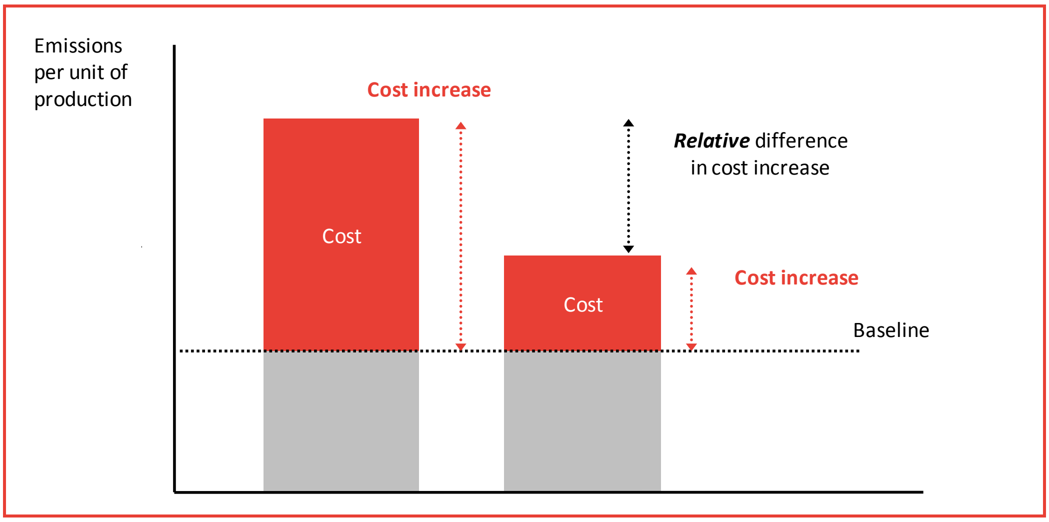
1 If these producers are price takers (for example, in global markets), then unless there is a concurrent increase in costs for global competitors then there would be no increase in prices, nor any decrease in global consumption. Gross margins would be reduced for each producer, and production would decline for each. If global consumption for the product doesn't fall, this fall in production would be met with an increase in overseas production.

Figure 10: Simple example – cost impact of partial auctioning



A higher baseline is represented in Figure 11. In this example, Producer 2 is below the baseline and receives credits for the difference. The increase in costs to Producer 1 is lower than in the previous examples but again, the relative change in costs is exactly the same because of the credits to Producer 2. The end-product price effects (assuming price setters) will be lower in this example than in the examples above. Permits would be fully tradeable and the scheme would be self funding: in this example Producer 1 would purchase the excess permits of Producer 2.

Figure 11: Simple example – cost effect of partial auctioning

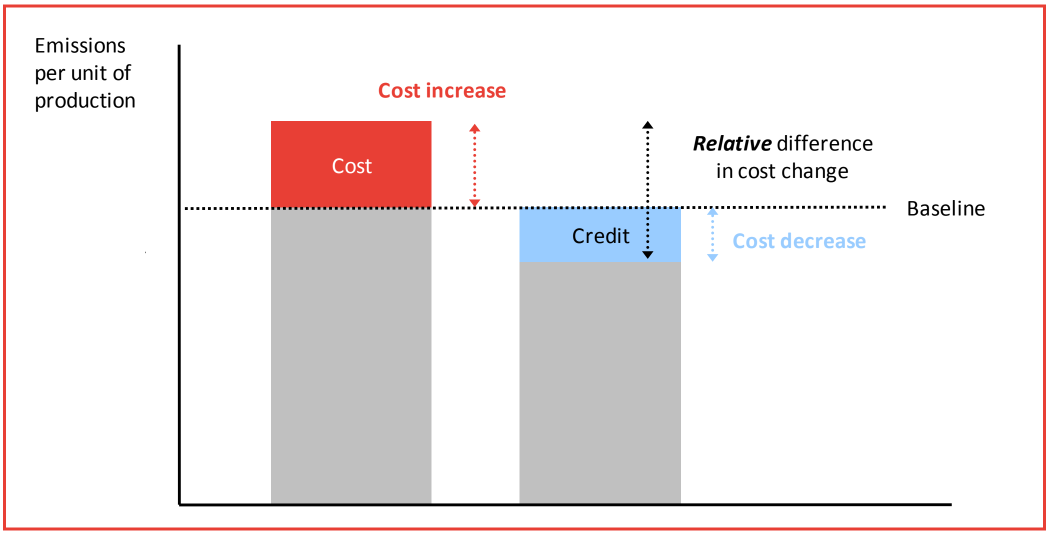
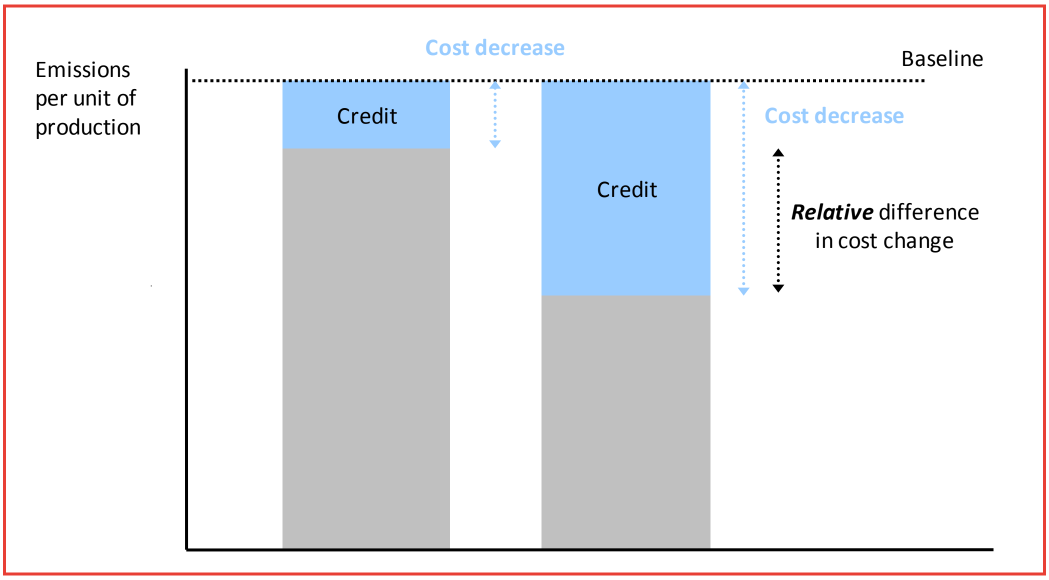


Figure 12 shows the baseline above the emissions of all – this is equivalent to a pure offset arrangement (or baseline and credit, such as the Kyoto Clean

Development Mechanism or the Renewable Energy Target). In this example, funds must be raised from another source to pay for the credits.

Figure 12: Simple example – cost impact of partial auctioning



The point of this example is to demonstrate the difference between production abatement and consumption abatement, and how the incentive to reduce production emissions is just as strong regardless of where the baseline is set.

The difference between the different baselines will be reflected in final product price (where the producer is a price setter), or in the margins of producers (if price takers).

Adopting a baseline (intensity target) for the electricity sector will result in lower final price effects than adopting an implicit baseline of zero (a standard cap and trade). The higher prices under the CPRS as proposed are transfers from consumers to the Government – the additional abatement resulting from this price increase is minimal, though it significantly increases tax churn and this has greater cost implications for the economy as a whole.

3.3 Applying intensity based approaches in Australia

3.3.1 Policy context

Lessons learned from the CPRS

Australia can draw on the lessons of its own recent experiences with the CPRS, and recent international developments. One of the main difficulties of the CPRS was that it was a patchwork of different scheme designs. It consisted of:

- A cap and trade scheme with partial auctioning, and the use of lump sum transfers from auction revenue to alleviate adjustment effects (notably higher electricity prices) for selected parties
- Unlimited access to internationally traded permits, which would in effect convert the cap and trade scheme into a carbon tax
- An intensity-based scheme for shielding selected emissions intensive trade exposed activities, with different rates of shielding applied to different activities
- Opt outs for agriculture and transport

The complexity is unsurprising. As already observed, any scheme is likely to be complex in order to accommodate various adjustment effects, and the need to address competitiveness and carbon leakage issues that arise because of the asymmetric nature of international commitments. The more pertinent question is whether the instruments underpinning this complexity were ones that were needed.

Frontier Economics' own research, which it carried out for the Coalition and Senator Xenophon, found that significant improvements could be made to the CPRS. The main improvement that Frontier Economics proposed was to introduce an intensity-based scheme that was specific to the electricity sector. The main effects of this were:

- Lower wholesale and retail prices for electricity relative to the CPRS, with prices gradually converging to those under the CPRS over time as the intensity baseline was lowered. The lower price effects are simply a result of one of the main properties of the intensity-based approach which is that it does not tax all unavoided emissions, but rather that it taxes only those above the baselines and subsidises generation below the baseline
- The combination of tax and subsidy mechanisms meant that the amount of abatement undertaken in the generation sector was the same as under the CPRS
- The lower price effects muted the tax interaction effect. Under the CPRS, some compensation was available to selected recipients through lump sum transfers. But lump sum transfers do not affect – by construction – investment, employment and production decisions of firms at the margin. By contrast, lower electricity prices do. In muting the tax interaction effect the intensity based measure ensured that contractionary effects on economic activity were lower than under the CPRS. While the proposed CPRS was estimated to reduce GDP by $121b (NPV from 2010-2030), the intensity approach was estimated to reduce GDP by $72b (NPV), even allowing for a doubling of the unconditional abatement target in 2020. This was a reduction

of $50b or 40% (estimated using generally the same modelling approach and assumptions that were adopted by Commonwealth Treasury)

- The savings from the scheme could be used to finance extra abatement – a 10% target by 2020 rather than 5%
- Because demand for electricity is highly inelastic in the short to medium term, lowering electricity prices did not translate into significant increases in electricity consumption and emissions. This would be complemented by various energy efficiency measures (already implemented or under consideration) which would deliver the same level of energy savings without requiring a carbon price signal
- The effects on job creation in regional Australia were markedly less severe than under the CPRS
- Because lower price effects were internalised by the scheme, and not the product of discretionary transfers, the approach avoids costs associated with inefficiencies in these sorts of transfers. The gradual adjustment of the price path to CPRS levels gives time for firms and households to adjust

The essence of Frontier Economics' work was to show that a better management of the indirect costs – those relating to the treatment of unavoided emissions - of a GHG reduction scheme lessens the size of shock and the overall costs faced by the economy, while allowing it to preserve environmental outcomes.

Broader developments

In addition to the work conducted by Frontier Economics, other developments that need to be taken into account are:

- The slow progress of multilateral negotiations. This does not mean that efforts globally have frozen. Rather, it suggests that efforts are likely to be incremental. Countries that manage the adjustments that come with implementing GHG reduction schemes are ones that are likely to build on these subsequently, and eventually to incorporate them into binding international commitments
- A greater scepticism toward cap and trade approaches applied on an economy-wide or multi-sectoral basis. This partly reflects concerns that the theoretical gains from emissions trading may be difficult to achieve in practice if participants have only a limited understanding of the abatement cost structures of each other. But is also reflects the fact that economy-wide approaches are usually accompanied by a raft of complementary measures designed to exempt or shield selected sectors from the full impact of the scheme. An alternative would be to limit scheme coverage to one or two major emitting sectors (such as electricity) where abatement costs are well understood and carbon leakage/competitiveness effects are less of a concern

- A trend towards the use of intensity-based measures in some major emitters, notably China and India. China has announced a goal to reduce its carbon intensity by 40-45% from 2005 levels by 2020, with much of the policy to deliver these cuts aimed at reducing emissions in electricity supply. India will cut its carbon intensity by 20-25% from 2005 levels by 2020. These economies bear greater similarities to Australia in that each is a net exporter of emissions (producing more emissions than they consume)
- A particular sensitivity to certain types of adjustment effects, particular energy costs, and the distributional consequences of these

3.3.2 A proposal for Australia

Our proposal is to implement an intensity-based scheme for the electricity sector as a transitionary measure to full emissions trade/carbon pricing. Its operation would follow the principles outlined in Section 3.2.1. As indicated in that discussion the key effects of the scheme would be to:

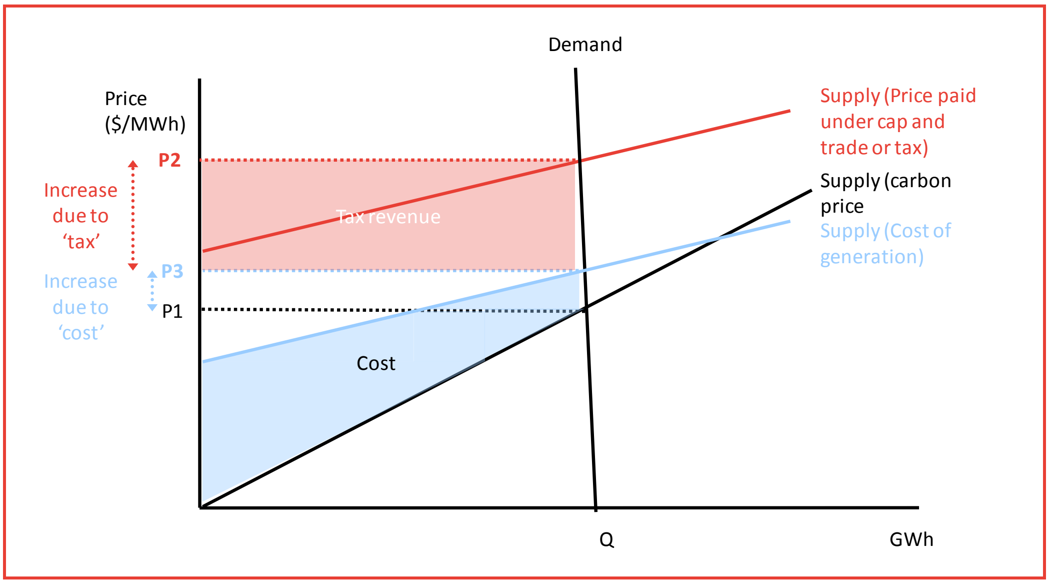
- provide abatement incentives for generation that are identical to those under a cap and trade approach or an equivalent carbon tax. That is, the effects in switching the electricity merit order are identical across all schemes
- reduce the overall tax on unavoided emissions, and therefore reduces the overall effect of the scheme on electricity prices faced by consumers.

The second point is one of the principal differences between the intensity-based approach and other, and this is illustrated in Figure 13 below, which shows price effects under cap and trade or a carbon tax. The black line shows the electricity supply curve prior to the introduction of a carbon tax. The introduction of a price on carbon changes the merit order, and leads to a flattening of the supply curve and an upward shift. This reflects the substitution of more expensive but lower emissions intensive generation for cheaper but higher emissions intensive forms. The shaded light blue area marked 'cost' indicates the direct cost of abatement. The red area reflects the further cost impost of the tax on all unavoided emissions. This tax shifts the supply curve up to the new level indicated by the red line.

Consumers face a higher electricity price that includes the direct cost of abatement plus the tax effect. The latter is essentially a transfer from consumers to Government. The higher price effect also induces a contractionary effect on the economy through the tax interaction effect, and it worsens problems of competitiveness and of carbon leakage in sectors (such as aluminium) that are intensive users of electricity.

By contrast, an intensity-based approach reduces the tax on unavoided emissions and therefore reduces the overall price of electricity faced by consumers. The extent of this reduction depends on the intensity benchmark that is set.

Figure 13: Effects of emissions pricing on electricity sector under cap and trade or emissions tax



The main motivation for choosing an intensity-based approach for the electricity sector lies in the benefits of the lower electricity price and smoother price path for electricity over time, and the macro-economic benefits of these documented in Frontier's previous work for the Coalition and Senator Xenophon (see Section 3.3.1). Moreover:

- Applying it to the electricity sector ensures that investors in electricity assets face an emissions price, which provides them with a level of certainty needed to make investment decisions.
- The sector faces far fewer obstacles or complications, as it is not trade exposed.

We see this as a starting point, that serves to introduce an emissions price into the largest emitting sector, that is also capital intensive and requires some level of certainty prior to locking in long term investments. The coverage of emissions pricing could then be extended progressively. The scheme is equally compatible with the implementation of a tax or a cap and trade scheme for the economy as a whole.

We also recommend that allowance be made for international trade in permits, or for possible recognition of soil sequestration offsets. While there are concerns about the verifiability of abatement opportunities in some jurisdictions, as well as about the impacts of permit trade on development outcomes in poorer countries, these do not justify an outright ban. Rather, Australia could complement its use of international permit trade with assistance to poorer countries in developing appropriate governance and development frameworks to support their abatement options.

3.4 Conclusions

This submission has highlighted the various ways in which GHG emissions pricing in Australia can be implemented. We have drawn on the underlying economics of emissions pricing as well as recent experience in Australia and elsewhere. Our main findings are:

- While much of the debate has been couched in terms of a dichotomy between cap and trade and an emissions tax, there are considerable points of similarity between the two. This is partly because most approaches to cap and trade – including the CPRS – tend to incorporate measures that make them akin to an emission tax. It also reflects the fact that the indirect costs of both are similar. They both charge unavoided emissions to the same extent, resulting in similar adjustment and competitiveness/ carbon leakage issues
- Arguments about the emissions certainty of an emissions cap becomes somewhat redundant when international trade of permits is considered, as domestic emissions will vary with the international carbon price and any shortfall in abatement will be met through a rise/fall in permit imports. Similarly, any possible variability in emissions under an intensity target falls to zero as emissions become decoupled from energy (and in any case can be mitigated through energy efficiency measures in the interim)
- The application of an intensity-based approach to the electricity sector can introduce broader emissions pricing in Australia. The electricity sector is the largest emitter of GHGs, and it has a relatively mature understanding of its abatement options. The costs of policy uncertainty on investment are currently low but will rise with requirements for new baseload investment
- An intensity-based scheme results in lower electricity price effects while preserving the same supply-side incentives to abate as a cap and trade scheme or a tax. The lower price effects reduce adjustment costs, reduce the contractionary effect on the economy by reducing the "tax interaction effect", and help to manage competitiveness and leakage issues
- As the emissions intensity baseline is ramped down, the electricity price effects of the scheme would converge over time to those that would be experienced under a tax or a cap and trade approach. This provides a smoother adjustment path for households and firms
- The application of an emissions intensity baseline is consistent with the application of either an emissions tax or cap and trade approach to other sectors of the economy

- There are benefits from international trade in permits. Australia can complement this with assistance to poorer countries in developing appropriate governance and development frameworks to support their abatement options

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