Linking the Australian Emissions Trading Scheme

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Abstract

Australia is establishing an economy-wide emissions trading scheme, with a detailed proposal tabled by the government in December 2008 and a scheme start planned for mid-2010. The proposal is for unilateral linking through CDM and JI, but no bilateral linkages to start with. Concerns about permit prices rising too high are prominent, and are reflected in a ban on permit sales and a price cap provision. This paper evaluates the proposed Australian scheme with regard to international emissions trading and linkages. Different scenarios for the Australian permit price under unilateral linking are considered. Options for bilateral linking with the European Union and New Zealand schemes are evaluated, including regarding access to 'hot air' units. We argue that Australia should dismantle obstacles to linking such as the price cap, and move toward bilateral linking with suitable schemes.

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1. Introduction

Preparations are underway for an Australian emissions trading scheme to start in 2010. International linking will be a key factor for the emissions price, market liquidity and volatility, and for the aggregate cost to the Australian economy of achieving a given emissions target. Just as in other countries explored in other papers in this issue, Australian policymakers are conscious of the possibilities of international linking, and are evaluating the issues according to a variety of different criteria.

Australian climate policy has experienced a shift and acceleration, following the election of a new government under Prime Minister Rudd in late 2007, who initiated ratification of the Kyoto Protocol as his first act in office. Analysis and planning for domestic emissions trading was already underway under the previous federal government (Prime Ministerial Task Group on Emissions Trading 2007) and separately in an initiative by the State governments (National Emissions Trading Task Force 2006), and was taken up with greater urgency by the new government over the course of 2008. Domestic emissions trading is to start in July 2010, with detailed provisions proposed by government in a December 2008 White Paper (Department of Climate Change 2008a). The final design of the Australian 'Carbon Pollution Reduction Scheme' will depend on the legislative process to take place over the course of 2009. Economic analysis of the effects of mitigation scenarios on the Australian economy was undertaken by the Australian Treasury (Department of the Treasury 2008). In addition, a major government-commissioned independent study was carried out in 2007-08 that made recommendations on Australia's climate policy, including the design of emissions trading and future targets (Garnaut 2008a).

The scheme as proposed in the White Paper aims to prevent the domestic permit price from rising 'too high' at least in the early years, through a ban on international permit sales, a domestic price cap, and unilateral linking with unlimited access to the Clean Development Mechanism (CDM) and Joint Implementation (JI). A cautious approach is taken to bilateral linking, with no bilateral links to start with but the prospect of linking to selected schemes further down the track. The European Union and New Zealand schemes would be obvious candidates to consider linking to.

In this paper, we lay out the key proposed design features of the scheme, and the government's stated position on international linking (section 2); analyse the provisions for unilateral linking and controlling the price in three scenarios, and reflect on the fundamental role of international linking for an open economy like Australia (section 3); explore options for bilateral linking with the European Union (EU) and New Zealand (NZ) (section 4) including the potential impact of surplus Kyoto units from 'hot air' surplus emissions units from Russia and Eastern Europe; and conclude in Section 5.

2. Key features of the planned Australian ETS

National target commitments and scheme caps

The announced national emissions target is a 5 per cent reduction at 2020 compared to 2000 levels, and conditional on commitments undertaken by other major countries, a reduction by up to 15 per cent at 2020. This compares to an expected increase in emissions by around 8 per cent at 2010, and 26 per cent by 2020, under official projections (Department of Climate Change 2008c).[2]

The scheme caps (the amount of permits issued under the emissions trading scheme) up to 2014/15 are scheduled to be announced in the first quarter of 2010 and would be guided by the overall national commitment. In early 2011, further indicative caps would be released.

Coverage, other greenhouse gas policies, and permit allocation

The proposed 'Carbon Pollution Reduction Scheme' (Department of Climate Change 2008a), as the emissions trading scheme is called, is to cover practically all greenhouse gas emissions outside land use change and agriculture, covering initially around 75 per cent of Australia's emissions, or around 450 $MtCO_2$-equivalent in 2006 (Department of Climate Change 2008b). Around 1,000 entities with emissions greater than 25 $ktCO_2$-equivalent/year are to be directly liable for their emissions. Smaller sources of combustion emissions, including transport and residential fuel use, are to be covered through 'upstream' permit liability on fuel suppliers. However, petrol and gas for road transport are effectively exempt through an offsetting reduction in fuel taxes, in place initially until 2013.

The government is assessing the inclusion of agricultural emissions, which account for around 16 per cent of Australia's emissions, from 2015, with a decision regarding inclusion to be taken in 2013. Forestry is covered by voluntary opt-in for reforestation activities from the beginning of the scheme, while land-use change (accounting for around 11 per cent of emissions in 2006, on a steeply falling trajectory) is excluded.

A range of other policies are aimed to curb greenhouse gas emissions in addition to the price signal from emissions trading. They include a mandatory renewable energy target, various programmes for industry, power supply and end use efficiency, and policies for forestry, land use and agriculture.

Permits are to be auctioned except for free allocations to emissions-intensive, trade-exposed industries (EITEI) such as aluminium, steel and liquefied natural gas, and a defined one-off amount to be granted to coal-fired electricity generators. The free

[2] Australia's net emissions under Kyoto accounting remained almost unchanged from 1990 to 2000 because reductions in land-use change emissions outweighed continued increases in emissions from most other sectors of the economy. As land-use change emissions dwindle, there is no further offsetting effect, so unabated emissions growth in future years would be strongly positive.

allocation to EITEIs is 90 or 60 per cent of historic benchmark emissions in the sector, depending on how emissions-intensive the production activity is, and includes new entrants and expanding entities.[3] The threat of carbon leakage has played an important role in the industry lobbying effort and broader public debate, with fears that emissions pricing might trigger the relocation of some energy-intensive resource industries. On the other hand, there are concerns that handouts of free permits by government to industry simply on the basis of emissions intensity and trade exposure create an adverse political economy and could undermine the long-term viability of the scheme (Garnaut 2008b). In this paper we set the issue of permit allocation largely aside.

Banking and borrowing

Unlimited banking is to be allowed from one compliance year to the next. Short-term borrowing is allowed at a maximum of 5 per cent, meaning that carbon pollution permits from the following year can be used to meet up to 5 per cent of a liable entity's obligation.

Price cap and international trading

A price cap is to apply in the period 2010-15, starting at A$40/t of carbon dioxide equivalent (CO2e) and rising at 5% per year plus adjustment for inflation, and the level of the price cap is to be independent of the national target and scheme caps chosen.[4] If demand for permits becomes high enough for prices to go above this level, the government will sell additional permits into the market at this fixed price. Thus, if and when in place, the price cap would loosen the Australian scheme cap, and through banking might also loosen future caps.

Permit sales from the Australian system into overseas systems are specifically excluded (outside any possible linking arrangements) in the initial years of the scheme.

International Kyoto credits can be used without limits in the Australian scheme, though only non-forestry CDM (Certified Emissions Reductions, CERs), JI (Emissions Reduction Units, ERUs) and removal units (RMUs) can be used, subject to future review. The White Paper does not address the possibility of new forms of emissions units that might arise under a post-2012 international agreement (e.g. such as from reductions in emissions from deforestation in developing countries).

Taken together, these rules effectively cap the permit price in Australia at the international CDM price, or the domestic price if no international purchases are necessary, whichever is lowest (see section 3).

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[3] The White Paper estimates that about 30 per cent of permits will be freely allocated (including power generators) and 70 per cent auctioned in 2010. The auctioned share could well decline over time, as EITEI activities expand – including through bringing agriculture into the scheme – while the overall emissions budget is reduced.

[4] Expressed in euros, the price cap starts at approximately €25/t rising to €32/t in real terms at 2015, on the basis of an exchange rate of 0.6 €/A$, approximately as observed on average over the last five years.

The current rules exclude Assigned Amount Units explicitly, subject to future review for the period after 2013. Thus, Australian companies cannot use surplus Assigned Amount Units (AAUs) from Russia and other former Soviet Union States which originate from the economic breakdown of those countries, so-called “hot air” units. This also creates questions about the compatibility of other schemes that Australia might link with in future, for example the New Zealand scheme, which in its current form allows compliance using foreign assigned amount units (see section 4).

Government view on linking

The White Paper states that Australia’s scheme may be bilaterally linked with other international schemes over time but emphasises that minimising implementation risk and promoting price stability and predictability has much higher priority in the short term. Therefore only unilateral links with the international market, through the CDM or JI, are proposed to apply at first.

Echoing earlier recommendations from the Garnaut Climate Change Review (2008), the White Paper argues that future bilateral links and deeper integration should only be undertaken with schemes that have internationally or mutually acceptable mitigation commitments; adequate and comparable mechanisms for monitoring, reporting, verification, compliance and enforcement; and that are compatible in design and market rules.

The White Paper points out that linking rules are as important to market participants as decisions about the scheme cap, as they are a key determinant of the domestic price, and that therefore, future linking decisions should be made together with decisions regarding the national trajectory.

3. Unilateral linking and controlling the price

The desire to limit the permit price in the Australian scheme is borne out of the fear of triggering too much adjustment too fast, reflected in many industry submissions to government,[5] and in the government's emphasis on a 'measured transition' that protects jobs – an aspect that is gaining particular importance during a time of economic slowdown.[6]

3.1 The means for controlling the price

The idea of a price cap, often also referred to as a 'safety valve', is to limit the risk of higher than expected compliance costs to emitters, as a strategy to make emissions targets more palatable with domestic constituencies (Toman 2004, Jacoby and Ellerman 2004).[7]

Modelling by Pizer (2002) and others since showed large improvem ents in expected welfare from introducing a price cap. However, almost all of the analysis in the literature deals with the single-country or whole-world case, where there is only one quantitative constraint and a single price cap. Where there are many countries and an internationally harmonised price cap, it has been shown that efficiency gains from the price cap could be large but distributed in a highly asymmetrical fashion, and could carry substantial budgetary implications (Jotzo 2006). The issue is more complex again in the real-world situation of separate but linked trading systems in different countries, with separate price caps, and where a country needs to fulfil a national emissions target irrespective of the operation of the price cap in its emissions trading scheme.

With unlimited access to the CDM, the price cap will come into effect only if the CDM price lies above the Australian threshold for the price cap. Here we look at scenarios that might arise for Australia.

3.2 Scenarios

Scenario 1: Compliance in the scheme through international purchases

Under this scenario emitters bid up the price of domestic permits to the level of international prices and buy some amount of international units from CDM or JI. The price remains below the price cap, so no additional permits are issued by government. To the extent that other national schemes allow the use of CDM/JI units, prices are

[5] Submissions to the government's Green Paper (which preceded the White Paper) are available at http://www.climatechange.gov.au/greenpaper/consultation/submissions.html.
[6] Remarks by Climate Change Minister Hon. Penny Wong, 20 December 2008, Adelaide. http://www.environment.gov.au/minister/wong/2008/tr20081220.html
[7] There is a theoretical basis for 'hybrid' systems of emissions trading with some degree of price control. This goes back to Weitzman's (1974) analysis showing that under uncertainty, price-based pollution control is superior to quantity control if the marginal damage cost curve is flat compared to the marginal cost curve, and to Spence's (1976) model of optimal pollution control under uncertainty using quantitative targets and both price ceilings and price floors. Models for hybrid climate policy architectures include not just straight-out price caps, but also more complex architectures like the McKibbin-Wilcoxen (2002) 'blueprint' proposal.

harmonised across schemes. The Australian permit price fluctuates with the international price, which is largely determined by supply and demand in other countries.

The Australian government engages in international trading only to the extent that emissions levels in non-covered sectors require purchases (or allow sales) for Australia's national emissions commitments to be fulfilled. International purchases or sales by government would also occur at (roughly) the prevailing international price, unless lower-priced so called "hot air" units (see section 4.3) were available, and the Australian government were to seek national compliance by purchasing them.

Scenario 2: Compliance in the scheme through the price cap

In this scenario, the international (CDM) price is above the price cap, and emitters buy extra permits issued by the Australian government at the predetermined price. They do not buy any international units, and – because it is disallowed – do not sell to other countries either. However, they might choose to bank any permits already acquired or given to them by government, and substitute these permits with extra purchases at the capped price. This would be a profit maximising strategy if future increases in permit prices were expected, and it would further loosen the effective scheme cap.[8]

Total emissions from sources covered by the trading scheme are larger than under the predetermined scheme cap, because additional permits are issued. In turn, Australia's total emissions are higher, so to comply with Australia's national emissions commitment, it becomes necessary to undertake more mitigation in non-covered sectors (which is limited given the broad coverage of the scheme), and/or to introduce regulatory measures for activities already covered by emissions trading (typically exacerbating economic distortions and compliance costs), and/or for government to purchase units in international markets.

If the government purchases units eligible for acquittal by its domestic emitters (e.g. CDM or JI units), then the cost of purchasing these units will very likely be greater than the revenue obtained by selling extra permits under the price cap domestically.[9] Consequently, there will be a budgetary cost of the price cap, possibly a large one. For example, if domestic permits are sold at a capped level of A$50/t but international units cost A$70/t, then the Australian government directly subsidises extra emissions under the domestic scheme at a rate of A$20/t. If extra permits were then issued to the tune of 5 per cent of total emissions or around 50 million tons per year, then the direct budgetary cost would be A$ 1 billion per year. None of the revenue from permit auctions is foreseen to be set aside to cover those potential budgetary costs.

[8] The White Paper foresees that permits issued under the price cap would not be eligible to be banked, but does not preclude banking of permits issued through auctioning or free allocations, even if the price cap applies. Therefore banking of 'price cap permits' could happen indirectly.
[9] The exception would be if the CDM price fell over time, and the government purchased international units for compliance at a later time at prices below the price cap level.

However, it would also be possible for the Australian government to make up the shortfall by purchasing international units that are not eligible within the domestic trading scheme, in particular Kyoto Protocol Assigned Amount Units. These might trade at a substantial discount to CDM/JI credits, especially where they originate from 'hot air' (see section 3). In that case, the government could create a budgetary surplus from issuing more permits domestically, and making up the national shortfall by buying lower-priced international units. However, this could diminish credibility of the Australian system's environmental integrity, if the units purchased and used by government for national compliance were perceived to be of inferior quality.

Scenario 3: Full domestic compliance at domestic market price

In this scenario, the Australian domestic permit price is below both the international price and the price cap, and all reductions needed to comply with the scheme cap are undertaken domestically. If the scheme cap is compatible with Australia's national target and emissions from non-covered sectors are within their respective budget, then there is little or no need for government to trade in international markets to meet the national target. The ban on permit sales means that the domestic permit price does not rise to the international price, or to that in other schemes.

This is obviously a desirable scenario for many emitters and from some policymaking perspectives. The national emissions target would be fulfilled with a relatively low domestic permit price, and therefore limited adjustment pressures in the economy. However, the price differential implies an economic inefficiency: the marginal cost of mitigation action in Australia is lower than elsewhere, and additional units of mitigation could free up permits that could be sold to other countries at prices above cost, with both parties gaining in the process.

There also is a risk that the price could be extremely low during the early years of the scheme, when the scheme cap is close to business-as-usual emissions. This in turn could erode confidence in the scheme, and inefficiently delay abatement in the early phases. In theory, such an outcome will be precluded through the provision of unlimited banking, which allows market expectations of future permit prices to be fully reflected in today's prices. However, the recent experience of sharp falls in EU ETS prices in response to the financial crisis (Lewis and Curien 2008) seems to point to failures in intertemporal permit markets.

3.3 What is the likely outcome?

From the White Paper, it is evidently the Australian government's expectation that Scenario 1 would eventuate, with Australian emitters buying credits internationally at prices below the price cap. However, there would also be a significant chance of scenario 2 and also scenario 3 applying.

The presumption that Australia would not meet its reduction targets through domestic mitigation alone (scenario 1) is supported by the Australian Treasury's modelling (Department of the Treasury 2008), where all main scenarios have Australia as a net

buyer in overseas markets in 2020, assuming permit prices only somewhat below the proposed price cap. This would seem plausible given that from past trends in Australia's national emissions, a significant amount of effort would be needed to achieve even the least ambitious of the national target commitments.

There is of course significant uncertainty about the future underlying growth trajectory and the abatement response. This is illustrated in the relatively broad range of results from three different models shown in the Treasury's analysis. In the 'minus 5 per cent' scenario, Australia's actual emissions at 2020 are between 6 and 20 per cent above year 2000 levels in the three models used, at a common emissions price of A$35/t. In the 'minus 15 per cent' scenario, 2020 emissions are between 8 per cent below and 10 per cent above 2000 levels, at a common price of A$50/t.[10]

Hence, if the abatement response (including to measures in addition to the emissions trading scheme) is underestimated, then compliance through domestic measures alone might be possible – in particular in the early years until 2015, the proposed final year of the price cap. If the economic downturn beginning in late 2008 turns into a severe recession, actual emissions might turn out to be below Australia's Kyoto targets and trajectories towards a 2020 target even without any price signal from the trading scheme. If that were the case, and if emitters and other market participants for whatever reason did not set aside (bank) significant amounts of permits for future use, then even a zero permit price could eventuate.

In the case where full domestic compliance is *not* achieved, the question is whether aggregate compliance is indeed achieved through international purchases (scenario 1) or the price cap (scenario 2). This depends on whether the international price (converted to Australian dollars) is lower than the price cap. CDM credits in secondary markets traded at around €20/t (A$33/t at a long-term average exchange rate of 0.6, and A$40 at the exchange rate of around 0.5 prevailing in early 2009) in mid-2008 before the onset of the financial crisis. At the time of writing, in January 2009, they traded at around €10/t (A$17-20/t), with expectations of further falls as the recession deepens and businesses' credit constraints keep them from hoarding permits for future years. But expectations of future international prices are significantly higher, with responses in a 2008 expert survey (Point Carbon 2008) putting the 2020 international price at an average €38/t (A$63-76). Some analysts (Lewis and Curien 2008) see the fundamental underlying price in the EU ETS around €30/t (A$50-60/t) in the short term, rising to €48/t (A$80-96) by 2020, even taking into account the recession. This spectrum of possible future prices encapsulates the proposed range for the price cap (rising from A$40/t in 2010 to A$51/t in 2015, before inflation adjustment).

3.4 Open economies and linking

Setting a domestic price cap implies that the government has a notion of the 'acceptable' permit price, irrespective of the quantity of emissions and abatement at

[10] Data in Table 6.4 of the Treasury report. Emissions price is in real (2005) A$. Modelling scenarios assume access to international markets for compliance with national commitments.

that price level, and irrespective of prices in other countries.[11] With no analysis presented to support the chosen price cap level, it stands to reason that the decision about the price cap level was driven by considerations of political economy. Political considerations in turn are likely to be dominated by short-term concerns, protecting the status quo. They can inhibit effective business responses to new circumstances, and hold back change in economic structure, by delaying investment in emerging industries such as renewable energy generation.

Australia is an example of a country that has gained from openness and reform. Over much of the 20th century, Australia insulated many of its markets and producers, and paid the price through relatively low economic growth (Anderson 2000). Then in the 1980s, Australia opened its trading regime, and has fared well with it: domestic industries adapt to shifts in international markets and prices, and economic structure more closely reflects comparative advantage. For example, the global metals boom of the early 2000s translated into fast expansion of Australian mining operations, and the downturn from late 2008 is shifting resources back out of mining and into agriculture, manufacturing and services. These are the efficient responses of an open economy heavily engaged in trade.

Similar principles apply to international linking of emissions trading, in the context of an emerging international mitigation regime. Shielding Australian producers from 'high' emissions prices that apply elsewhere results in less than the economically efficient amount of abatement undertaken in Australia.[12] In the situation where Australia has a quantitative emissions commitment, less domestic abatement means that greater transfers need to be made for mitigation overseas, or through extra (and quite possibly more costly) policies outside of emissions pricing.

Ultimately, the future for an open and trade-intensive economy is in harmonisation with international emissions markets, insofar as they are mature and underpinned by stable policy frameworks. An economically efficient outcome, with comparable emissions prices to other countries, could of course be achieved in ways other than linking emissions trading markets. But in the context of an international agreement based on quantitative emissions targets, access to international emissions trading would be necessary. Given its natural resource endowment, Australia is likely to continue to export emissions intensive commodities like minerals and agricultural products, even if

[11] In the earlier 'green paper' (Department of Climate Change 2008), it was suggested that the price cap would be set "high enough above the expected permit price to ensure a very low probability of use". This was modified in the White Paper (Department of Climate Change 2008a) to "the price cap should be set high enough to deter widespread use", though still noting concerns that the price cap could breach the environmental integrity of the scheme. The starting level was set at a $40/t starting value with reference to the government's modelling scenarios that assume international prices between $23–32/t. Experience in other schemes has shown that modelling projections of permit prices were highly unreliable (Grubb 2008); hence there may be merit in using methods such as prediction markets to project future prices, for the purpose of policy design.

[12] As shown by Babiker et al (2004), the economically optimal emissions price may differ between countries because of differing interactions with existing taxes, but a price cap is not intended as a tool to correct for such effects.

strict global carbon constraints applied over decades to come.[13] It seems implausible that resource rich countries would be able to negotiate substantially greater per capita allocations than others. Australian emissions intensive exports would then need to be covered by permits purchased from other countries – and the cost of those permits would be recouped as part of the export revenue.

Bilateral linking could provide more reliable access to international permit purchases than unilateral linking to the CDM (whose survival as a mechanism yielding large amounts of credits cannot be taken for granted, see Luetken and Michaelowa 2008), or any successor mechanisms.

But linking bilaterally does of course mean giving up some or all control over the permit price, which for the case of relatively small market participants like Australia would be determined to a large extent by the targets and scheme rules of the large market participants (Jaffe and Stavins 2007; *Haites this issue?*). Australia would be largely 'importing' both the permit price and the variability of the price through time. Price volatility in the first phase of the EU ETS and then again after the onset of the financial crisis in late 2008 has strengthened arguments against linking to the EU scheme – but then again it is unclear whether an Australian scheme by itself would produce a less volatile price.

A separate question is whether bilateral linking means that Australia is not just a 'price taker' but also a 'policy taker'. Australia may have little influence on the rules of schemes that it links with, and might be forced to change its own rules to allow compatibility. The converse argument is that linking may give Australia greater influence in other countries' decisions about scheme design and targets.

3.5 The price cap as an obstacle to linking

Options for bilateral linking will likely be curtailed while provisions for a price cap are in place in Australia. Among fully linked schemes, if a price cap is in force in one country, it effectively caps permit prices across all linked emissions trading schemes: if the permit price in the other country's scheme moved above the price cap, Australian permits would be exported and Australian liable entities would access their domestic price cap, until the price in the linked systems was equalised again. Such arbitrage could be unacceptable to other countries, as their own emitters would effectively be complying with emissions limits by (indirectly) buying permits from the Australian government. Conversely, the Australian government would take on a greater budgetary risk, if permits sold by domestic emitters were packaged with Kyoto units. Finally,

[13] As an illustration, consider the Treasury's (2008) modelling results reported for 2050, again for the range of three models. Under the least stringent scenario, Australia reduces domestic emissions between 24 and 55 per cent relative to 2000, compared to a national emissions reduction target of 60 per cent, at a carbon price of A$115/t (real). Under the most stringent scenario, domestic emissions reductions range between 69 and 86 per cent, compared to a 90 per cent reduction target, at A$197/t. The latter scenario implies that actual emissions would be between 1.4 and 3.1 times larger than Australia's allocation at 2050, with the gap made up through international permit purchases.

linking bilaterally could either increase or decrease the probability of the price cap applying, depending on the other country's underlying domestic emissions price.

Governments on both ends would need to be comfortable with these implications. In the absence of relevant international experience, it seems reasonable to assume that bilateral linking with price caps would in practice require either the same level price cap to apply in both countries, or for the price cap to be set very much higher than the expected price, with very low probability of applying.

4. Bilateral linking scenarios with existing ETS

Here we examine the opportunities and challenges for bilateral linking between Australia and the EU ETS as well as the New Zealand (NZ) scheme. The discussion is on the basis of the designs for the respective schemes as of January 2009. Linking the Australian scheme with the NZ scheme (which is open to the international market) could have significant price implications for the Australian scheme, including through possible access to 'hot air' international units.

Linking options with other countries are not considered in this paper as the final design of most other trading schemes is unclear at this stage. The analysis by Sterk (this issue) on the US Warner-Liebermann Proposal, by Haites (this issue)? on the Canadian Systems and by Kimura (this issue) on Japanese developments indicate that the design competition is still ongoing. Those proposals differ from the EU ETS in some key design features and may end up being more in line with the Australian design. For example, the US Warner-Liebermann proposal aims for a broader coverage by using a hybrid upstream/downstream approach as well as the inclusion via offsets of agriculture and forestry. Some Japanese and US proposals include measures "to avoid significant economic harm", so called "emergency off-ramps," which seem to have similar objectives as the price cap in Australia. The US proposal also suggests one year compliance periods and allows for limited borrowing, similar to the Australian scheme.

But Australia should not only look to the developed world for future linking opportunities. Australia is neighbour to Indonesia and Papua New Guinea, two nations that present large and almost untapped mitigation options. Both have large opportunities to reduce deforestation and to reforest, and to quickly replace fossil fuels with renewable energies. The majority of these options escape the CDM, because they are not eligible (e.g. deforestation or government policies for energy efficiency), or because of barriers to CDM finance from existing policies and institutional structures (Jotzo et al. 2008).

The Garnaut Climate Change Review suggested it would be desirable to build "a regional market that encompasses (in the first instance) Papua New Guinea, other south-west Pacific developing countries, and — with greater difficulty and in the context of involvement by other developed countries — Indonesia" (Garnaut 2008a, p. 340). Australia has significant technical knowledge to offer, and is already engaging in pilot projects for reducing deforestation in particular in Indonesia. The medium term goal could be to help establish comprehensive mitigation policy frameworks in Indonesia and Papua New Guinea – be it in the form of domestic emissions trading, emissions taxes, regulation or a mix – and for Australia to act as a buyer of permits.

4.1 Linking to the EU-ETS

Linking to schemes that may have a significant impact on the Australian permit price, such as the EU-ETS whose market size is four to five times larger, at this stage does not appear a realistic prospect, or one desired by the Australian government.[14] The prohibition on international permit sales is obviously intended to stop the Australian permit price rising to the future level of the EU permit price, if the underlying supply and demand in Australia alone would result in a lower permit price.

From a political perspective the comparability of effort may be a criteria for linking schemes. The EU has committed to a 20 per cent reduction in 2020 emissions compared to 1990, and 30 per cent "provided that other developed countries commit themselves to comparable emission reductions and economically more advanced developing countries commit themselves to contributing adequately according to their responsibilities and capabilities" (European Parliament 2008). The Garnaut (2008) Review model of determining national commitments shows the EU 20 per cent reduction commitment roughly compatible with a 10 per cent reduction for Australia.[15] Of course, comparability of effort could be evaluated according to many other criteria (den Elzen et al. 2008).

Coverage of the EU ETS is narrower than in Australia. The EU ETS covers around 45 per cent of GHG emissions in 2008, and excludes agriculture, waste and the emissions of installations that are below the thresholds as well as road transport emissions – but will include emissions from aviation in 2012. The EU may argue that some of the emissions covered in the Australian scheme cannot be as accurately measured, and linking the schemes would import this uncertainty into the European scheme. This would especially be so if Australia decided to include agriculture at a later stage. The past reluctance of Europe to include forestry in the ETS may also cause difficulties as Australia is including forestry on a voluntary basis.

The EU ETS operates in phases (second phase 2008-12, third phase 2013-20) and does not allow borrowing between phases, whereas Australia's permits have annual vintages and short-term borrowing of 5% is allowed. Linking could allow EU companies to indirectly borrow up to the capped amount through the Australian scheme (through Australian emitters borrowing more and on-selling), causing some budgetary risk for Australia at the end of a commitment period. In contrast, Australia's companies may be able to borrow more than the 5 per cent within each multi-year EU phase, but this will depend on the release of allowances over time which may change. As the compliance periods differ – the Australian schemes is based on it's financial year, 1st of July to 30th June, whereas the EU ETS follows calendar years – liquidity of the spot market of both

[14] Based on the 5 per cent reduction target assuming an equal burden sharing between the 75 per cent of covered emissions and the 25 per cent non covered emissions, Australia's allowances in 2020 would be around 374 Mio. t CO2e.(based on data in Department of Climate Change 2008b). The EU ETS will allocate in 2020 around 1720 Mio. t CO2e, which is based on a 20 per cent reduction target relative to 1990, and does not including aviation and other sources to be covered from 2013 onwards (European Commission 2008).

[15] This model is based on contraction and convergence towards equal per capita allocations over time, thus taking into account both higher per capita emission levels and much faster population growth in Australia.

schemes may benefit, whereas future markets may not gain significantly since contracts settlement days seem not compatible.[16]

With regard to supplementarity (the Kyoto principle that flexible mechanisms should be supplemental to domestic mitigation action), the EU ETS sets quantitative and qualitative limits for the use of CERs and ERUs whereas the Australian scheme would not limit the use of credits, apart from excluding forestry CERs. The implication of full bilateral linking under these parameters would be that greater amounts of CERs could effectively enter the EU ETS through on-selling of Australian permits to the EU, with Australian emitters resorting to the CDM to a greater extent.

The most important obstacle for short-term linking seems to be the price cap of the Australian scheme – see discussion under section 3. Europe has a relatively high penalty of around 100€/t CO2e combined with a make-good provision which ensures that the penalty is unlikely to function as a price cap. Linking to the Australian scheme with a price cap in place could create a risk that lesser reductions would be achieved in the EU, as discussed earlier.

4.2 Linking to the New Zealand trading scheme

New Zealand would be a candidate for early linking, given that the country is close geographically, a variety of economic ties and policy links exist, and both countries intend to integrate agriculture and forestry into emissions trading. Linking would also offer opportunities for sharing governance arrangements and technical resources (for example, auditors and accreditation resources, and harmonising registries). New Zealand has shown strong interest in linking with Australia, in particular to overcome possible liquidity constraints that could hamper its relatively small scheme.

While bilateral links to schemes that significantly impact the Australian permit price are not desired by the Australian government in the short and medium-term, bilateral links to schemes may be established early on to schemes where linkage is deemed not to significantly affect permit prices. New Zealand is a much smaller market, compromising under a full coverage scenario around 62 $MtCO_2$-equivalent per year (UNFCCC 2007) compared to around 450 Mt in Australia. Thus, the New Zealand domestic market by itself would be likely to only influence Australia's price only to a modest extent. The question, addressed in detail below, is however whether this might bring lower prices through access to 'hot air' Assigned Amount Units.

The proposed New Zealand scheme has been approved by Parliament in September 2008 (New Zealand Government 2008). However, its future is unclear as it is currently being reviewed by the new government which came into power at the end of 2008,

[16] In the EU ETS the settlement date is December of each year and in Australia it will most likely be June.

awaiting a final report by March 2009 (Point Carbon 2009). Consequently the discussion about linking with the NZ scheme is subject to policy uncertainty.

Both schemes set an **absolute cap** over a specified period. While the Australian scheme is giving their companies more planning certainty (5 year cap plus 10 years gateways), the New Zealand government has not announced any cap or reduction targets for the 2013-20 period. Any uncertainty over the NZ scheme caps would be imported into the Australian scheme if both were linked.

At this stage, the only possible comparison of stringency is the effort required to meet Kyoto targets, which is probably less relevant than the period 2013–2020. In the First Commitment Period, Australia will require little effort to comply with its national target (Department of Climate Change 2008c). By contrast, the NZ government is projecting a gap of 14.7 MtCO2e per year for the first Commitment period between projected and allowed emissions, which is around 5 per cent of NZ's Assigned Amount (Ministry of Environment 2008).[17] Although the **stringency of caps** is not an in-principle impediment to the linking schemes, comparable stringency is likely to be a political precondition for linking. Thus, the setting of the Australian target for 2020 may have impact on a future NZ decision about linking, and likewise any target adopted or negotiated by NZ would affect an Australian linking decision.

With regard to **coverage** both schemes feature a comprehensive system with a hybrid approach, covering small emissions sources such as transport upstream, and large emitters downstream. Both countries want to bring the emissions from agriculture into the scheme, accounting for around 16 per cent and around 48 per cent of Australia's and NZ's emissions respectively in 2006.[18] New Zealand has committed to include agriculture from 2013 onwards.[19] Given the competition between those countries in some international agricultural markets such as dairy and wool, which both cause significant methane emissions from livestock, a common approach should be aimed for in order to minimise competitive distortions. In the forestry sector, the general approach is similar; both schemes will bring forestry directly under the cap. In New Zealand forestry is mandatory while in Australia a voluntary opt-in is foreseen. Both schemes allow unlimited use of CERs, but do not accept CERs from forestry projects.

[17] 14.7 Mio. AAUs is the net emissions position – different to the net position published in the Treasury of 21.7 Mio AAUs - which is excluding the AAUs committed to projects amounting to 7 Mio. AAUs for the First Commitment Period. Those figures have been changed significantly over time mainly due to changes in policies and land clearing.

[18] These figures are for 2006 emissions based on the 2008 submitted GHG Inventories for New Zealand and Australia respectively including land use change and forestry removals which can be viewed under http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4303.php

[19] The point of liability has not been decided yet. Australia is consulting and aims to decide by 2013 if agriculture is going to be included from 2015. The main issues for both countries is the trade-off between (i) covering the emissions at the farm-level which will result in a larger number of entities and higher transaction costs, but with a more effective incentive for reductions or (ii) covering emissions on a more aggregate level (e.g. slaughterhouses) to make the scheme more manageable but at the same time reducing incentives for emissions reductions through farm-level management practices.

Linking would likely provide advantages to New Zealand in providing greater liquidity as it seems that the NZ government is not planning to auction any permits but envisages some sectors such as transport to buy units in international markets. Thus, the access to the Australian auctions may prove important for the liquidity of the New Zealand market, as the international market – especially for AAUs – may be less liquid, with trades expected mainly by governments).

Both countries allow unlimited **banking** of allowances into the future but borrowing rules appear different. As described in the EU context there could be some indirect borrowing effects for both countries which may have some budgetary implications for Australia (Betz and Stafford 2008).

As discussed in Section 3, Australia's **price cap** is a major in-principle hurdle to linking. In linked schemes, New Zealand emitters would gain access to the Australian price cap, through on-selling of permits from Australian companies. As discussed above, this could have budgetary consequences for Australia.

A comparable obstacle for linking in the near future could be the difference in international **units** eligible under both schemes. Given that the NZ scheme would allow the unlimited use of international units – including Assigned Amount Units, which could potentially be "hot air" – the option of exporting permits from NZ conflicts with Australia's stance to disallow AAUs for compliance in the scheme. Essentially, the proposed NZ scheme is fully open internationally, whereas the Australian scheme has provisions to partially de-couple from the international market.

However, the link could reduce the risk of reaching the price cap in Australia, insofar as it would effectively allow the use of – most likely cheap – "hot air" permits in the Australian scheme, again indirectly through on-selling of NZ units from NZ participants. The extent that hot air enters the Australian scheme would be capped at the total amount of covered emissions in New Zealand (around 78Mtt CO2e in 2006). Table 1 summarises the key findings with regard to linking, and the following section will discuss issues relevant to hot air.

Table 1: Summary table on linking the Australian to the EU and New Zealand trading schemes

	Major obstacles to linking		Main similarities between schemes
	Australian view	Linking partner view	
Australia - NZ	• Unlimited amount of Assigned Amount Units in NZ scheme • Price Cap (short term) in Australia	–	• Coverage, including forestry approach • Unlimited use of CERs and ERUs • Exclusion of forestry CERs
Australia - EU	• Price cap (short term) in Australia • Possibly high permit prices in EU ETS	• Price cap in Australia (short term) • Unlimited CERs and ERUs • Voluntary opt-in of forestry • Potential future inclusion of agriculture	• Stringency of cap • Allocation (similar to EU ETS 3rd phase) • Exclusion of forestry CERs

4.3 Hot air and implications for the global carbon market

The term "hot air" refers to the surplus of Assigned Amount Units (AAUs) from Russia and other former Soviet Union States which originate from the economic breakdown of those countries in the 1990s, and the attendant steep reductions in emissions to levels well below the Kyoto targets. In the official UNFCCC glossary, hot air "refers to the concern that some governments will be able to meet their targets for greenhouse-gas emissions under the Kyoto Protocol with minimal effort and could then flood the market with emissions credits, reducing the incentive for other countries to cut their own domestic emissions." (UNFCCC 2009)[20] Some see hot air as an impediment to environmental integrity: Using those Assigned Amount Units for compliance will not result in any additional GHG reductions to the atmosphere and emissions will be higher compared to a non-trading regime. The concessions of loose targets and "hot air" had to be made in order to get those countries to support the Kyoto Protocol.

Over the First Commitment Period, hot air throughout the Kyoto Protocol may amount to 8,400 Mt CO2e or 1,680 Mt CO2e annually (see Appendix 1). The latter equals more than three times annual Australian emissions, or around four times estimated current

[20] Hot air can be measured as the difference of the Assigned Amount of a country and its business as usual (BAU) projections. It is important that the projections are based on business as usual (BAU) scenarios and not on "with measures scenarios" for separating recession or external factor effects from the impact of policies and measures. Only recently countries have established their Assigned Amount and thus we are able to better estimate the potential hot air based on the difference of the Initial Assigned Amount and the "without measures scenarios" projections of the 4th National Communications. For data, see Appendix.

demand by ratifying Annex I countries (excluding Canada).[21] Thus, the amount of hot air could be significant and would allow all countries to fulfil their Kyoto Protocol commitments. The consequence could be a substantial decline in demand for CERs and – depending on the seller's strategy for releasing the hot air into the market – it could lead to substantial price reductions.[22] To avoid this, most ETS schemes – apart from New Zealand so far – do not allow companies to use AAUs for compliance directly by using a distinguished "currency" for their scheme.[23] This increases demand for CERs and so their price should be above the price of AAUs from hot air candidates which could then be bought mainly by governments. Thus, the hot air units could act as a buffer in case compliance costs get too high – in complying with their national commitments, governments would then have to decide between the impact on their budgets versus the impact on their reputation.

Since hot air can be banked without limits into future Commitment Periods under current Kyoto Rules, it could substantially reduce future reduction efforts. Comparing the reduction effort in 2020 with the envisaged commitments for the US, the EU and Australia 2020 shows that if all the hot air is banked it would reduce demand for CERs by 27-30 % compared to a non-hot air scenario (see Appendix 2).

To make buying AAUs from the "hot air" candidates more attractive to governments, the concept of Green Investment Schemes (GIS) was developed.[24] Under GIS the money received for the "hot air" units is earmarked for investments which will result in environmental benefits. The process is called "greening".[25] Again, use of greened Assigned Amount Units by one scheme would allow all linked schemes to access them also.

Possible solutions to reduce hot air in the second period could include: i) banking of hot air could be restricted or banned, ii) more stringent targets could be set for the second commitment period, for the countries that now have surplus units, which would make them use up their own hot air, and iii) the new regime could be under the Framework

[21] Current demand is calculated on estimates for Norway/New Zealand 200 MtCO2e, Japan 260 MtCO2e and European Union with 1,900 MtCO2e of AAUs for the First Commitment Period. These figures represent the gap between Assigned Amount and projected emissions in 2010, based on different sources (see Appendix 1). Canada has not been included since the current government does not intend to achieve their Kyoto target (REF Haites this issue?)

[22] Böhringer et al. (2007) modelled the impact of different Russian strategies to release hot air on the market. Anger (2008) estimated that including hot air in the international market can lead to a price drop from 28.5 to 5.0 €/ton of CO2.

[23] There may as well exist a potential loophole that companies under the ETS buy hot air camouflaged as a JI project. This could happen if ERUs – under the Second Track - are no "real" emissions reductions projects. Again the amount of the hot air entering the system depends on any limits of the use of Kyoto units in any of the linked systems.

[24] In 2008 Hungary and Latvia adopted the GIS legislature and at least three more European countries are prepared to follow suit. So far some countries have been buying greened Assigned Amount Units (Sharmina et al., 2008).

[25] Two different types of "greening" can be distinguished: (i) "soft greening" relates to activities which have non-quantifiable and non-measurable emission reductions, (ii) "hard greening" refers to activities in which the greening process can deliver measurable and quantifiable emission reductions (Blyth and Baron 2003).

Convention and not related to the Kyoto Protocol which could also restrict the eligibility of hot air units in a post-2012 regime.

A way to limit the use of hot air at the company level without excluding it altogether would be to allow a specific share of international units to be surrendered, which could also include a priority list (e.g. first CDM credits up to a defined limit, next JI credits, then AAUs).

5. Conclusions

Australia's government is taking a cautious approach to international linking. The proposal tabled in late 2008 is for unilateral linking with unlimited access to credits from the CDM and JI, but no bilateral linkages to start with, although full linking with selected partners is envisaged in the future.

A defining theme in scheme design is to limit the maximum domestic permit price, at least during the start-up phase. This is to be achieved through the combination of unlimited access to international emissions credits, ban on sales out of the system, and a government-administered price cap. We have shown that the price cap brings with it significant risks to public budgets and economic efficiency, because it can override the scheme cap but not the national emissions commitment. It is also an important obstacle to bilateral linking with other schemes.

A number of hurdles to linking with Australia would exist from the perspective of the European Union. The Australian price cap, while in place during the first five years of the scheme, would likely preclude linking. The unlimited use of units from the Kyoto mechanisms CDM and JI would be another obstacle. Whether the EU would accept unlimited use of Kyoto units in a scheme it links to would likely depend on outcomes of future international negotiation, including the stringency of commitments. And whether the EU would accept the Australian provisions for voluntary opt-in for forestry and the prospect of including agriculture down the track, would likely depend on whether Australia can demonstrate rigorous monitoring and verification in these sectors.

Regarding linking with New Zealand, apart from budget risks arising from the price cap, the potential indirect inflow of hot air into the Australian system could prove a major barrier from an Australian perspective, despite similarities in other areas and a presumed inclination by both parties toward linking. To facilitate linking, New Zealand might need to modify their scheme rules, for example by excluding hot air from the system, with liquidity ensured through access to Australian units. Quantitative analysis shows that hot air (surplus permits from Russia and Eastern Europe under the Kyoto Protocol) could play a significant role beyond the first commitment period and could lead to a sizeable reduction in demand for other mitigation units, making it important to limit its impact in a post-2012 agreement.

Australia is also likely to look toward its developing country neighbours for future opportunities to collaborate on mitigation, and eventually trade permits. Indonesia and Papua New Guinea both present large untapped mitigation options, especially in forestry and land use where Australia has considerable expertise.

Australia's longer-term opportunities lie in integration with international emissions markets. Economic history has shown that Australia, a country strongly engaged in international trade, has much to gain from an open trading regime that transmits international prices to the domestic economy. Similar principles apply to emissions

markets, where efficient economic responses require comparable emissions prices across countries. While price harmonisation could be achieved through other means than linked emissions trading schemes, bilateral linking would also ensure consistent access to international permit trading opportunities. In a world with strong quantitative carbon constraints, the continued export of emissions-intensive commodities from Australia would likely depend on buying permits internationally.

With this in mind, it would be logical for Australia to dismantle the initial barriers to international linking of its emissions trading scheme, to search out linking opportunities with existing and emerging schemes that are compatible in design and ambition, and to work with developing countries in the region to establish and support mitigation programs there.

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Appendix 1: An estimate of 'hot air', Mt CO_2-equivalent

	Annual Assigned Amount	Projection in 2010 (without measures)	Annual hot air	Total Hot Air (2008-2012)	% of Hot Air
Czech Republic	181	154	27	134	2%
Estonia	40	24	15	77	1%
Hungary	116	88	28	138	2%
Latvia	24	14	10	50	1%
Lithuania	44	29[a]	15	74	1%
Poland	552	472	79	397	5%
Slovakia	67	56	11	55	1%
Slovenia	19	21	-3	-13	0%
Bulgaria	122	81	41	204	2%
Romania	256	161	95	476	6%
Eastern European Countries	**1,420**	**1,101**	**318**	**1,592**	**19%**
Russia	3,216	2,329	887	4,437	53%
Ukraine	925	490	435	2,175	26%
Belarus	117	78	39	196	2%
Total hot air			**1,680.10**	**8,400**	**100%**

Sources:

Annual Assigned Amount: Report of the review of the initial report of the respective country, to be viewed
http://unfccc.int/national_reports/initial_reports_under_the_kyoto_protocol/items/3765.php
Projections 2010: Fourth National Communication of the respective country, to be viewed
http://unfccc.int/national_reports/annex_i_natcom/submitted_natcom/items/3625.php

a) only energy sector is "without measures" in this estimate
b) figure assumes "optimistic" GDP growth (6.4% p.a); assuming "moderate" GDP growth (4.2% p.a.) the figure is roughly 2,200Mt CO2
c) figure includes LULUCF & assumes "optimistic" GDP growth (7.8% p.a); assuming "moderate" GDP growth (5.3% p.a.) the figure is 445.75Mt CO2

Appendix 2: A scenario for potential demand for permits at 2020, Mt CO_2-equivalent

	2020 Targets		Business-as-ususal projections for 2020	Maximum demand, 2020		Ratio of projected Hot air to maximum demand, 2020	
In Mio. t CO2equ	Allowable Emissions (Unilateral emission target/base year)	Allowable Emissions (International reduction emissions target/ base year)		Under minimum ambition ('unilateral' emissions target	Under higher ambition ('international' emissions target	Under minimum ambition ('unilateral' emission s target	Under higher ambition ('internati onal' emissions target
Australia	499 (-5%/2000)	446 (-15%72000)	664	165	218	5.1	3.9
EU-27	4,462 (-20/1990)	3,904 (-30%1990)	5,494	516	795	1.6	1.1
USA	6,135 (0%/1990)	6,135 (0%/1990)	8,330	2,195	2,195	0.4	0.4
Total for these three countries/regions				2,876	3,207	0.30	0.27
Annual Hot Air over 2013-2020 period				851	851		

Sources:

Allowable Emission 2020 are based on latest submission inventories for respective base year and announced targets (Australian Government 2008b)

Projections Australia: Department of Climate Change 2008 (with measure scenario)

Projections EU: Capros et al. 2008 (Business as usual scenario)

Projections US: 4th National Communication (With measure scenario, however does not include any measures of new Obama government

Note:

Demand is usually calculated as the difference of allowable emissions and projections. For the European Union, demand is assumed to be 50% of the difference between Business as usual emissions compared to allowable emissions, as per EU proposals (REFERENCE).

The annual hot air over 2013-202 is the hot air estimated for Russia, Ukraine and Belarus in Table 2 divided by 8 (2013-202). The hot air of the European Union Member States has been excluded, since it is reflected in the demand of EU-27.