



Putting a price on carbon

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Australia's developing cap and trade system for greenhouse gas emissions is treading a difficult path amidst the needs of both economic and natural environments.

Australia's Carbon Pollution Reduction Scheme (CPRS) is a cap and trade system for carbon dioxide and other anthropogenic greenhouse gases that is currently being debated in government, industry and internationally. It represents an attempt by the federal government to limit Australia's carbon emissions and therefore decrease the country's contribution to climate change over the coming decades. The seed for the CPRS arose from the Garnaut Climate Change Review (Garnaut 2008), which examined the impacts of climate change on the Australian economy and recommended a series of medium- and long-term policies to achieve 'sustainable prosperity'. The current CPRS legislation is before the federal parliament, with a number of significant modifications having occurred since its inception as Green (Department of Climate Change 2008a) and White Papers (Department of Climate Change 2008b) issued by the Department of Climate Change in 2008, due to the political debate that has occurred. The primary objective of the CPRS is to create a mechanism that will achieve Australia's long-term emission target of 60% reduction on 2000 levels by 2050, which is thought to be the level that will stabilise CO₂ levels in the atmosphere, and avoid dangerous climate change. The legislation is also aimed at achieving this outcome by enabling Australian industries to adapt to lower-emission technology without placing too significant cost burden on themselves and society, though there is debate on whether this will be achieved.

The cap and trade system operates by limiting the amount of greenhouse gas emissions the country can make, 'the cap', which in turn is expected to place a price on carbon because the right to emit becomes limiting. This is an attempt to place a price on carbon

in a systematic way throughout the economy. The trade part of the scheme allows companies to buy and sell emission permits (also known as allowances) at a price determined by the market, to cover their emissions. Hence, those companies that can undertake carbon abatement strategies cheaply will implement those changes and sell their outstanding permits to those businesses that cannot. Therefore, company profits are increased by either selling unused permits or reducing the number of permits needed to be bought. Those businesses that do not adapt will be forced to pass on the cost of their permits to their consumers and therefore reduce the company's competitiveness compared to their lower carbon-emitting competitors. The market outcome of this will favour companies that make the adaptation to low-carbon technology.

As an alternative to the cap and trade scheme, another proposal is for direct taxation of the emission of carbon dioxide, e.g. a carbon tax. This proposal works by taxing the burning of fossil fuels in proportion to their carbon content, so that coal will be more heavily taxed than natural gas. Hence, this will increase the competitiveness of low-carbon industries technologies. The difference between the two is that a carbon tax provides price certainty on emissions, while a cap and trade scheme provides quantity certainty on emissions. The carbon tax system is conceptually simpler than cap and trade, but has several problems. The most significant is that the price of carbon is set by government, which can lead to it being manipulated for political purposes, such as an additional source of government revenue.

A cap and trade scheme is not a new idea, with the USA's Acid Rain Program considered a successful example (United States Environmental Protection



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Agency 2007), where SO_2 and NO_x emissions have been capped to prevent acid rain and permits allowed to be traded. The 'cap' has successfully reduced SO_2 emission in the United States by over 40% since the 1990s, and the USA's EPA estimates that by 2010 the overall cost of complying for businesses and consumers will be \$1–2 billion a year, a quarter of what was originally predicted. A not so successful system has been the current European Union emission trading scheme (EU ETS), which operates the largest carbon trading scheme in the world, responsible for 40% of the EU's total greenhouse gas emissions (Ellerman and Buchner 2007). The scheme covers the emissions of 21 EU countries, including Germany, France and the UK. However, the program has been criticised on a number of points; one of the most serious was over-allocation of permits, especially in the first phase of the program, which led to a meaningless cap. Because of the over-allocation of permits, the price crashed from €30 per tonne of CO_2 in May 2006 to €0.03 in December 2007, which implied that no real effort was required to reduce emissions, with only Germany and the UK achieving actual reductions. This over-allocation of permits was due in part to poor data on emission baselines and uncertainty in emission forecasts.

The proposed Australian CPRS is believed to

incorporate around 1000 companies that make up the bulk of Australia's greenhouse gas emitters, and will subsequently have their emissions constrained as part of the scheme. The actual amount these companies emit are covered in part by the Australian government's National Pollutant Inventory (NPI), which makes it mandatory for industry to report their emission levels for a range of industrial pollutants, including CO_2 . Hence, the majority of Australian businesses will not need to monitor emissions or directly purchase permits to cover those emissions. However, their cost of business will be affected by the implementation of the CPRS, as a result of rising price in utilities (specifically electricity) and goods. The price of carbon has been estimated by the Department of Climate Change to be \$20 per tonne of CO_2 ; however, CSIRO has suggested that the price may go higher than \$45 per tonne to represent a real cost to the economy to facilitate the transition to a low-carbon economy and avoiding dangerous climate change. The effect of this pricing on a household's energy budget is debatable (Hatfield-Dodds and Denniss 2008). The flow-on effect of energy price increases to other utilities and everyday products, as well as the uncertainty in the permit market, makes the CPRS one of the most far-reaching legislations to be proposed by government in decades. It has the

potential to have a significant impact on the industrial, economical and even social aspects of Australian society, primarily because of the current way we obtain our energy and the direct relationship that has with Australia's economic growth. This potentially far-reaching nature of the CPRS has naturally attracted criticism (both justified and not) with the majority of this criticism focused on either the envi-

Carbon-based gaseous emissions, principally carbon dioxide and methane, represent a global problem requiring a global solution. In absolute terms Australia is a small contributor, but to have any international influence we must be proactive in formulating domestic solutions. The world community was successful in obtaining an international agreement to phase out chlorofluorohydrocarbons aerosols; a similar outcome for carbon-based emissions will be much more difficult and will depend upon the G20 countries providing decisive leadership. This essential condition has not yet been satisfied. Furthermore, an international carbon trading system will be fraught with difficulties. I do not think enough members of the Australian community yet recognise that if polluting industries can buy cheap green permits in a developing country the CPRS will not provide a local solution as the incentive to reduce emissions in Australia will be much diminished.

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ronmental or economical aspects of the scheme.

Environmental criticism is focused on the reduction target, in particular the intermediate 2020 target. There is still much debate over the 25% reduction target by 2020 (at the time of going to press), with this intermediate target generally seen as too low by environmental organisations. For example, the Australian Conservation Foundation is calling for a 40% reduction by 2020 to avoid catastrophic climate change (Australian Conservation Foundation 2009). In opposition to this, industries stress that achieving any significant reduction in the short 2020 timeframe will be too costly. They rightly point out that Australia is responsible for only ~2% of the total world's carbon emissions, and therefore any move by Australia to reduce emissions without similar efforts by the large emitters, specifically the USA and China, will be insignificant and damage Australian industry competitiveness. However, complicating this argument

is the fact Australia has the highest emissions per capita, and therefore there is onus on Australians to cut emissions. Fortunately, a number of studies, most notably the McKinsey report (McKinsey & Company 2008), have indicated that significant reductions can be achieved in areas such as energy efficiency and increasing fuel economy, which save money. However, these will not be enough to achieve the current federal government's 2020 target, let alone those of the environmental lobby.

One aspect of the economic criticism towards the CPRS is focused on who has the right to pollute, how permits should be distributed and those sectors of the economy that are entitled to free permits. This is where the debate around the CPRS is most fierce, because access to free or discounted permits will be a competitive advantage once the scheme comes into force. There is a valid argument for the distribution of free or heavily discounted permits to key sectors of the economy, given that they provide vital services upon which the broader economy and society rely. Therefore, placing constraints on their financial operation can have repercussions through the whole economy. However, the sector that is most vulnerable to the CPRS is electricity generation because they are currently one of Australia's largest emission sources. To support their argument for subsidised permits, the industry threatens plant closures, bankruptcy and loss of generator capacity upon implementation of the CPRS if they do not get their full entitlement. However, the actual outcome of implementation of the CPRS will not be as dramatic. Naturally the cost of generation will increase, and hence home power bills will rise, but the result will make renewable energy generation more attractive to the consumer and investors. Hence, this should subsequently direct investment towards the renewable sector, i.e. low-emission technology, the purpose of the legislation.

Another aspect of the economic criticism is the distribution of revenue generated by the auction of permits. The Green Paper (Department of Climate Change 2008a) on the CPRS designated around 30% of potential revenue towards compensating industry and power stations, with a further 16% to reduce fuel taxes. This amounts to billions of dollars to support industry and placate the consumer from higher utili-

ties bills. However, there is a strong argument that the revenue should be invested into the transition to a low-carbon economy, such as research, development and commercialisation of low-emission technologies, as well as supporting energy efficiency measures.

An interesting side issue associated with the CPRS surrounds the agricultural sector. Currently under the proposed scheme, farmers are initially excluded, and will slowly join the scheme over the coming decade. However, unlike every other sector of the economy that wishes to also be excluded from the CPRS, there

Increasing the terrestrial storage of carbon in the Australian landscape must be an important part of our response to mitigate climate change... To capture this opportunity for increased storage of terrestrial carbon our ETS must:...

...extend terrestrial carbon definition beyond Kyoto definitions to ensure that carbon in soil under a wide range of vegetation and managements is included and valued.

...ensure that terrestrial storage of carbon is implemented within the landscape in line with Regional Landuse Planning and regional NRM incentive programs so to avoid perverse impacts on food production, water supply and biodiversity.

Dr John Williams, Wentworth Group of Concerned Scientists (quote courtesy Australian Science Media Centre)

is a strong argument for agriculture to be included from the start. This is because some sections of the agricultural sector see economic benefits, specifically from reduction in land clearing, changes to farming practices and carbon storage in soil, which can be used as carbon offsets and therefore sold as permits to the market, generating another revenue source for the sector.

The small size of Australia's emissions compared to the world's means that Australia's CPRS is minor compared to the EU ETS, emerging schemes in North America, and the developing international carbon permit market. The Climate Conference in Copenhagen is part of the United Nations Framework Convention on Climate Change (UNFCCC) to renew a climate agreement before the Kyoto Protocol

expires in 2012. A potential critical outcome of this meeting will be the development of an international carbon trading policy, where offsets and permits in one country are valid in another. Part of any international agreement will be who are issued the permits and how they can be traded. It may be based upon the European model, with the financial services sector in London already establishing itself as a key carbon trading hub. The development of an international carbon trading system will ensure that industries cannot just move their manufacturing to an unrestricted country and escape any emission penalties. However, before the implementation of an international carbon trading system, a number of key concerns will need to be addressed, such as cap levels, regulation of the carbon market, and enforcement of the caps. Of particular concern will be verification of offset programs, such as ensuring that development of carbon sinks, such as reforestation in the developing world, are not scams or green washing. This is of concern to the Australian CPRS now, with doubts being raised about proposed carbon sink projects in PNG.

Carbon cap and trading schemes appear to be the mechanism by which the majority of the world's industrialised economies have decided is the best way to achieve carbon reductions. While the scheme is no 'silver bullet' to avoiding dangerous climate change, it does initiate the need to make real sustainable changes to society and finally places a price on the effect of carbon.

REFERENCES

- Australian Conservation Foundation 2009, <http://www.acfonline.org.au>. Accessed 4 November 2009
- Department of Climate Change 2008a, *Carbon pollution reduction scheme*. Green paper, Canberra.
- Department of Climate Change 2008b, *Carbon pollution reduction scheme: Australia's low pollution future*. White paper, Canberra.
- Ellerman A.D., Buchner B.K. 2007, *Review of Environmental Economics and Policy*, **1**, 66.
- Garnaut R. 2008, *The Garnaut climate change review*. Cambridge University Press, Port Melbourne.
- Hatfield-Dodds S., Denniss R. 2008, *Energy affordability, living standards and emission trading*, CSIRO.
- McKinsey & Company 2008, *An Australian cost curve for greenhouse gas reduction*.
- United States Environmental Protection Agency 2007, *Acid rain program progress report*.

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