

# **The Essential Role of Carbon Pricing**

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**16<sup>th</sup> Global Conference on Environmental Taxation**

***Green Fiscal Reform:***

***Protecting our Natural Resources for a Sustainable Future***

**24th September 2015**

**University of Technology, Sydney**

This international conference on taxation and the environment is exquisitely timed. It is two and a bit months before the Paris conference of the United Nations Framework Convention on Climate Change. It is a bit over one week after the elevation, after two years of aberration, of an Australian Prime Minister, who is committed to respect for science and to policy based on rigorous analysis of the public interest.

On Paris, over the past year, heads of government of major economies—Presidents Obama, Xi, Park and Hollande; Chancellor Merkel; Prime Ministers Cameron and Abe—have given consistently firm preparatory support to a strong outcome.

Two G20 heads of Government set out to swim against the tide of leadership opinion and policy on climate change in the major economies. Both learned to respect the strength of the tide and this year have swum across rather than directly into its full force. Maybe soon neither will be swimming on this beach at all. Prime Minister Abbott's time has passed. Prime Minister Harper of Canada seems set to lose his Parliamentary majority before the Paris meeting.

Former Vice President Gore at a seminar at the University of Melbourne in July expressed conditional regret about the likely outcome in Paris. "A legally binding, comprehensive agreement would be the Gold Standard," he said. "We won't get the Gold Standard at Paris, but we will see an important step forward".

I responded by agreeing that a comprehensive legally binding agreement would be the Gold Standard. A Gold Standard that was as inappropriate as the international monetary Gold Standard that gave the world the Great Depression. The monetary Gold Standard had been too rigid and cracked under pressure.

The Copenhagen and Cancun conferences of the United Nations in 2009 and 2010 defined a new approach to international cooperation on climate change mitigation that has led to higher ambition and greater progress on substantive matters. I call this new and more successful approach Concerted Unilateral Mitigation.

Concerted Unilateral Mitigation was drawn in outline by the heads of government of the United States, Brazil, China, South Africa and India at Copenhagen and agreed formally by the whole international community at Cancun. Then and since, we have seen the confirmation of earlier international agreement on crucial issues of measurement and carbon trade. We have seen comprehensive global agreement on the objective of holding human-induced climate change to two degrees Celsius.

Within Concerted Unilateral Mitigation, each country defines its own contributions to reducing emissions as contributions towards holding temperature increases to two degrees. Each is constrained in the targets that it sets by its domestic polities' conception of what is a reasonable contribution to the global effort, and by international review and comment.

There has been a marked fall in the trajectory of global greenhouse gas increases within Concerted Unilateral Mitigation since 2009. Most important have been the decisive changes in

China and the United States. In both countries, longstanding associations between growth in economic output and greenhouse gas emissions have been broken since 2009.

Countries have been declaring targets for reducing emissions after 2020 in the approach to the Paris conference. The announced targets embody commitments to faster rates of decline in emissions. Independent analyses in Australia and abroad point to Australia, standing out amongst developed countries for weak emissions reduction commitments, as well as for the high starting points relative to population—ahead of Canada in second place.

Most developed countries and China have been meeting targets for emissions reductions within Concerted Unilateral Mitigation, and have policies in place to continue to do so within the more ambitious targets that are now being pledged.

The announcements of post 2020-targets have been associated with acceptance that the rate of decline in emissions will have to accelerate after 2025 or 2030 to realise the global two degrees objective. The G7 Heads of Government meeting in Germany in June 2015 accepted that the achievement of the two degrees objective would require complete decarbonisation of the world economy—zero emissions—in the course of the twenty first century. Global emissions would have to fall by something approaching the upper end of the range 40-70 percent by mid-century. Rates of reduction of emissions entitlements would fall proportionately less in lower income countries—many from very low levels—with the implication that reductions of about 90 percent in developed countries would be required by mid-century. As a matter of arithmetic this would require virtually complete decarbonisation of electricity emissions in the developed countries by that time.

It is unlikely that individual countries of modest size with high starting points and weak early targets—Australia and Canada—will be able to resist indefinitely pressure from the larger countries to do their fair shares in a global mitigation effort. It is unlikely that the domestic politics of the laggards will support continued free riding on the efforts of comparable countries. Sooner rather than later, the laggards will catch up—achieving similar end points at higher cost than if steady progress had been made from an early time.

Once it is accepted that emissions are going to be reduced to levels consistent with the two degrees objective, the focus shifts to the costs and certainty associated with meeting specified reductions in emissions.

The new Prime Minister of Australia, Malcolm Turnbull, has said since his accession to office that there are many ways to reduce emissions. What matters, he says, is the reduction and not the instruments used to achieve the result. He notes that different approaches carry different costs, but that is not critical to environmental outcomes.

He is correct.

The Prime Minister's point was made to me by President Obama's Secretary for Energy, Nobel Laureate in Physics Stephen Chu, in early 2011. The Secretary had said that the United States would achieve the ambitious emissions reduction targets that the United States placed before

the United Nations conference at Copenhagen primarily through a national Emissions Trading System. It was clear after the 2010 Congressional elections that an ETS was not going to be legislated. I asked Professor Chu whether and how the targets would be reached.

“Don’t worry, Ross,” he responded. “We had intended to reach the targets through an efficient and low cost means—an Emissions Trading System. But with the Congress blocking the low-cost path, we will get there by other means”. Secretary Chu proceeded to describe the comprehensive regulatory approach that has been revealed progressively through Presidential statements in the four and a half years since then.

The cost of reducing emissions does not matter to the environmental outcome. However, it does matter to economic outcomes—to productivity, to the budget deficit, and therefore to the levels and vulnerability of the material standards of living of citizens.

And there are circumstances in which costs matter even to environmental outcomes. High cost approaches to reducing emissions are likely eventually to be associated with greater political resistance.

Economic analysis has clear messages on the costs of alternative approaches to reducing emissions. Great economists in the classical (John Stuart Mill) and neo-classical (Pigou) traditions note that some economic activities impose costs on others. From the beginning, environmental damage featured prominently amongst such negative “externalities”. The efficiency of a market economy requires regulation or compensating taxes to stop the damage to others. If the compensation is to be through a tax, the tax rate should be equal to the external cost.

In the second half of the twenty first century, the economists who came to be the high priests of uninhibited market exchange, Hayek and Friedman, included environmental costs prominently in a limited list of “external costs” that needed to be compensated by taxation if a market economy were to operate efficiently.

The internalisation of climate change externalities carries some special challenges.

The external costs are global, so that effective action to remove the distortion that they impose on the operation of markets requires participation of all significant economies.

The external cost of a tonne of carbon emissions is the same in Hanover as Honiara. Efficient correction of the externality requires the same tax rate in all places.

The costs imposed on others depend on the total amount of carbon emissions over long periods of time, and not on the amount at a single point in time. The specification of the two degrees objective allows the calculation of the total accumulation of emissions over time that can be allowed. This “carbon budget” can be drawn down quickly or slowly. How fast? And what rate of tax will generate an optimal rate of depletion? These are the questions answered by Hotelling almost a century ago for optimal depletion of a mineral resource (Hotelling 1931). Hotelling tells us that the optimal tax rate will rise over time at an appropriate interest rate.

The tax rate can be set in one of two ways. Rights to emit emissions up to the global budget can be allocated unambiguously among economic entities. If free exchange of emissions entitlements are allowed, the optimal price, rising over time at the interest rate, emerges in the market.

Otherwise, the optimal price can be determined analytically through economic modelling, and a carbon tax applied at that level—rising over time at the Hotelling interest rate. Deficiencies in human foresight and therefore of forward-looking economic models suggest that the more flexible Emissions Trading System is less likely to require frequent discretionary recalibration.

The Concerted Unilateral Mitigation discussed above is now the mechanism through which responsibility for allocating emissions is allocated among countries. The economically efficient and equitable way to allocate national entitlements is by auction to the highest bidder.

The Carbon Tax and the Emissions Trading System applied at the same rate provide similar incentives for reducing emissions across industries, projects and firms. They generate similar and potentially large amounts of public revenue.

While the purpose of the Carbon Tax or ETS is to avoid dangerous climate change, they incidentally collect large amounts of revenue for some combination of reducing a budget deficit and public debt; reducing other taxes; or increasing public expenditure. Economic analysis suggests that even if the climate change benefits are ignored, this is a relatively low-cost means of raising revenue (Nordhaus 2008; Garnaut 2011).

Once emissions reduction responsibilities have been allocated amongst countries, it is possible for each country to contribute its share of the mitigation responsibility not only through the application of a Carbon Tax or an ETS, but also by direct regulation of emissions-intensive activity, or by fiscal payments to low-emissions activities, or through multifarious regulatory and fiscal interventions. In practice, most governments use many different instruments—sometimes combining regulatory interventions, fiscal payments, a Carbon Tax and an ETS.

The costs of countries living within their carbon budgets can be reduced if entitlements are tradeable between countries. This allows emissions to be reduced more in countries in which costs of mitigation are lower and less in countries in which they are higher. While international trade in entitlements through a national window is possible under any mitigation policy regime, it is more simply compatible with an ETS.

Economic analysis tells us that the costs of reducing emissions is lowest if there is a single global carbon price achieved through trade in entitlements. The eclectic nature of real-world mitigation takes us a long way from this ideal. In the messy real world, a single country can minimize its own mitigation costs through application of a single carbon price, however others are choosing to reduce emissions. A set of countries can minimize each of their emissions reduction costs by allowing trade in entitlements, whether or not other countries participate in trade.

Trade within the Clean Development Mechanism poses special challenges. The CDM was established under the Kyoto Protocol to allow developed countries to purchase emissions entitlements from developing countries that can reduce emissions at low cost (Garnaut 2012). It is an offset mechanism, so that the price is determined by demand created by purchasing countries' rules on meeting their own emissions reduction targets. Restrictions on use of the permits in countries with domestically binding targets has caused massive oversupply and chronically low price for CDM credits—conditions are which are likely to continue for the foreseeable future. The price of the credits at present bear no relation to the costs of reducing emissions in any country.

The CDM credits are legitimate within the international rules. However, in conditions of oversupply and price distortion they should be utilized with caution. The abundant supply and low prices of CDM credits are temporary. Heavy reliance on the use of CDM credits rather than domestic adjustment to meet emissions reduction targets would leave an economy vulnerable to future increases in price—especially if weak early targets were meant that the rate of emissions reduction has to accelerate sharply in future years.

These are live issues in Australia at present. Some use of CDM credits is legitimate. Heavy reliance on them would increase the adjustment costs for Australians in future. My own suggestion would be to limit use of CDM credits to the meeting of part of the increased ambition in the post-2020 emissions reduction targets—the increase that is necessary for Australia to contribute its fair share to the global mitigation effort, and for which there will be considerable pressure from other countries around the Paris meeting.

I discussed the issues related to mitigation in a single country in a many-country world in my Climate Change Review presented in 2008 to all of the Governments of Australia—Federal, State and Territory (Garnaut 2008)—and the Garnaut Climate Change Review presented to the Multi-Party Review of Climate Change in 2011 (Garnaut 2011). I expanded on some of the points made there in Garnaut 2013 and Garnaut 2014.

My conclusions then seem about right now. Australia has to do more to reduce emissions by 2020-30 than is contemplated by targets communicated so far to the United Nations. It will have to do much more in the two decades after that—to reduce emissions by 90 percent from levels at the beginning of the century and to completely decarbonize the electricity system. It could make progress through these targets through a range of regulatory and fiscal interventions—although it will require much more muscular direct action than is embodied in current policy.

The cost of acquitting Australia's full responsibilities as part of a global effort to hold emissions reduction to two degrees is likely to be prohibitive in budget and productivity terms, unless the weight of policy is taken over by broadly based carbon pricing at some time. The sooner, the lower the cost of Australia doing its fair share in the global mitigation effort.

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