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Exploring a Carbon Tax for Australia

John Humphreys

Perspectives on Tax Reform (14)

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Foreword

This Policy Monograph by John Humphreys is the fourteenth in the Perspectives on Tax Reform series from the Centre for Independent Studies. In this paper, Humphreys links tax reform to the highly controversial issue of climate change policy.

Although there are differences between the Coalition and Labor on greenhouse gas objectives, both seem determined to adopt a system of carbon trading as the key policy instrument. Humphreys compares carbon trading with the alternative of a carbon tax and comes out strongly in favour of the latter. In his words, it is 'more efficient, effective, simple, flexible and transparent.'

Advocacy of a new tax always comes as a jolt to many people who are interested in tax reform, because their objective is to reduce the number of taxes and to contain, if not lower, the overall tax burden. As Humphreys points out, though, the purpose of a carbon tax should not be to raise additional tax revenue, nor even to reduce overall energy usage, but to use price signals to shift the composition of energy consumption in favour of 'dirty' rather than 'clean' forms.

Therefore, while advocating a carbon tax Humphreys is careful to specify that it should be revenue-neutral, and he identifies several options for offsetting tax reductions. Depending on the choices made by the next government, a carbon tax could actually advance the cause of tax reform—or it could set it back and add to the overall tax burden.

It is not a foregone conclusion that we need a carbon trading scheme or a carbon tax. Humphreys provides much food for thought on the nature of the optimal policy response and how it can fit in with broader tax reform.

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Exploring a Carbon Tax for Australia

John Humphreys

Executive summary

One of the most prominent policy issues being debated in Australia at the moment is how the government should respond to the potential threat from climate change. Mainstream scientific opinion suggests that increased emissions of greenhouse gases (such as carbon dioxide) are leading to global warming, and that this could cause significant costs if not adequately addressed. In contrast, there is no mainstream opinion as to how policy-makers can best respond.

With growing public concern and constant calls for government action on climate change, it is important that we have a full debate about what is the best response. Many politicians have rushed to support poor climate change policy. Our government is currently using an approach of regulation and subsidy while considering the possibility of implementing a carbon trading scheme. We would be better served if the government replaced all of these options with a revenue-neutral carbon tax. A carbon tax is preferable to a carbon trading system because it is more efficient, effective, simple, flexible, and transparent. More importantly, a carbon tax has the added benefit of providing revenue which can be used to cut other taxes. Indeed, a revenue-neutral carbon tax may have little or no economic cost.

A carbon tax of $15 per tonne of CO_2e (carbon dioxide equivalent) emissions would generate enough revenue to increase the income-tax-free threshold to $10,000 or to drop the top marginal tax rate to 30%. A $30 per tonne CO_2e carbon tax would allow us to do both of the above or to increase the income tax free threshold to $15,000.

Alternatively, a $30 per tonne CO_2e carbon tax could be used to fully offset all current fuel taxes. In such a reform, higher electricity prices would be offset by petrol prices falling about 30 cents per litre. This approach could be seen as transferring our current environment tax, which is on fuel, to a lower rate on a broader base. It would be revenue-neutral, efficiency-neutral, and equity-neutral, and would encourage Australia to start shifting away from its reliance on carbon-intensive ‘dirty’ coal.

The goal

There is an emerging consensus in Australia that the government needs to take further action to help combat anthropogenic global warming (AGW). The most prominent policy option, preferred by both Liberal and Labor, is the introduction of a carbon trading system to reduce the amount of carbon that is being released into the atmosphere. This is the wrong approach. If something does need to be done about greenhouse gases in Australia, the best approach to implement a carbon tax and to use the revenue generated to remove or decrease other taxes.[1]

The goal is not to reduce energy use, but to increase the relative appeal of alternative energy.

To combat man-made climate change, it is necessary to address emissions of greenhouse gases including carbon dioxide. The goal of government action on climate change is to reduce our reliance on carbon-intensive energy (specifically, 'dirty' coal) so that human activity produces less greenhouse gas. The goal is *not* to reduce energy use, but instead to increase the relative appeal of alternative energy (nuclear, solar, wind, 'clean' coal, and so on) so as to speed the transition away from carbon-intensive energy. No matter how this is done, it will have an adverse consequence on Australia's coal industry. Yet the transition will take time, and it is worth remembering that the export market (three quarters of our coal is exported) is determined by the economic performance and environmental policies of other countries and so will not be affected by Australian energy policy (see Box 1 below).

Encouraging the transition from carbon-intensive energy to alternative energy can be achieved in many ways. One option is to subsidise low-emission energies and new technologies, and the Australian government has already spent almost $2 billion on this.[2] This option involves politicians directing government funds toward particular industries or technologies. For example, the government uses a range of programmes to direct funds toward improved wind and solar energy, energy from pig waste and from using biomass waste from sugar mills, cloud-seeding for more hydropower, geothermal energy from hot dry rocks, wave power, and a range of other energy alternatives.[3] Australia's government support of the energy industry is not limited to subsidising renewable energy—for example, in 2001–02, $8.6 million was spent on cooperative research centres that assist the fossil fuel industries,[4] and the government continues to support the Australian Nuclear Science and Technology Organisation.[5]

Box 1: Bob Brown and the ending of coal exports

In February 2007, Bob Brown argued that Australia could not adequately address climate change unless we reduce our coal exports.[6] He was wrong.

The international coal market is large (775 million tones in 2005) and competitive.[7] While Australia is a significant exporter of coal, removing our supply from the market would simply increase the demand for non-Australian coal.

Ultimately, the greenhouse gas emissions of China, Taiwan, Korea, and Japan (major regional coal importers) will depend on the economic development and environmental laws in those countries. It is reasonable for Australia to manage our national emissions but it is unreasonable to expect us to control global emissions.

The most important way that Australia can contribute to combating AGW is to shift our domestic energy consumption towards less carbon-intensive energy. By putting a price on carbon, Australia can increase the incentive to invest in alternative energy technology and increase the incentive for energy users to switch from 'dirty' coal to cleaner energy.

This approach to industry policy is referred to as 'picking winners,' and requires the government to choose which ideas are subsidised and which are taxed. The problem with picking winners is that the government generally does a poor job. In his overview of government research and

development, Sinclair Davidson refers to a recent study that compared the relative importance of privately funded and government-funded research, and found that private research was more successful.[8] More generally, it is widely accepted that the market is better at picking winners than politicians and bureaucrats.

A better approach to encouraging the switch to non-fossil fuels is to put a price on carbon, which makes all alternative energies relatively more competitive and then allows the market process to discover the best new energy sources. This can be achieved through a carbon tax or a carbon trading system.

Carbon trading versus carbon tax

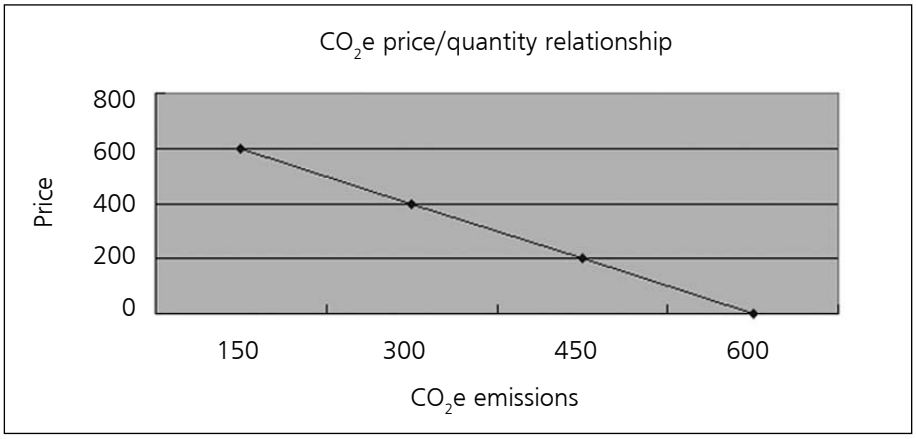
Both carbon trading and carbon taxes involve manipulating the price and quantity of carbon released into in the atmosphere from human activity. Carbon trading involves fixing a quantity of emissions available to be made and then allowing the price of carbon to fluctuate. In contrast, a carbon tax involves setting a fixed price of carbon and allowing the quantity emitted to fluctuate.

The market is better at picking winners than politicians and bureaucrats.

The difference between the two approaches can be seen in Figure 1. The graph plots a hypothetical relationship between CO_2e (carbon dioxide or equivalent emissions) and the CO_2e price. When the price (y-axis) is zero, then emissions (x-axis) are 600 million tonnes of CO_2e. As the price increases, the amount of emissions decreases.

A carbon trading system would involve fixing the quantity of CO_2e to be emitted (for example, 450 million tonnes), and allowing the market to work out the price (in the example, $200 per tonne). A carbon tax would involve fixing the price of CO_2e (for example, $200 per tonne) and allowing the market to work out the quantity (in the example, 450 million tonnes).

Figure 1: CO_2e price/quantity relationship



In reality, the price–quantity relationship will not stay constant. If the demand for fossil fuel energy increased (through strong economic growth, for instance), the curve would move right. If the demand for fossil fuel energy decreased (e.g., through alternative energy becoming cheaper), the curve would move left. Under a trading system, these changes would lead to a fluctuation in the price. Under a tax system, these changes would lead to a fluctuation in the quantity of emissions.

Both systems create a price for carbon, which will artificially increase the price of fossil-fuel-intensive activities, such as transport and electricity generation. Both approaches will therefore have a negative effect on producers of fossil fuels (less demand) and energy consumers (higher prices). This consequence is true of both approaches and so does not help us to differentiate between the two alternatives.

Some economists—for instance, Warwick McKibbin and Peter Wilcoxen,[9] John Quiggin and Joshua Gans[10]—advocate the use of carbon trading. The supposed benefits of trading include having a fixed level of carbon emissions (and therefore fixed environmental impact), the subsidy

to recipients of carbon credits, and the difficulty in removing a carbon trading system because of entrenched special interest groups.

All of these factors, however, could also be seen as arguments against a carbon trading system. As with any fixed quota, fixed carbon emissions are less efficient than a tax, because quotas do not allow production decisions to adjust to changing circumstances, and fluctuating carbon prices would create uncertainty. This is directly analogous to the situation in trade theory where tariffs are preferred to quotas because they are more efficient. As McKibbin and Wilcoxen (advocates for carbon trading) admit, 'from an economic perspective, a carbon tax would be an ideal instrument for addressing climate change. It would be efficient given the uncertainties surrounding climate change, and it would definitely work,' while a carbon trading system 'would be inefficient.' As environmental economist Jack Pezzey notes, a tax 'is still a highly cost-effective measure, better in most economists' view than emissions trading because it keeps the carbon price stable.'[11] Despite Prime Minister Howard's comments that a carbon tax is crude, inefficient and pays no regard to market forces,[12] it is actually more flexible, efficient and responsive to the market than a carbon trading system, because changed circumstances can result in changed use of resources.

With a carbon tax, money flows from polluters to the government. In a carbon trading system, money flows from polluters to organisations who receive carbon credits. The allocation of carbon credits amounts to a subsidy for some producers, and while this would be popular among the recipients of the subsidy, it would likely to promote further inefficiencies by picking winners and creating perverse incentives (not least the incentive to pollute heavily in the base year to get more credits the year after).

McKibbin and Wilcoxen prefer a carbon trading system because it will create a special interest group (carbon-credit holders) who will lobby to make sure the system is maintained. Yet it is not likely, that a carbon tax would be repealed without a good reason, and the continued existence of the fuel tax shows that the government is not generally inclined to abolish unpopular environmental taxes. Further, it is possible in the future that we would legitimately want to abolish the carbon price, and so the political durability of the carbon trading system is potentially a strike against it.

Perhaps the strongest argument for a carbon tax over a carbon trading scheme is that the revenue raised from a carbon tax can be used to reduce or remove other taxes, and therefore to offset the economic costs of the carbon tax. With a modest carbon tax and appropriate offsets it is possible that a carbon tax might have no net negative economic effect. This is impossible under a carbon trading system where the payments of polluters are used as subsidies.

The strongest argument for a carbon tax … is that the revenue raised can be used to cut other taxes.

Other problems with the carbon trading system include significant compliance costs, including search costs, negotiating costs, approval costs, and insurance costs. There is also the possibility of State governments charging stamp duty on carbon credit trading, further reducing the efficiency of the trading system. Also, resources used in carbon trading are a net waste that could otherwise be used elsewhere in the economy. Quiggin and Gans also note that while a trading scheme can put a price on carbon, compared with tax it does so 'in a less transparent measure.'[13]

Carbon trading would also have higher administration costs, as a trading system is new and necessarily highly technical. The consistent renegotiation of carbon credits is likely to lead to continued rent-seeking behaviour, lobbying, and strategic behaviour in avoiding or manipulating the market. Some of these problems also exist with a carbon tax, but to a lesser degree. For example, we already have a tax bureaucracy, and, as the Productivity Commission (PC) notes, 'most countries find it easier and administratively less challenging to implement environmental taxes than emissions trading' and 'the administrative costs of an emissions tax are likely to be relatively low.'[14] In contrast, the PC suggests that 'emissions trading usually requires new institutions, such as a registry, mechanisms for trading and a body for monitoring and enforcement';[15] while Quiggin and Gans agree that 'some measure of independent regulation and review will be required.'[16] Alex Robson goes further, warning that 'enforcement costs, compliance costs and administrative costs

involved in this kind of wholesale regulation, and control over individuals and firms could be truly staggering.'[17]

Many of these costs of trading are already apparent in other trading systems, such as the EU carbon trading system (see Box 2) and the Australian taxi-licensing system. Taxi licences have been slow to adjust to changing conditions (resulting in poor and prohibitively expensive service), have created a wasteful artificial market in licences that benefits licence traders but not the government or the economy, involves administrative and compliance costs, and has been notoriously difficult to reform.

Box 2: The European Emissions Trading Scheme (EU ETS)

In 2004, the EU started the largest emissions-trading system in the world. After two years of operations, Michael Grubb and Karsten Neuhoff offered a summary of performance and highlighted a number of problems with the system.[18]

The EU ETS was found to have a highly volatile price that moved from under €10 per tonne of CO_2e (late 2004) to nearly €30 per tonne (mid 2005), €20 per tonne (late 2005), €30 per tonne (early 2006) and then a crash back to €10 per tonne (April 2006) before collapsing to €1 per tonne in 2007. Given the uncertainty about future political negotiations, the future price is even more uncertain. This uncertainty leads to delayed investment, and risk aversion leads to less incentive to invest. The potential economic costs have been discussed by William Nordhaus[19] and Robert J. Shapiro[20] among others.

Another problem identified with the scheme is over-allocation of permits for some polluters, which has led to substantial profits for some and to perverse incentives to retain inefficient operations. The authors highlight the fact that such allocations could be regarded as state aid. When new allocations are provided to new entrants, this amounts to an investment subsidy, and to picking winners. As these allocations are linked to the carbon-intensity of operations, they also encourage investment in carbon-intensive industry.

The constant need for re-negotiations and the complexity of the system has made the EU ETS highly political, and the nature of the re-negotiations is such that they may encourage polluters to set a high emission standard in 'base' years so that they receive a higher allocation of permits in future negotiations. This 'updating' problem means that carbon trading can lead to higher energy prices without offering any incentive for reform.

Despite including the word *trading* in the name, a carbon trading system is not the best market solution for creating a carbon price. Like the quotas and taxi licences previously cited, carbon trading is a costly, bureaucratic and inflexible approach. In contrast, a carbon tax is a relatively efficient and flexible alternative that allows market participants the maximum freedom to do business. Kenneth Green, Steven Hayward, and Kevin Hassett[21] of the American Enterprise Institute echo these arguments, saying that a revenue-neutral carbon tax is preferable to carbon trading because it is more effective and efficient, includes less corruption and rent-seeking, provides price stability, allows for other tax cuts, and has greater adjustability and lower administration costs. They point out that a carbon tax has broad support from across the political spectrum—Al Gore, the Earth Policy Institute, NASA scientist James Hansen, Harvard economist Gregory Mankiw, and the CEO of Duke Energy all endorse it, and they suggest that 'the irony is that there is a broad consensus in favour of a carbon tax everywhere except on Capitol Hill.'[22]

Carbon tax revenue[23]

The amount of revenue raised from a carbon tax depends on the tax rate and the base. New Zealand suggested NZ$15 per tonne CO_2e. Western Australia has suggested a tax of up to A$25 per tonne. In his report on the viability of nuclear power, Ziggy Switkowski suggested that a tax of A$15–$40 per tonne would be needed to make nuclear competitive with coal.[24] Sweden has a

tax of US$150 per tonne.[25] The Australian Department of the Environment and Water Resources (once the Department of the Environment, Sport and Territories) has previously looked at options ranging from a A$1 to $50 per tonne,[26] and Japan has considered options ranging from around US$10 to US$100 per tonne.[27] Some studies suggest a Pigouvian[28] rate should be between US$4 and US$25 per tonne,[29] or between US$3 and US$95 per tonne.[30] *The Stern Review* suggested a social cost of carbon of US$85,[31] and William Nordhaus suggested US$16.[32] The effective tax from the EU trading system has fluctuated between €1 and €30. This paper considers two examples: taxes of A$15 per tonne and A$30 per tonne.

Modelling done by McLennan Magasanik Associates suggests that a carbon price of A$30 per tonne of CO_2e would lead to an extra 1000MW of gas-fired energy and 2400MW of renewable energy by 2030 over the business-as-usual scenario.[33] In contrast, modelling by the Australian Coal Association suggests that until after 2030, most of the shift from a A$10–30 tax would be toward gas, not renewable energy.[34]

The total amount of greenhouse gases emitted in Australia is expected to be 603 million tonnes of CO_2e in 2008.[35] Much of this, however, comes from agriculture, industry and households, in such a way that it is administratively and politically difficult to tax. If a carbon tax were limited to the energy sector, then there would be 430 million tonnes of CO_2e to tax.[36]

Making the simplifying assumption that there will be no change in total energy use, a tax of $15 per tonne would raise about $6.5 billion, and a tax of $30 per tonne would raise about $13 billion. As explained below, this simplification should not affect the actual budget impact of a revenue-neutral carbon tax.

A $30 per tonne carbon tax could be used to replace the current fuel taxes with little or no economic cost.

Irrespective of the tax rate chosen, it would be preferable to introduce the tax in stages over time, to allow carbon-emitting firms and electricity consumers, who will both face higher prices, a greater capacity to adjust. A tax of $15 per tonne of CO_2e could be introduced in three increments of $5 per tonne, several years apart. This incremental approach would also give policy-makers time to assess the economic, social, and environmental impacts of marginal change.

In addition, it may be possible to link a carbon tax with the degree of AGW, as suggested by Canadian economist Ross McKitrick.[37] The 'McKitrick tax' would link the size of the tax to the warming in the tropical troposphere (up to 15 km altitude, between 20°N and 20°S). According to the International Panel on Climate Change (IPCC), warming in the tropical troposphere should be an early and strong signal of AGW. McKitrick suggests a tax at twenty cents for every hundredth of a degree celsius of warming in the tropical troposphere (about 0.25°C over the 1979–98 average) would require a $5 per tonne CO_2e tax. If greater warming became apparent, the tax rate would increase.

A similar approach could be used in Australia, where the tax increments could be dependent on observed warming and the carbon tax could be decreased or abolished if warming failed to occur.

Replacing the fuel tax

One way to think of a carbon tax in Australia is as an extension of our existing fuel and diesel taxes. The transport sector currently emits 94 million tonnes of CO_2e per year, and pays a high tax rate (petrol tax is 38.143 cents per litre, excluding GST), while the stationary energy sector emits 306 million tonnes of CO_2e and pays no environmental tax. A carbon tax could be seen as a replacement of the fuel tax, effectively reforming our environment tax to have a lower rate on a broader base. This could be seen as good tax policy irrespective of the environmental arguments.

In the 2007–08 Budget, the government estimated petrol tax revenue at $7.1 billion and diesel tax revenue at $6.4 billion.[38] Total fuel taxes are just over $14 billion.[39] One option is to replace the current fuel taxes with a $30 per tonne carbon tax that applies not only to transport but also to stationary energy (primarily electricity generation).

This would result in an effective reduction of 75% in the fuel levy, which would lead to a

reduction in petrol prices by about 30 cents per litre, and help to offset recent high petrol prices.

The direct economic impact of this change would be roughly neutral, as the price elasticity of demand[40] for petrol (-0.1 to -0.7)[41] is about the same as the price elasticity of demand for energy (-0.3 to -0.6).[42] That means that the net loss of welfare from the energy tax would be approximately equal to the net gain in welfare from the lower transport tax.[43] This also means that the earlier simplifying assumption of no behavioural change in energy use is broadly accurate, as the increased use of transport would offset the decreased use of electricity.

Not only would this approach be revenue-neutral and welfare-neutral, but it would also be broadly equity-neutral, as both the fuel tax and the carbon tax are flat taxes and everybody and every industry uses transport and electricity. While a carbon tax would be regressive (as poor people pay a higher percentage of their income on electricity), it is no more regressive than the fuel tax. While there will be some winners (heavy transport users) and losers (heavy energy users), for many people the higher electricity bill will be broadly offset by the lower transport bill.

A possible complaint against this reform is that it simply replaces one environmental tax with another and doesn't increase the total tax burden on CO_2e. At this point, it is important to stress that the goal of a carbon policy is *not* to decrease the use of energy, but to change the incentives to switch to less carbon-intensive energy (and especially away from 'dirty' coal) and this approach achieves this outcome in an efficient, budget-neutral, and equitable way.

With a $15 per tonne carbon tax, the government could lift the income-tax-free threshold to $10,000.

Reducing income tax

Another option is to introduce a carbon tax and then to use the proceeds to lower income tax. The most obvious, simple and equitable way to lower income tax is by increasing the tax-free threshold.

A $15 carbon tax would raise about $6.5 billion, which would allow the government to increase the tax-free threshold (TFT) to $10,000.[44] Alternatively, the government could abolish the 45% and 40% tax brackets so that the top marginal tax rate was 30%.

A $30 per tonne carbon tax, on the other hand, would raise about $13 billion, which would allow the government to increase the TFT to around $15,000. Alternatively, the government could abolish the 45% and 40% tax brackets, *and* reduce the 30% tax bracket to about 27%. Another option would be to increase the TFT to $10,000 and abolish the 45% and 40% tax brackets.

Unlike the first option (replacing the fuel tax), it is more difficult to assess the likely welfare consequences of a carbon tax/income tax offset. This is because the price elasticity of supply for labour is controversial and difficult to estimate with accuracy, and the welfare consequences of labour-market distortions extend beyond the immediate behavioural responses (for instance, unemployment and social security payments).

If the revenue from a carbon tax were used to increase the tax-free threshold, it would be roughly equity-neutral. But the benefits of increased tax thresholds would be reduced over time due to bracket creep (where economic growth and inflation push people into higher tax brackets). To ensure that the tax cut is sustained it would be necessary to include some sort of guarantee against this tax-by-stealth, perhaps through tax-bracket indexation, semi-regular reviews of the TFT level, or a legislated system of regular TFT increases.

In contrast, if the revenue from a carbon tax were used to eliminate some marginal tax rates, this would actually decrease the problem of bracket creep (because there would be fewer brackets), but it would make the tax system relatively more regressive. This is because the reform would replace a progressive tax (income tax) with a regressive tax (carbon). Given the offsetting benefits and costs of these two approaches, it might be preferable to use a mix of both.

As with the fuel-tax option, one possible objection to this approach is that a lower income tax might encourage people to spend more on energy. Once again, it is important to remember that the goal of government policy should not be to control or limit the use of energy, but to encourage the transfer to less carbon-intensive energy.

Conclusion

Climate change is an increasingly topical issue in Australian political debate. The United Nation's IPCC this year announced that they are now more than 90% certain[45] that humans are contributing to global warming through greenhouse gas emissions. Computer models project that the next century could see continued warming of 1.1°C to 6.4°C (most likely between 1.8°C and 4.0°C) and many people fear that the negative consequences from such a change could be significant.[46]

The debate is now turning to possible policy solutions to AGW. To justify any government action, it is necessary to show that the benefits of that action exceed the costs. The free market does not create a perfect system, but there is no point in supporting government intervention if the cure is worse than the disease. Government policy should only be supported if it clearly passes a cost-benefit analysis. This paper does not attempt to address the issue of whether the government should act or whether any government action on climate change produces a net benefit.[47]

Government policy should only be supported if it clearly passes a cost-benefit analysis.

Instead, this paper starts with the recognition that we live in a current political reality where the government (with bipartisan support) has been acting on climate change for the past ten years, and has stated its clear intention to take further action. In this environment it is prudent to ask which policy option will achieve the stated goal (reducing CO_2e) at the lowest cost.

All policy options (regulation, subsidies, carbon tax, carbon trading) are designed to reduce emissions by switching our energy production from carbon-intensive energy (primarily 'dirty' coal) to other energy sources. The most efficient way to do this is to introduce a price signal and allow the market to determine the best alternative. The government should not attempt to pick winners or to bias the market in favour of any alternative such as nuclear, wind, solar, 'clean' coal, or hot rocks, and funding for these industries should be removed. A price signal can be introduced either through a carbon tax or through carbon trading.

This paper argues that a carbon tax is relatively more efficient, simple and equitable than a carbon trading system. One of the significant advantages of a carbon tax is that the revenue raised can be used to reduce other taxes to minimize the impact on economic efficiency.

A carbon tax of $15 per tonne of CO_2e would raise about $6.5 billion, and this could be used to increase the income TFT to $10,000 or to drop the top marginal tax rate to 30%.

Alternatively, a carbon tax of $30 per tonne CO_2e would raise about $13 billion, and this could be used to increase the TFT to $10,000 *and* abolish the 45% and 40% tax brackets. Alternatively, the revenue could be used to increase the TFT to $15,000 *or* cut the top tax rate further, to 27%.

Another interesting alternative is to use a $30 per tonne CO_2e carbon tax to offset fully the current fuel taxes. This approach would be revenue-neutral, welfare-neutral and equity-neutral. It would result in a reduction of petrol prices by about 30 cents per litre, and the saving to the household transport budget could be used to offset the higher electricity bill.

This approach offers no increase in the total environment tax, but reforms the environmental tax to set it at a lower rate that applies to a broader base. As such, this policy can be seen simply as good tax policy, as well as providing an incentive to encourage Australia to start shifting away from our reliance on 'dirty' coal.

Endnotes

1 This paper does not take a position on the debate about whether the Australian government *should* do something about greenhouse gas emissions.

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[39] This excludes the Petroleum Resource Rent Tax (PRRT).

[40] The elasticity of demand measures the change in quantity demanded caused by a change in the price. A high elasticity (>1) means that a change in price will cause a large change in quantity demanded. A low elasticity (<1) means that a change in price will cause a small change in quantity demanded.

[41] Department of Transport and Regional Services, 'Petrol Demand Elasticities, Australia, 1958–81,' http://dynamic.dotars.gov.au/btre/tedb/pdf/table5B04.pdf.

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[43] The net loss of welfare (or deadweight loss of taxation) is caused by the changed behaviour of the taxed party. It is not caused by the loss of money to the individual, because that loss is exactly offset by the increased revenue to the government.

[44] All tax statistics in this section are from Malcolm Turnbull and Jeromey Temple, *Taxation Reform in Australia: Social Alternatives and Indicative Costings* (29 August 2005), http://www.malcolmturnbull.com.au/Pages/Downloads.aspx/15/30/Turnbull_Temple%20Tax%20Paper.pdf.

[45] Questions have been raised about the meaningfulness of these estimates in Sinclair Davidson and Alex Robson, 2007, 'Certainty Clouds the IPCC,' *IPA Review*, 59:1, 7–10.

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[47] In their submissions to the Prime Ministerial Task Group on Emissions Trading, both the Productivity Commission (PC) and Alex Robson point out that independent action by Australia (implementation of a carbon tax or carbon trading scheme) is likely to have little impact on global climate change, as Australia only contributes 1.4% of global emissions, and could cause significant harm given Australia's coal industry and cheap electricity. The PC points out that the best reason for taking early independent action is, assuming that we will eventually make an international commitment to reducing our carbon emissions, that it may smooth the transition to a low-emissions economy.

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