

Submission

to

The Climate Change Authority

on

**Special Review Second Draft Report
Australia's Climate Policy Options November 2015**

by

'The U3A Climate Conversation Group', Canberra

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The Climate Conversation Group is an informal grouping of citizens operating under the auspices of the University of the Third Age (U3A) Canberra and are concerned about the impact of climate change and the consequent ethical and moral responsibilities that fall on the current generation of decision makers. There is a particular concern about the impact of decisions on the future lives of young children who have no voice in today's decision-making. The Group seeks to explore the issues based on evidence and the moral dimensions and to provide a general citizen's perspective on these issues.

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EXECUTIVE SUMMARY

This submission is from a group of citizens concerned about energy security, climate change and the security of the environment for future generations. Based on our consideration of the strategic environment for policy development, our response is guided by the following principles:

1. Greater urgency is required in the mitigation of Australia's greenhouse gas (GHG) emissions to enable Australia to play its part in the implementation of the Paris agreement, both as a duty of care to its citizens and to minimise costs to the Australian economy and society over the longer term.
2. The purpose of Greenhouse Gas (GHG) Policy is to create an economy with low GHG emissions.
3. Australia must actively manage the transformation of its energy system with the aim of achieving a clean, secure and economic energy supply where there are transparent links between national targets and emissions measures for the different sectors of the economy.
4. The cost of implementing GHG Policy must be borne equitably across society and have regard to the rising cost of climate change impacts being increasingly borne by society.
5. The cost of impacts of climate change be recognised by placing a price on GHG emissions.

Consistent with these principles and in recognition of the growing impacts of climate change on the environment and society - the social cost of carbon we recommend:

Recommendation 1: In keeping with the spirit of the Paris Agreement, the Australian Government take enhanced action prior to 2020 and voluntarily cancel any units issued under the Kyoto Protocol that are valid for the second commitment period and adopt policies that will achieve a genuine 5% reduction of greenhouse gases below year 2000 levels by 2020.

Recommendation 2: An overarching principle for assessing an appropriate mix of measures to implement GHG policy in Australia should be '*Achievement of a Low Emissions Economy*'.

Recommendation 3: Mandatory carbon pricing is essential to drive the achievement of a low emissions economy.

We agree that the principles of cost effectiveness, environmental effectiveness and equity are appropriate but their application should have regard to the following:

Cost effectiveness can be achieved by:

- ensuring that money is invested in schemes that will provide measurable reductions in emissions at the lowest possible cost;
- taking action to reduce net emissions sooner rather than later, as it will be cheaper to prevent carbon dioxide levels rising progressively than to undertake a large scale, sudden intervention later.

Equity means fairness, which in this context means:

- the less well off should not be further disadvantaged in implementation of GHG policies.
- all sectors of the economy must be engaged in mitigating emissions by whatever means is appropriate to each sector with a transparent connection to national targets. This is required to maintain broad public and industry support and minimise rent seeking.

- inter-generational equity must be taken into account by taking early action to reduce energy usage and actually make measurable reductions in emissions to minimise impacts and costs on future generations.

Environmental effectiveness means that:

- policy measures must be evidence based and result in genuine measurable emissions reductions, primarily targeting direct emissions.

Our view is that mandatory carbon pricing is essential for Australia to have a credible GHG policy that drives the behaviour required to reduce Australian emissions over the longer term. The early introduction of such a scheme is essential to meet both 2030 targets and enable an ambition for higher targets consistent with the Paris Agreement.

We are averse to overly complex schemes that require significant administration and could be susceptible to abuse. From this perspective a fee and dividend approach is attractive because it is effective in one jurisdiction, straightforward, budget neutral and easily understood by the public, but we are not able to judge its applicability in the Australian context. We stress that the workings of any proposed scheme needs to be transparent to the public and that complexity and opportunities for gaming and rent seeking must be minimised.

It is our view that voluntary carbon pricing is more suited as a supporting mechanism sitting alongside a separate primary emissions reduction scheme(s) (mandatory pricing / regulation) and directed at particular issues such as carbon farming and emissions from waste dumps. In the absence of a revenue stream from carbon pricing, large-scale emissions reductions are unlikely to be achieved and be affordable to the public purse. Being funded from the budget, voluntary schemes are inequitable, as the polluter does not pay and significant emitters are not required to participate.

Renewable Energy Targets (RET) have been effective in reducing emissions from the electricity sector at limited cost to consumers as a whole. However their application must be accompanied by policies that address the business models for electricity supply and the impact on low-income consumers. The latter can bear increased residual costs (supply charges) from the installation of rooftop solar by others. RETs are important in supporting emerging technologies. An RET is unlikely to be required in the longer term if a realistic carbon price were to be introduced. The Australian experience has illustrated the importance of policy continuity if the confidence of the investment community is to be maintained.

Regulation is most effective where market mechanisms will not deliver the required outcome. It is particularly applicable in areas where society requires regulation to meet other goals such as safety, environmental values and market failure. Over time regulation can have a significant impact in improving energy efficiency and curtailing emissions in land use. Capital assets (e.g. buildings) once built offer only limited opportunities for curtailing energy consumption in their use unless the necessary features are incorporated in their design. In principle, it can be argued that with a mandatory carbon price, energy efficiency targets are not required. This assumes perfect operation of the market, but in actual fact market failures can still occur. For example, decreases in fuel prices may result in surges in the purchase of more powerful vehicles and up-front construction costs of buildings may result in behaviours contrary to long-term policy goals. Judicious application of Energy Efficiency Targets through regulation can be complementary to carbon pricing.

An essential part of GHG policy is to change the mindsets and behaviours of people in the market place ranging from consumers through to commercial market participants. It is extremely naïve to expect this to be achieved without clear public communication of the role and importance of economic instruments – witness the polarised debate over the Carbon Tax. Economic instruments need to be accompanied by broad education and a discussion with the community as to their ‘what, why, and how’ as well as the pros and cons for individuals and society in general. As an important part of the policy mix and supplementary to other policy actions that will have a more direct impact on reducing emissions, we see information programs educating the public both in how to meet emissions reduction targets and why it is important to do so.

Supportive research, development and demonstration policies are required to enable the transition to a low carbon economy. Australia has a small manufacturing base, thin capital and venture capital markets and is heavily dependent upon imported technology and equipment that limits the role of the Australian private sector in driving the necessary technological changes to achieve the transition. Because of its geography and the size and structure of the economy, Australia has particular requirements that demand a strategic approach to the technological issues necessary to achieve our national GHG targets. In these circumstances the national government has an important role in aiding the development and adoption of technologies to enable a transition to a low carbon economy.

A variety of measures will be required to achieve the necessary level of emission reductions across the economy. We are of the view that the core measure should be a mandatory price on carbon with supplementary measures including voluntary carbon pricing, regulation, information and innovation support tailored to the issues of particular sectors. A key requirement is that the process of decarbonisation be actively managed with necessary changes being made over time in the light of experience. This is a major strategic enterprise that will take some time to deliver. In light of the urgency to commence meaningful reductions, policies with shorter-term impacts such as a higher renewable energy target or regulation of emissions in the electricity-generating sector may be needed to gain momentum.

THE STRATEGIC CONTEXT

Thank you for the opportunity to comment on Australia's Climate Policy Options from the perspective of a group of citizens with concerns about energy security, climate change and the security of the environment for future generations. As a group of retired citizens, our future financial stability and welfare depends, to a large extent, on receiving decent returns from our retirement investments. Although already in our 'third age', projected life expectancy requires us to look at an investment time period of up to 40 years. Given the prospects of major disruption to investments in fossil fuels well within this time period, we believe it is essential for the government and financial institutions to take a strong lead in ensuring an orderly transition. This can only be done if governments are prepared to look squarely at this problem, accept its urgency and be prepared to act in the broader interests of the community. We believe the lobbying power of the fossil fuel industry has detracted from the government's ability to assess the changes required objectively and greater balance needs to be added into the debate. This section develops some guiding principles for our responses to the specific questions in the Discussion Paper.

Climate-change is a global issue and can only be addressed by a global response where each nation plays its part. The recent Draft decision -/CP.21 (Adoption of the Paris Agreement) by the *United Nations Framework Convention on Climate Change* emphasises *“with serious concern the urgent need to address the significant gap between the aggregate effect of Parties’ mitigation pledges in terms of global annual emissions of greenhouse gases by 2020 and aggregate emission pathways consistent with holding the increase in the global average temperature to well below 2 °C above pre- industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above pre- industrial levels”*.

The Draft decision also stresses: *“the urgency of accelerating the implementation of the Convention and its Kyoto Protocol in order to enhance pre-2020 ambition”* and *“the enduring benefits of ambitious and early action, including major reductions in the cost of future mitigation and adaptation efforts”*.¹

This highlights the urgency for the government to adopt effective policies that will firmly place Australia on an emissions pathway to do its fair share in limiting the rise in global temperatures to no more than 2 °C. With climate change impacts increasing and as the largest emitter per capita in the OECD with its total emissions rising again,² Australia has an ethical obligation to act. It is imperative that Australia adopts further mitigation measures as a matter of urgency in 2016 and not wait until after a review in 2017-18. It is for this reason that between now and 2020 that we would expect to see policy changes which will result in a *real* 5% reduction below 2000 levels in Australia's GHG emissions as an absolute minimum. We do not consider the use of 128 Mt of Kyoto carryover units to meet Australia's 2020 target as being in the spirit of achieving genuine emissions reductions.

Understanding the risk of dangerous climate change is critical.³ The correlation between expected temperature rise and atmospheric carbon dioxide levels is imprecise. The internationally accepted 2 degree/450 parts per million scenario is shorthand for the following: *‘at 450 parts per million of*

1 UNFCCC Adoption of the Paris Agreement. Proposal by the President, FCCC/CP/2015 L.9 Rev.1 12 December 2015, P2

2 Australian Government, Department of the Environment; Quarterly Update of Australia's National Greenhouse Gas Inventory: June 2015; December 2015, Table 2, P6

3 Wagner, G and Weitzmann, M.L. Climate Shock: the economic consequences of a hotter planet. 2015 p66.

carbon dioxide in the atmosphere, there will be a 66 per cent (2 in 3) chance of the temperature rising between 0.9 and 2.3°C over pre-industrial levels'.⁴ This also means there is around a 34 percent (1 in 3) chance the temperature will be outside this range. Because the temperature increase is already at around 1°C, all the risk is on the upside³. As the concentration of carbon dioxide in the atmosphere rises the chance of an extreme outcome, such as 6°C, rises faster than the median and the social costs become incalculable as the risks increasingly become existential.³ This is why 450 parts per million is really a maximum limit and ideally should be less.

If the risk of not doing anything, or not enough, means that the probability of catastrophic impacts increase unacceptably then spending to reduce GHG emissions today (insurance) to mitigate the risk is warranted. The difference between climate change mitigation and regular insurance is that we now know that unless the world weans itself off fossil fuels, dangerous climate change is guaranteed to affect the whole planet. The uncertainty lies in knowing only the approximate temperature rise we can expect from a given level of carbon dioxide in the atmosphere and the approximate nature and timing of the impacts. Are we prepared to take this risk? Only governments are in the position to manage this risk and Australian society looks to government to put in place the policies to do so. Indeed, governments have such a duty of care to their citizens.

For a government that is rightly concerned about finances, it will be much more economic to take effective action early than wait and reduce emissions post-2020 – reinforcing the need for urgency.

Guiding Principle 1: Greater urgency is required in the mitigation of Australia's GHG emissions to enable Australia to play its part in the implementation of the Paris Agreement, both as a duty of care to its citizens and to minimise costs to the Australian economy and society over the longer term.

The government has announced Australia will reduce its emissions by 26-28 percent relative to 2005 levels by 2030, but if the temperature targets in the Paris Agreement are to be met it will be incumbent on Australia to increase its target substantially beyond this if it is to do its fair share. Given the scale of the changes required in the longer term, it is essential that policies to reduce greenhouse emissions address all sources in the Australian economy and be seen to do so.

Much attention is paid in the Discussion Paper to the need to maintain competitive neutrality across the economy, but the paper does not acknowledge that the purpose of GHG policy is to change the economy from one with high to one with low GHG emissions. This is hardly competitively neutral to the present fossil fuel industry. Consistent with our targets and the Paris Agreement we need to acknowledge this and state that the goal of policy is to drive a change in the economy from one with high GHG emissions to one with low GHG emissions.

Guiding Principle 2: The purpose of GHG policy is to create an economy with low GHG emissions.

The government's current "Direct Action" policy alone is insufficient to achieve the required emissions reductions. As recent government data show, in the twelve months to June 2015 Australia's emissions have once again started to rise with a 1.3% increase in annual emissions, including a 3% increase in emissions in the electricity sector.² We see Direct Action as being a supporting mechanism to other policy options that will guarantee genuine emissions reductions. Also the legislated safeguards mechanism which is due to come into effect in 2016 is inadequate to the degree that large emitters, particularly brown coal-fired power stations, could significantly

4 IPCC Fourth Assessment Report Climate Change 2007 – The Physical Science Basis

increase emissions. It is our view that there must be a mechanism to cap and control emissions. At present, this is not being done.

Notwithstanding that fossil fuel usage at some level will be with us for many years, all the evidence indicates that material efforts to de-carbonise energy supply must be an essential requirement of energy policy in the next decade. The International Energy Agency⁵ has stated: *'In the face of rapidly growing demand and the increasingly urgent threat of climate change, we are continuing to respond to the energy system as it evolves rather than actively managing its transformation towards the aim of achieving a clean, secure and economic energy supply. A radical change of course is long overdue'*.

The economic consequences for our economy are profound. Failure to include constraints on GHG emissions as a key shaper of energy policy represents a strategic and economic risk. Australia has the greatest exposure to fossil fuels of all OECD countries, both in terms of domestic use and exports. To prevent global temperatures rising past the accepted scenario of 2°C/450 parts per million, the world only has a fixed carbon budget of a further 1200 billion tonnes of carbon dioxide that can be emitted into the global atmosphere by 2050⁶. This fixed carbon budget requires a very significant portion of identified fossil fuel reserves to stay in the ground. These then become stranded assets, which is a financial term that describes something that has become obsolete or nonperforming well ahead of its useful life, in this case because of GHG considerations.⁷ This is a particular issue for Australian coal and this topic is increasingly being discussed in financial markets with impact for valuation of companies and funding of projects⁷. This begs the question as to whether special consideration needs to be given to energy-dependent trade-exposed industries, where the market is already moving against them and only the cheapest sources of supply have a future during the transition.

Unless Carbon Capture and Storage (CCS) proves to be a viable option, two thirds of known global fossil fuel reserves must remain unused⁷ and a large proportion of fossil fuel assets will have to be written off. Any further investment in exploration and development of fossil fuels will be essentially wasted expenditure. Already coal demand in the US has reduced⁸ and importers such as China⁹ and India¹⁰ are moving to focus on renewable sources, nuclear energy, gas and their own coal resource endowment as they seek to overcome both energy poverty and pollution. In the transition to low carbon energy, prices for fossil fuels are likely to remain low where supply exceeds demand. In these circumstances, only the lowest cost producers will survive. Investments in fossil fuel companies will underperform in financial markets. However, coking coal accounts for some two thirds of Australia's coal exports by value and will continue to be in widespread demand for smelting of metal ores for which there is no alternative technology.

Government will have to set policies to manage a complete overhaul of our energy systems. Essentially the abatement pathway is a progressive shift to a low-carbon electricity system that diffuses into all industry sectors including transport⁵. At the same time energy efficiency is maximized in all facets of energy use⁵.

5 International Energy Agency 2014, Tracking Clean Energy Progress 2014

http://www.iea.org/publications/freepublications/publication/Tracking_clean_energy_progress_2014.pdf

6 IPCC Fifth Assessment Report Climate Change 2014 - Synthesis Report.

7 Carbon Tracker, <http://www.carbontracker.org/library/#stranded-assets>

8 US Energy Information Administration, <http://www.eia.gov/todayinenergy/detail.cfm?id=24472> Jan. 8 2016

9 Australian Mining, 2015, <http://www.australianmining.com.au/news/china-to-cut-coal-consumption>

10 Australian Mining, 2015, <http://www.australianmining.com.au/news/india-s-coal-imports-expected-to-continue-decline>

Policies need to provide predictable and reliable markets and regulations for private sector investments. For example, new technologies affect the way the electricity markets operate. This requires new business models to allow integration of centralized and distributed generation systems based on renewable sources and electricity storage systems. The necessary long-term and large-scale investments in the electricity sector will only occur with supportive government policies.

Similarly, policies will need to be adopted to drive energy efficiency and promote widespread application of the best available technologies. In the transport sector, emission and efficiency standards can promote uptake of energy efficient models and curtail fuel demand. Support for research, development and demonstration in the Australian context is required for the introduction of new technologies such as smart grids and advanced biofuels – the dramatic decline of cost in photovoltaics only occurred because of continued support for research and demonstration in countries like Germany.

Clearly, Energy Policy and GHG Policy are two sides of the same coin. We are strongly of the view that these policies need to be integrated to optimise both GHG reductions and the provision of energy services to the Australian community.

Guiding Principle 3: Australia must actively manage the transformation of its energy system with the aim of achieving a clean, secure and economic energy supply where there are transparent links between national targets and emissions measures for the different sectors of the economy.

In decarbonising the economy it is axiomatic that the lowest cost options should be preferred, but this begs the question as to whether this is the lowest cost to business, to government or to society at large. Our view is that it is society at large that should be the focus. After all, it bears the brunt of the rising impacts of climate change.

US studies¹¹ have placed the social and environmental damage of carbon emissions released in 2015 at about A\$57 per tonne (US\$40 per US ton) of carbon dioxide released. Australia's annual emissions of 550 million tonnes translate to \$31 billion of environmental and social damage annually, whilst that from total global emissions in 2015 is about \$2,240 billion. As time passes, each year's emissions will cause increasing damage because the impact is cumulative. Based on our land area being 5.6 percent of the global total, the annual environmental and social damage in Australia from Australian emissions is estimated at \$1.7 billion whilst that from total global emissions in Australia is \$125 billion.

These calculations are indicative only, but illustrate an important point. The feedback of environmental and social damage from Australian emissions to Australia is not insignificant and the impact of total global emissions on Australia is very significant. Clearly, in setting the parameters for greenhouse and energy policy it is not enough only to consider the costs to the economy and government. The rapidly rising costs of the impacts of climate change that affect society at large must be factored in. These considerations make urgent action imperative.

The case of fuel tax concessions illustrates the need for integration of GHG, energy and industry policies. In Australia each year, about 50 billion litres of diesel are subject to a fuel tax credit for almost \$7 billion of government revenue foregone¹². On combustion, this diesel produces around 50 million tonnes of carbon dioxide emissions. Thus, nearly 10 percent of Australia's emissions

11 Wagner, G and Weitzmann, M.L. Climate Shock: the economic consequences of a hotter planet. 2015 p23.

12 Environment Victoria <http://environmentvictoria.org.au/fossilfuelsubsidies>

have an implicit government underwriting of around \$140 per tonne of carbon dioxide. Other support for fossil fuel consumption has similar consequences.

In effect, public funds are being used both to enable and reduce carbon emissions through the Fuel Tax Credit and the direct action policy respectively! This raises serious issues of equity across society as to where the benefits of public expenditure or revenue foregone flow. It reinforces the need for transparency to the public and policies that address carbon emissions across the economy and not just selected areas.

Economic theory suggests that to level the playing field between energy sources, taxes should be placed on emissions at least equal to the damage caused.¹¹ Currently this is A\$57 per tonne and far more than the repealed carbon tax. Until now, climate change has been treated as an externality to the day-to-day operation of the economy. The threat posed by climate change means now that the cost of mitigating carbon dioxide emissions must be absorbed into the economy as a whole. Indeed a case can be made that energy policy should be contingent on meeting climate change objectives, particularly when the implications of managing climate change to acceptable levels of risk are considered. This is why we believe a price on carbon is so important and indeed is essential to achieve the necessary mitigation outcomes.

Guiding Principle 4: The cost of implementing GHG policy must be borne equitably across society and have regard to the rising cost of climate change impacts being borne increasingly by society.

Guiding Principle 5: The cost of impacts of climate change be recognised by placing a price on GHG emissions.

CHAPTER 1 – INTRODUCTION AND CONTEXT

We agree that emissions reduction targets and policies that allow Australia to play its part in the international response should be viewed as a prudent risk management strategy. As we see it, governments have a duty of care to act in the best interest of their citizens and this includes acting to protect its citizens, as much as possible, from the adverse effects of climate change. Australia is particularly vulnerable to the effects of climate change. While Australia has set targets for 2020 and 2030, these are extremely modest compared to some other international efforts. Setting policy to achieve genuine emissions reductions within Australia's "fair share" of the global carbon budget must be a priority, if the average global temperature rise is to be restricted to 2 °C. From this perspective, we broadly support the Climate Change Authority's earlier recommendation of a national carbon budget of 10.1 Gt from 2013-2050 and an emissions trajectory range of 40-60% below 2000 levels by 2030.¹³

The Terms of Reference for the Special Review requested by the Minister for the Environment include recommending in its final report what action Australia should take to implement the outcomes of the Paris conference.

We note that the Paris Conference encourages enhanced action prior to 2020 including:

- enhanced ambition in the pre-2020 period in order to ensure the highest possible mitigation

¹³ Australian Government Climate Change Authority; Reducing Australia's Greenhouse Gas Emissions - Targets and Progress Review Final Report, February 2014; P9

efforts under the Convention;¹⁴

- promoting the voluntary cancellation by Party and non-Party stakeholders, without double counting of units issued under the Kyoto Protocol, including certified emission reductions that are valid for the second commitment period.¹⁵

Accordingly, there is scope for the government follow the lead of Britain, Germany, Denmark, Sweden and the Netherlands in cancelling Kyoto carryover units and ensuring that Australia achieves at least a genuine 5% reduction in emissions compared to 2000 levels by 2020.

Recommendation 1: In keeping with the spirit of the Paris Agreement, the Australian Government take enhanced action prior to 2020 and voluntarily cancel any units issued under the Kyoto Protocol that are valid for the second commitment period and adopt policies that will achieve a genuine 5% reduction of greenhouse gases below year 2000 levels by 2020.

The terms of reference for the Special Review require the Authority to consider whether Australia should introduce an emissions trading scheme (ETS) and to consider the effects of an ETS on the international competitiveness of Australian businesses. It is our view that the current Direct Action policy alone will be insufficient to meet government's 2030 target and that some form of mandatory pricing on carbon emissions will be essential to achieve the government's goals. We will address this in more detail later in this submission.

CHAPTER 2 – PRINCIPLES FOR ASSESSING POLICIES

Q.1. The Authority proposed assessing policies on their cost-effectiveness, environmental effectiveness and equity. Are these principles appropriate? Are there any other principles that should be applied, and if so why?

There is one important overarching principle that we believe should be included that is particularly relevant to the selection of policy options and that relates to the purpose of policy. In trying to maintain competitive neutrality across the economy it is important to recognise that this has to be consistent with the objective reducing greenhouse gas (GHG) emissions and that this will affect the fossil fuel sector of economy to a greater extent than any other sector. This principle will direct policy options required to achieve this outcome in the longer term.

Recommendation 2: An overarching principle for assessing an appropriate mix of measures to implement GHG policy in Australia should be ‘Achievement of a Low Emissions Economy’

We agree that the principles of cost effectiveness, environmental effectiveness and equity – particularly intergenerational equity – are appropriate but their application should have regard to the following:

Cost effectiveness can be achieved by:

- ensuring that money is invested in schemes that will provide measurable reductions in emissions at the lowest possible cost;
- taking action to reduce net emissions sooner rather than later, as it will be cheaper to

14 UNFCCC Adoption of the Paris Agreement. Proposal by the President, FCCC/CP/2015 L.9 Rev.1 12 December 2015, Para 106, P15

15 UNFCCC Adoption of the Paris Agreement. Proposal by the President, FCCC/CP/2015 L.9 Rev.1 12 December 2015, Para 107, P15

prevent carbon dioxide levels rising progressively than to undertake a large scale, sudden intervention later.

- it presents the opportunity of saving some of the costs of the impact of climate change both to Australia and more broadly, notwithstanding this will be some time in the future.
- it also contributes to mitigating the risk of dangerous climate change stemming from the uncertainty in the relation between carbon dioxide concentrations in the atmosphere and temperature increase (see Strategic Context above).

Equity means fairness which in this context means:

- the less well off should not be further disadvantaged in order to achieve policies.
 - this can be achieved, when necessary, through targeted compensation measures or by introducing schemes that are budget neutral.
- all sectors of the economy must be engaged in mitigating emissions by whatever means is appropriate to each sector with a transparent connection to national targets. This is required to maintain broad public and industry support and minimise rent seeking.
 - the goal of policy should be competitive neutrality that minimises GHG emissions consistent with our national targets.
- inter-generational equity must be taken into account by taking early action to reduce energy usage and actually make measurable reductions in emissions to minimise impacts and costs on future generations.

Environmental effectiveness means that :

- policy measures must result in genuine measurable emissions reductions, primarily targeting direct emissions rather than through secondary abatement measures;
 - while emissions reduction through changes in land-use are useful, direct reductions in emissions and transition to renewable forms of energy are required to meet current and future target costs effectively and equitably.

CHAPTER 3 – POLICY OPTIONS

Mandatory Carbon Pricing

Q.2. *What lessons can be learned from Australia and overseas on the effectiveness of mandatory carbon pricing, and its interaction with other climate policies.*

There is evidence that the introduction of a Carbon Tax in Australia did have a positive effect in reducing emissions. During the two years that the Carbon Tax was in effect in Australia, demand for electricity fell by 3.8% and total emissions in the electricity sector fell by 8.2%.¹⁶ Analysis of the latest 'unadjusted' quarterly emissions from the National Greenhouse Inventory shows that during years 2012-13 and 2013-14 emissions in the electricity sector fell by 9.4% and overall emissions fell by 2.8%.¹⁷ By contrast, in the 12 months to June 2015 emission in the electricity sector rose by 3% and overall emission rose by 1.3%.¹⁸ We would not want to see this trend

16 Jotzo, F and O'Gormann, M. Impact of carbon pricing on Australia's electricity demand, supply and emissions. ANU Centre for Climate Economic & Policy, CEEP Working Paper 1411, 17 July 2014.

17 Department of the Environment; Quarterly Update of Australia's National Greenhouse Gas Inventory, June 2015; Data Table, 1a, P26

18 Department of the Environment; Quarterly Update of Australia's National Greenhouse Gas Inventory, June 2015; Data Table, 2, P6

continue over the next 12 months.

Overseas, a review of the state of climate change policy in Canada¹⁹ stated:

“the effectiveness of [climate change] measures is heavily influenced by the choice of mandatory versus voluntary approaches. Generally speaking, mandatory measures provide more certainty that a given amount of emission reductions will be achieved because of the regulatory burden imposed. This burden certainly exists in a cap-and-trade system where the emissions limit is established but the price of compliance is unknown. In contrast, a mandatory carbon tax provides price certainty but the level of emissions reductions that will occur is uncertain. The forthcoming federal coal-fired power station regulations and Quebec’s cap-and-trade system are examples of mandatory measures that will provide a more predictable amount of GHG reductions.”

Q.3. How does the mandatory carbon pricing perform against the principles of cost effectiveness, environmental effectiveness and equity? What type of pricing scheme is likely to be more effective and why?

Cost Effectiveness:

According to many economists, including Nicholas Stern and Ross Garnaut, direct pricing of carbon is the most effective method of reducing carbon emissions (see also Strategic Context above). A direct price on carbon places the burden for the environmental damage back on those who create it - the emitters – and who are in a position to do something about it at source. They can reduce emissions or continue “polluting” and pay for it. Economic theory¹¹ suggests the carbon price should reflect the true external costs of fossil fuels that the public has to pay for through damage in the environment (droughts, floods, etc) and health care costs arising from consequences such as heat waves or environmental pollution – the Social Cost of Carbon.

In practice and consistent with the principle of Cost Effectiveness, the carbon price should reflect what is necessary to change behaviour and achieve the national emission reduction targets. There is a link between emission targets and carbon price. As targets increase there will be a need for a higher carbon price to provide the necessary signals to achieve the more difficult emission reductions. This price might then be expected to approach the Social Cost of Carbon. The price on carbon emissions levels the playing field between emitting energy sources and greener energy sources with lower or no emissions (e.g. solar and wind) and/or by removing the carbon dioxide emission at source. It provides a driver for the change from current fossil fuel technologies to greener technologies by explicitly pricing the climate change externality.

Government concessions for fossil fuel use such as the Fuel Tax Credit run counter to the effectiveness of carbon pricing in reducing emissions (see Strategic Context). The Fuel Tax Credit on diesel is an ‘excise concession’ for use of diesel which affects around 10 percent of Australia’s GHG emissions and was granted before climate change was recognised as an issue. It now could be considered as a negative carbon tax. Serious consideration needs to be given as to whether this concession is warranted given that it acts against seeking alternative sources of energy use. This is an area that may warrant Direct Action measures and Research and Development and Demonstration e.g. advanced biofuels or liquefied natural gas (LNG).

Environmental Effectiveness:

¹⁹ Reality check: the state of climate progress in Canada; National Round Table on the Environment and the Economy (Canada); Ottawa; 2012.

Mandatory pricing schemes are environmentally effective because they drive changes in behaviour leading to a real reduction in GHG emissions as evidenced by the Australian Carbon Tax noted above, but the level of emissions that can be achieved have to be estimated by modelling and monitored against national targets. The price would have to be reviewed periodically and adjusted to achieve the desired targets. These schemes may have application in the earlier stages of emissions reduction but in the longer term it will be essential to know what emissions reductions can be achieved as the targets become more stringent.

Equity:

While mandatory pricing carbon schemes are effective from both a cost and environmental point of view, passed-on costs can cause hardship for lower socio-economic groups unless some form of compensation is introduced. In 2012-13 when the Australian Carbon Tax was brought in, such compensation was introduced in acknowledgement of these increased costs. Much of the compensation remains in place.

A remaining question regarding a carbon tax is whether, by the way it is implemented, it targets parts of the economy that have limited response options – particularly in the small business sector. For example, in agriculture a tax on fuel may simply raise costs because there are few options for reducing fuel consumption in farm operations. Compensation might have to be applied in such cases or special measures introduced such as a biofuel initiative.

Pricing Options:

Carbon Tax:

The price on carbon is set to reflect the amount of emissions reduction that can be expected against a national target. Other advantages are its flexibility as the rate of the tax can be varied according to the need for emissions reduction.

The Australian Carbon Tax was introduced with a fixed price of \$23 per tonne and would have transitioned to an emissions trading scheme. While there is evidence that this scheme worked and drove down emissions, there has been debate about the actual cost of the scheme. Some parliamentarians have asserted that the true cost was \$1300 a tonne for the emissions reduced.²⁰ This figure appears to have been derived by dividing the revenue received – a so-called “\$A15.4 billion slug on the economy” – by the ~12 Mt reduction in emissions. This is an incorrect calculation. The carbon tax was a tax on emissions – not a tax on emissions reduced. Furthermore, the revenue collected from the tax is not a cost – it can be used for other economic purposes, including additional mitigation against climate change, reducing taxes, infrastructure or reducing debt. This debate reinforces the need to focus on the benefits to society at large and not just a subset of society.

As we see it the advantages of a Carbon Tax are:

- the evidence shows that it worked, even over the short period that it operated in Australia, but the full impacts lay in the future;
- there is certainty over the carbon price for industry between periodic reviews;
- it can be adjusted to reduce emissions and be scaled to meet any future increase in ambition;
- it is simpler, easier and quicker to implement than other systems;
- it is more transparent than other systems and cannot be rorted.

²⁰ Harris, Michael. The Conversation. 28 June 2015. <https://theconversation.com/the-carbon-tax-wasnt-a-slug-to-the-economy-and-direct-action-may-be-a-waste-of-money-43839>

The downsides / disadvantages of a carbon tax are:

- political apprehension and public concern over new taxes flowing to consolidated revenue, particularly where there is a lack of transparency to the public about how the revenue is to be deployed. This was reflected in the lack of bipartisan commitment to the Australian Carbon Tax and the constant possibility of repeal signalled uncertainty and probably delayed a response from industry;
- the extent of emissions reduction can be controlled up to a point by regulating price, but inevitably it becomes harder and harder to achieve the required reductions and may become insensitive to the level of tax with consequent price rises;
- the price for business applies to all emissions, regardless of capacity to reduce emissions;
- it can be inequitable for low income families (unless compensation is applied, as was the case for Australia's Carbon Tax) and some businesses – options to handle this are available as part of a broader mitigation package – with benefits accruing to those businesses with the most flexibility to mitigate emissions.

Fee and Dividend (A form of Carbon Tax):

While a carbon tax can be set at any level and the revenue used as the government chooses, an alternative could be a 'fee and dividend' system similar to that employed in British Columbia and designed to be essentially a budget-neutral form of carbon pricing. It differs from a tax flowing to consolidated revenue in that the revenue is hypothecated and returned to households as periodic payments independent of the tax system.

As we see it, the advantages of fee and dividend pricing are:

- while a fee can be construed as a levy or a tax, the fact that all is returned to the public and does not flow into consolidated revenue places it in a different category;
- the fee charged puts a price on carbon and therefore drives behaviour to reduce emissions;
- the "dividend" accrues equally to members of the public and is independent of energy consumption, thus preserving the conservation. This helps offset the increase cost of goods and services;
- the less well-off receive enhanced protection compared with higher income earners because they spend a higher proportion of their income on energy services;
- it is politically savvy and avoids the claims of "A great big tax" or "A New Tax";
- it is relatively simple to administer;
- it has the potential to bring down carbon emissions quickly if the fee is increased annually;
- it can be scaled to meet any required increase in ambition.

The effectiveness of a fee and dividend price on GHG emissions in the province of British Columbia (BC) in Canada since 1 July 2008, as reported by Elgie & May²¹ is instructive:

- *BC's fuel consumption fell by 17.4% per capita (and by 18.8% relative to the rest of Canada);*

21 BC's Carbon Tax Shift After Five Years: Results Elgie & McClay 2013

<https://www.skepticalscience.com/co2-limits-economy.htm>

- *BC's GDP kept pace with the rest of Canada over the same time period;*
- *the tax shift has enabled BC to have Canada's lowest income tax rates (as of 2012);*
- *the tax shift has benefited taxpayers: cuts to income and other taxes have exceeded carbon tax revenues by \$500 million over the period 2008-2012*

A separate report²² by the British Columbia's Department of Finance stated that: “*B.C. now has the lowest income tax rates in Canada for individuals earning up to \$122,000. The general corporate income tax rate in B.C. is among the lowest in North America and the G7 nations, and since 2001, B.C.'s small business income tax rate has been reduced by 44 percent.*”

Accordingly, for a government keen on reducing income and company taxes, we see advantages in utilising a ‘fee and dividend’ approach.

The disadvantages of a ‘fee and dividend system are:

- the quantum of emissions reduction is not guaranteed, but can be influenced by increasing the price over time;
- the price for business applies to all emissions, regardless of capacity to reduce emissions;

Cap and Trade Emissions Trading Scheme (ETS):

A benefit of a cap and trade ETS is that a controlled cap can be set on emissions and this helps ensure that the required emissions reduction across the economy can be guaranteed. However, compared to a carbon tax it creates a “right to pollute” and the market – not the government – determines the price of such rights. Businesses have the flexibility to decide whether they will reduce their emissions and sell their emissions reductions on the market or purchase carbon credits from the market so that they can continue to emit. Many economists believe that a cap and trade ETS is the most cost effective method of reducing emissions.

As we see it the advantages of a Cap and Trade ETS are:

- the cap can be progressively changed to meet national emission reduction targets;
- more certainty over the amount of emissions reduction;
- greater flexibility for businesses;
- politically feasible.

The disadvantages of a Cap and Trade ETS are:

- there is less certainty about price of emissions (demand for emissions allowances fluctuates) and at times the price can drop so low as to be ineffective;
- it is complex to establish – the issue of too many permits can affect the performance of the system;
- it has higher administration costs;
- it can be susceptible to gaming and fraud through the financial system and particularly through establishment of schemes internationally for carbon offsets which fail to deliver.

Baseline and Credit ETS:

Baseline and credit schemes use a combination of penalties and subsidies making low-emissions activities cheaper and high-emissions activities more expensive.

Advantages

22 <http://www.fin.gov.bc.ca/tbs/tp/climate/A2.htm>

- Target is expressed in units of intensity per unit of production;
- Emitters only pay for emissions above the baseline, not for all emissions;
- Cheaper for emitters;
- Could be run by industry rather than government;
- The government's Direct Action Scheme could have its baseline adjusted to transition to a Baseline and Credit Scheme;
- Baseline can be tightened over time to transition to a Cap and Trade system and could be scaled to meet any required increase in ambition.

Disadvantages

- No fixed limit on emissions;
- Generally not as successful as Cap & Trade Schemes in achieving desired environmental benefits;
- Uncertainties in setting baselines – getting the baseline correct can be difficult as it requires detailed knowledge of specific industries;
- System can be subject to 'gaming' or 'rorting'.

Summary of Position on Mandatory Carbon Pricing

Our view is that mandatory carbon pricing is essential for Australia to have a credible GHG policy that drives the behaviour required to reduce the main sources of Australian emissions over the longer term. The early introduction of such a scheme is essential to meet both 2030 targets and enable an ambition for higher targets consistent with the Paris Agreement. We are averse to overly complex schemes that require significant administration and could be susceptible to abuse. From this perspective a Fee and Dividend System may be attractive because it is effective in British Columbia, straightforward, budget neutral and easily understood by the public, but we are not able to judge its applicability in the Australian context. We do emphasise that in any scheme that is introduced there is a need for transparency to the public in the way the scheme works and that complexity and opportunities for gaming and rent seeking be minimised.

Recommendation 3: Mandatory carbon pricing be adopted to drive the achievement of a low emissions economy.

Voluntary Carbon Pricing

Q.4. What lessons can be learned from Australia and overseas on the effectiveness of voluntary carbon pricing and its interaction with other climate policies?

By definition, voluntary carbon pricing is not mandatory and therefore large emitters are free not to participate. The government's Direct Action Policy is a voluntary carbon pricing scheme and it is noteworthy that, to date, no large emitters have been successful bidders at either of the two reverse auctions conducted under the Emissions Reduction Fund (ERF) Scheme. Following the second auction in November, the Minister for the Environment stated *“The results today are further proof that we have one of the most effective systems in the world for significantly reducing emissions.”* However, the fact that the government had a successful auction is not proof that the ERF scheme is effective. As for all schemes, only time will tell whether the identified emissions will be delivered. The government has announced that it has already purchased 92 Mt of abatement under the scheme and if the current pricing is maintained the ERF may be able to purchase up to ~100 Mt of abatement which will take a decade to deliver. In the meantime, since repeal of the carbon tax, Australia's emissions have risen.

The ERF may not be as effective as hoped for because:

- in some cases the government may have paid for emissions reductions that would have taken place anyway;
- the amount of abatement purchased in the Landcare sector will be extremely difficult to quantify. For example, how does one quantify or guarantee 7 Mt of “bushfire abatement” when no one could be sure whether or not a bushfire might take place in the abatement area prior to 2020;
- many of the projects generate credits by paying to avoid destruction of native forest. A lower cost alternative may be to regulate to limit native forest clearing;
- there is no guarantee that an accepted proposal will deliver the contracted abatement even though the government speaks as if the abatement has already been achieved;
- most of the contracted reductions will not occur until after 2020;
- according to one commentator only 45% by volume of contracted abatement will be useful in achieving the 2020 target;²³
- there is nothing in the ERF Scheme that acts as an incentive for major polluters to reduce emissions. The ERF has not attracted any successful bids from any of the big emitters, where real and substantial emissions reductions are necessary if Australia is serious about doing its part to limit global warming;
- the ERF process does not force the necessary change required for the economic transition to a low carbon economy;
- the ERF does not (yet) have a mechanism to guarantee that emissions will not rise. The so-called 'safeguard' mechanism allows emissions to increase because the baseline is set for the highest emissions level over the period 2009/10 to 2013/14 with a sectorial cap of 198 Mt in the electricity sector. This effectively allows emissions in the electricity sector alone to rise by nearly 9% over current values without penalty.

The present safeguard mechanism can best be described as a “safeguard to pollute”. It is certainly not a mechanism to safeguard against rising emissions and is a major failure of the current scheme. A review in Canada states that in contrast to mandatory measures:

*“voluntary measures can raise awareness of energy conservation by consumers, but are not as effective as carbon pricing or regulations at changing behaviour or drawing investment that leads to reduced emissions”*²⁴

Q5. How does voluntary carbon pricing perform against the principles of cost effectiveness, environmental effectiveness and equity?

Cost Effectiveness: While voluntary carbon pricing may appear to be cost effective (The ERF has purchased abatement at \$13.12 per tonne), this costing will only be effective if *genuine* abatement is achieved. While abatement in the Landcare sector may have its place, it can be difficult to assess and quantify. In the case of the ERF, abatement is either not guaranteed or, in some cases, the money may have been inefficiently spent on abatement that would have occurred anyway. The ERF comes at a direct cost to the budget bottom line and does not address the broad spectrum of Australia’s emissions. As such the question as to whether it represents value for money for expenditure of tax-payers’ funds remains unanswered.

23 Christoff, Peter. The Conversation. 13 November 2015

<https://theconversation.com/australias-climate-targets-still-out-of-reach-after-second-emissions-auction-50519>

24 Reality check: the state of climate progress in Canada; National Round Table on the Environment and the Economy (Canada); Ottawa; 2012.

Environmental effectiveness: The evidence that a voluntary carbon scheme, such as the ERF, is effective is not questionable. Major failings of the ERF scheme are that it (currently) allows emissions to rise and the so-called safeguard mechanism is practically worthless. Voluntary carbon pricing could be effective if targeted towards industrial emissions. However, given the quality of abatement that has been sourced it may be difficult for some of the projects to deliver genuine abatement. For example, under the Direct Action Initiative, the government has purchased the rights for abatement where people avoid land clearance. The problem here is one of additionality – one does not know for certain whether or not there was an intention to clear the land, which then also questions the 'effectiveness' of the scheme.

Equity: Stand-alone voluntary carbon pricing schemes, such as the ERF, are not equitable. Polluters outside the scheme are in effect getting a free ride whilst the community at large bears the brunt of the costs through budget outlays. The fiscal impact of scaling up voluntary schemes is very large and places a disproportionate responsibility on the general tax-payer whilst polluters benefit by having emission reductions paid for them.

Summary of Position on Voluntary Carbon Pricing

It is our view that voluntary carbon pricing is more suited as *supporting* mechanism sitting alongside a separate primary emissions reduction scheme(s) (mandatory pricing / regulation) and directed at particular issues such as carbon farming and emissions from waste dumps. However, there could be scope to change the baseline of the current scheme to ensure that the safeguard mechanism actually reduces emissions. The scheme could readily be changed to a baseline and credit mechanism which would be more effective, but not as effective as other mandatory pricing mechanisms such as a carbon tax, or a cap and trade emissions trading scheme.

Renewable Energy and Energy Efficiency Targets

Q6. What lessons can be learned from Australia and overseas on the effectiveness of renewable energy targets and energy efficiency targets, and their interaction with other climate policies?

Renewable Energy Targets (RET):

The RET in Australia was originally set at 45,000 GWh and was designed to provide *at least* 20% of electricity demand by 2020. Unfortunately, unnecessary political bickering over 'a true 20%' led to uncertainty, introduced sovereign risk into the Australian renewables sector and has held back investment. Although agreement has now been reached on a reduced target of 33,000 GWh per annum by 2020, these events have demonstrated the need for bi-partisan continuity in policy if mitigation goals are to be met and the renewables sector is to make investments in Australia.

In contrast with targets of some countries²⁵, the Australian RET is modest:

Denmark	50% renewable electricity by 2020.
EU 28	20% of <i>all energy</i> consumed by 2020.
China	20% zero emissions energy for <i>all energy</i> by 2030.
Indonesia	25% renewable electricity by 2025.

In 2013-14 renewable energy made up only 5.9% of Australia's energy consumption,²⁶ but has

25 Stock, P. Giga-What? A Guide to the Renewable Energy Target, Climate Council of Australia, 2015, p6

26 Australian Energy Update 2015; Australian Government, Department of Industry and Science, Canberra; Table 3.1

caused significant disruption to the business models for electricity grid operators. This has been the experience overseas also, but this disruption is inevitable whatever mechanism is used to introduce renewable power generation. It does emphasize the need for governments to be pro-active in working with the energy sector to adjust the regulatory and business framework required by renewable technologies to take their place in the market.

Energy Efficiency Targets:

According to the IEA,⁵ improved energy efficiency in buildings, industrial processes and transportation could reduce the world's energy needs in 2050 by one third, and help control global emissions of greenhouse gases. This is a vast subject so only general points can be made here.

Energy efficiency targets are most relevant where market failures prevent the adoption of the most efficient energy solutions. The targets reduce the demand side of energy usage by users who do not have the knowledge, information or resources to make optimum choices that minimise energy use. As such, judiciously applied energy efficiency targets are effective.

Energy efficiency has proved to be a cost-effective strategy for building economies without necessarily growing energy consumption. For example, the state of California²⁷ began implementing energy-efficiency measures in the mid-1970s, including building code, vehicle and appliance standards with strict efficiency requirements. During the following years, California's energy consumption has remained approximately flat on a per capita basis while national U.S. consumption doubled. As part of its strategy, California implemented a "loading order" for new energy resources that puts energy efficiency first, renewable electricity supplies second, and new fossil-fired power plants last.

Lovins, the founder of the Rocky Mountains Institute, points out²⁸ that in industrial settings, "*there are abundant opportunities to save 70% to 90% of the energy and cost for lighting, fan, and pump systems; 50% for electric motors; and 60% in areas such as heating, cooling, office equipment, and appliances.*" In general, up to 75% of the electricity used in the U.S. today could be saved with efficiency measures that cost less than the electricity itself.

According to an Australia Institute study²⁹: '*Australia's first mandatory regulatory energy efficiency measures were introduced in the late 1990s, in the form of Mandatory Energy Performance Standards (MEPS) for refrigerators and freezers. Since then, MEPS have been extended to a very wide range of residential and commercial appliances and equipment, and analogous energy efficiency requirements have been applied to new buildings. It is estimated that these measures have, in total, reduced demand for electricity in 2013 by over 13 TWh, or 37 per cent of the total shortfall*' in electricity demand that has occurred over the last few years.

Fuel economy in vehicles has been driven as much by the increasing cost of fuel as it is by concern about emissions.⁵ As a result new vehicle fuel economy has been increasing rather rapidly in OECD countries, although fuel economy for new passenger light vehicles varies by as much as 55% between countries with Australia at the high end of the distribution suggesting considerable opportunity for improvement.⁵ The policy framework to achieve this as envisaged by the IEA³⁰ is summarised below.

27 California Energy Commission https://en.wikipedia.org/wiki/California_Energy_Commission

28 Lovins, A http://e360.yale.edu/feature/amory_lovins_energy_efficiency_is_the_key/2091/

29 Saddler, H. Power Down – Why is electricity consumption Decreasing. Australian Institute Paper 14, 2013 p4

30 International Energy Agency, Tracking Clean Energy Progress 2013, p78

Barriers	Policy options to address market failure			
	Information and labelling	Fuel economy standards	Fuel taxes	CO ₂ -based vehicle taxes/feebates
Low and volatile fuel prices; price risk aversion	Provides key information to consumers; more helpful when annual fuel spending are also displayed.	Delivers improved fuel economy regardless of market prices or buyer risk aversion.	Helpful since it raises the fuel cost of driving; can include a price floor mechanism.	Can send strong market signals to buyers; but does not address variable (per km) cost of travel.
High discount rates	Same as above.	Overcomes the market failure by improving the vehicle supply (OEMs) side; requirements across whole fleet can guarantee an outcome.	Can help, but if discount rates are very high, a high tax might be needed to compensate.	Largely overcomes the discount rate issue by reducing cost differential up-front.
Lack of information	Directly addresses this problem but may not fully overcome counter perceptions that fuel economy is unimportant.	Helps improve fuel economy even when consumers are less informed, but should be easier to implement with informed consumers.	Does not address information problem; may be more readily accepted and have bigger impact when more information is available.	Must be linked to labelling system so consumers know and understand the basis for the relative taxes.

For passenger cars, countries with regulations in place have shown annual improvement in fuel economy of around 2.6% since 2005. Non-regulated markets lag behind, mostly due to a shift of preference towards bigger and more powerful vehicles as consumers' personal income has increased.⁵

Q.7. How do renewable energy targets and energy efficiency targets perform against the principles of cost effectiveness, environmental effectiveness and equity?

Renewable Energy Targets:

Cost Effectiveness: In the electricity sector Renewable Energy Targets are a reasonably cost effective method of reducing GHG emissions. According to the Climate Council, a Productivity Commission review found that policies that encouraged large-scale renewable electricity were the second most cost effective after emissions trading schemes.³¹ At present the RET is the primary means for decarbonisation in the electricity sector. While there has been much political controversy on the impact of the RET in raising prices of electricity to the consumer, all reputable studies have shown that the increase has been relatively modest in comparison with other drivers of price increases such as investment in the grid.

Environmental Effectiveness: The RET is environmentally effective because it replaces generators that produce GHG emissions with zero emissions generation. Its effectiveness could be improved by ensuring that the new renewable generating capacity replaces the highest GHG emitting generators first (such as brown coal generators). Regulation which sets a timeline for retirement of the oldest and highest emissions generators (such as Hazelwood in Victoria) may be required in conjunction with the new renewable generation coming on-line.

Equity: It is hard to assess the equity of the RET. While the RET can lower wholesale prices due to the cheaper cost of production once infrastructure is in place, this benefit does not necessarily extend to the consumer. It is estimated that the cost of the RET makes up between 1-5% of power bills.³² Consequently, the cost of the RET may be inequitably borne by the less well off. While the cost of electricity is expected to rise in the future retail electricity bills are expected to remain at 2-3% of household income. None-the-less, according to a CSIRO economist, by 2030 electricity consumers with solar panels are expected to be \$120-\$210 better off on average each year

31 Stock, P; Giga-What? A Guide to the Renewable Energy Target; Climate Council of Australia; 2015; P12.

32 ABC Fact Check. 23 July 2015. <http://www.abc.net.au/news/2014-03-07/how-does-the-renewable-energy-target-affect-your-power-bill/5253136>

compared to those without solar panels. By 2050 the cost differential is forecast to balloon out to \$860-\$1140 per annum.³³ This would be a concern from an equity point of view.

Q.8. What lessons can be learned from Australia and overseas on the effectiveness of regulation, and its interaction with other climate policies?

Regulation in Australia:

Regulations related to the building code, energy efficiency measures etc all play a part in mitigating the effects of climate change and energy efficiency measures have been effective in reducing demand in the electricity sector. State based limits on land clearing also have played their part although in general they are motivated by concerns to protect biodiversity and other environmental values rather than primarily to reduce carbon emissions. However, regulation to reduce emissions has not been used as effectively as it might.

The 2012 Maddocks' Report³⁴ highlights some deficiencies in regulating for climate change including:

- Lack of explicit or implicit recognition of the need to adapt to climate change
- Lack of harmonisation and fragmented approach
- Inability to review regulations or standards with sufficient frequency
- Ineffective implementation
- Difficult or costly compliance and enforcement

Significantly the report declares:

“The challenge that climate change presents for Australia's infrastructure and associated services cannot be overstated. There is a risk that existing regulatory frameworks might 'lock in' maladaptive action, which could compromise the short, medium and long-term resilience of our infrastructure. A new approach is needed to ensure that effective responses to climate change are embedded in relevant regulatory frameworks.”

Regulation needs to be a more effective tool in the government's policy to address climate change. Apart from regulation to adapt to climate change (eg infrastructure), regulation may be used to directly control some aspects of emissions.

Regulation Overseas:

Regulation to control emissions has been used much more effectively overseas. Examples are: Canada: Regulation to close coal-fired generators (coal fired generation ceased in Ontario is 2014). There are regulated standards for any new coal-fired generators that may be built after 2015.

United States: The Environmental Protection Agency's Clean Power Plan for existing power stations and Carbon Pollution Standards for modified and reconstructed power plants that take real action on climate change. While the USA's electricity sector is responsible for 33% of the country's GHG emissions, the Clean Power Plan sets achievable standards to reduce carbon dioxide emissions by 32% from 2005 levels by 2030.

- There has been success in California with an active approach to energy policy since the 1970's which has resulted in stable energy usage in the face of a growing economy.

33 Graham, Paul. The Conversation. 3 December 2015. <https://theconversation.com/the-electricity-network-is-changing-fast-heres-where-were-heading-51652>

34 Maddocks 2012. Report for the Department of Climate Change and Energy Efficiency; The role of regulation in facilitating or constraining adaption to climate change for Australian infrastructure.

Q.9. How could various types of regulation perform against the principle of cost effectiveness, environmental effectiveness and equity.

The cost effectiveness depends very much on the sector. Regulation of land clearing has the effect of 'sterilising' land and may limit land availability in particular areas for commercial use, driving up the price. It conceivably could limit the options of private land-owners from deriving the maximum benefit from the land that they own. However, all land is subject to zoning laws so fundamentally this is no different. Preventing land clearing through regulation is cost effective in preventing prospective emissions over a business as usual scenario.

Efficiency standards for transport and appliances are effective measures in limiting emissions over time as evidenced by the examples given above. Such regulation is a natural extension of those that already apply to manufactured goods in terms of safety and fitness for purpose. In a world of changing emissions standards, regulation is also required to prevent import dumping of low efficiency manufactured goods to the detriment of Australian policy aims. Similarly the government needs to regulate to the highest overseas vehicle emissions standards (Euro 6) to prevent car manufacturers and importers dumping high-emitting vehicles in Australia. This measure should meet the principles of both cost and environmental effectiveness and should not impact on equity.

Australia could learn from actions taken in Canada and the United States and regulate to limit emissions in the electricity sector over time. While coal-fired generation will be needed for some time, in the short to medium term regulation to replace the oldest and / or highest emitting coal-fired generators with renewables according to a timetable could be considered. This action would be environmentally effective.

Buildings are already subject to building codes that set out the performance requirements and safety of buildings. Overseas in Europe and Canada building codes are used extensively to improve energy efficiency particularly in heating. In Australia there is considerable scope for improving the thermal performance of buildings in both heating and cooling and also in electricity usage. Whilst these requirements may increase the capital cost of construction, they are more than compensated by ongoing reduction in running costs.

The critical issue here is the broad acceptance of the national need to reduce greenhouse gas emissions. Frequently these activities are not undertaken because they can increase the cost of construction and hence can be construed by the builder as affecting the competitive marketability of the property. In the case of leased accommodation, construction costs accrue to the owner whilst running-cost savings accrue to the lessee. Regulation and the monitoring of compliance at the construction stage are effective in addressing this market failure. Buildings once built offer only limited opportunities for curtailing energy consumption in their use unless the necessary features are incorporated in their design.

As indicated above, there is considerable scope for improving energy efficiency in the commercial and industrial sector. However the opportunities vary from industry to industry and are not easily mandated by regulation. Carbon pricing would have some effect but also opportunities may be addressable though voluntary pricing mechanisms.

Summary

Regulation is most effective where market mechanisms will not deliver the required outcome and is particularly applicable in areas where society requires regulation to meet other goals such as safety,

environmental values and market failure. Energy efficiency standards for appliances, vehicles and buildings can have a significant impact in improving energy efficiency. Regulation of land clearing in concert with other policies regarding land-use is the most effective way of limiting emissions from land use change.

Information Programs and Innovation Support

Q.10. What lessons can be learned from Australia and overseas on the effectiveness of information programs and innovation support, and their interaction with other climate policies?

Information Programs:

As discussed previously, an essential part of GHG policy is to change the behaviours of people in the market place ranging from consumers through to commercial market participants. It is extremely naïve to expect this to be achieved without clear public communication of the role and importance of economic instruments – witness the polarised debate over the Carbon Tax. Economic instruments need to be accompanied by education and genuine engagement with the community as to their ‘what, why, and how’ as well as the pros and cons for individuals and society in general. To date, effective community engagement has been lacking. Transparency is essential to gain the public support for the measures being undertaken.

More specifically, programs such as Appliance Energy Ratings are useful to consumers in demonstrating where operating costs can be saved and have been demonstrably effective in reducing electricity demand in Australia.²⁹ Similar information programs could be useful in developing awareness and driving the uptake of low-emissions vehicle technology. Information programs have a useful role in educating the public both in meeting emissions reduction targets and why it is important to do so. While supplementary to other policy actions that would have a more direct impact in reducing emissions, they are an essential part of the policy mix.

Innovation Support:

The IEA⁵ has emphasised the importance of supportive research, development and demonstration programs and policies in enabling the transition to a low carbon economy. Many new technologies and ways of using existing technologies have to be introduced to the market to enable the transition to a low carbon economy. The well-known Grubb Technology curve³⁵ illustrates how unit costs rise exponentially during the research, development and demonstration phases of technology development. It is only after the initial deployments have been made that the ‘learning by doing’ experience allows unit costs to diminish as technology maturity is achieved. The greatest investment risks occur in the transition from R&D through demonstration and initial deployment - the so-called Valley of Death - where many technologies fail to get investment support. Sometimes this can be because the technologies are deemed not sufficiently robust to warrant investment, but other times it is simply a market failure, which can be related to the nature of the technology.

The development and growth of the silicon solar panel industry and wind turbines are classic examples of how support of early R&D and demonstration of the technology by countries such as Germany, and to a lesser extent the US, has led to a mature industry. Unit costs have plummeted and these renewables are now beginning to compete with fossil fuels in electricity generation on equal terms. In contrast Carbon Capture and Storage technology is stuck in the ‘Valley of Death’. This is largely because of the failure of governments to commit to a carbon price make it economically viable to capture and store the emissions, but also because the capital cost of

³⁵ Wikipedia, https://en.wikipedia.org/wiki/Technology_life_cycle

individual plants is very large and elements of it such as disposal are very site specific. Nonetheless, any strategic consideration of the technologies required to enable a low carbon economy indicate that some level of carbon capture and storage will be required.

Australia has a small manufacturing base, thin capital and venture capital markets and is heavily dependent upon imported technology and equipment. This limits the role of the Australian private sector in driving the necessary technological changes to achieve the transition. Because of its geography, and the size and structure of the economy, Australia has particular requirements that demand a strategic approach to the technological issues necessary to achieve our national GHG targets. In these circumstances the national government, through bodies such as ARENA, the Clean Energy Finance Corporation and CSIRO, has an important role in developing and facilitating the adoption of technologies to enable a transition to a low carbon economy.

Q.11. How do information programs and innovation support perform against the principles of cost effectiveness, environmental effectiveness and equity?

Strategically well-designed and well-executed information and innovation programs can perform well against the principles. Information provided to the public and industry at large of the issues and choices that need to be made in making the transition to a low carbon economy are critical in changing behaviour.

It is essential that any innovation program be evidence based whereby the critical issues for Australia are translated into technical portfolios of opportunities. These opportunities can then be rigorously evaluated by competent technical experts and by economic analysis. Political picking of winners in response to lobbying must be avoided – a classic case is grain based ethanol biofuel where analysis shows that there is little or no energy benefit gained from the process while being heavily dependent upon fossil fuel inputs.³⁶

Funding of publicly supported R&D is a legitimate expenditure of government. In this situation, it may well be that, once again in the interests of transparency and consistency, some revenue from a carbon price could be hypothecated against R&D expenditure in GHG mitigation.

CHAPTER 4 – FINDING THE RIGHT FIT BETWEEN SECTORS

Q.12. What policies do you consider best suited to which sectors and why?

Electricity Sector:

We are strongly of the view that a mandatory price mechanism needs to be placed on carbon emissions in this sector to drive a change over time toward low emissions technologies. A price on carbon is essential to level the playing field between strongly emitting energy sources such as fossil fuels and low emitting sources such as renewable energy sources. It will then allow the market to establish the balance between the different forms of technology required to operate a reliable electricity grid operating whilst minimising GHG emissions. This includes the balance of centralised and distributed generation systems, flexibility in meeting demand variations, smart grid applications and the role of electricity storage in the grid. At the end of the day it is the reliable delivery of electrical services with low emissions to industry and the consumer that matters.

³⁶ Hall, C.A.S., Balough,S. & Murphy,J.R. What is the minimum EROI that a sustainable society must have? *Energies* 2009, 2, 25-47.

The introduction of a carbon pricing mechanism will test, for example, the potential role in Australia of high efficiency power stations and the reality of carbon capture and storage and, in the longer term perhaps, even of nuclear sources. Given that a portfolio of energy technologies will be required to meet the needs of the economy and society, it is essential that a realistic pricing mechanism be introduced as soon as possible to commence the long period of change that will be required.

While we favour a simple, transparent, direct pricing mechanism, the government may wish to consider modifying the current Direct Action scheme to a baseline and credit scheme. This could be achieved by setting the safeguard mechanism at a realistic level that will result in effective emissions reductions. As there is currently an oversupply in electrical generation capacity, the sector may benefit from some regulation to set a date for retirement of old and carbon-intensive power generating plant. This would provide the necessary early momentum for the transition towards a low carbon economy. Canada has demonstrated that this can be done. Over time, the greatest gains in emissions reductions are likely to be gained in the electricity sector.

Land Sector:

Regulation should be used in the Land Sector to control and limit land clearing. This will be more cost-effective than paying landholders not to clear land. Given the short-term benefit that can be derived from carbon farming as articulated at the Paris Summit, continuation of voluntary pricing in this sector is warranted.

Transport Sector:

As indicated above, there is considerable potential to improve the energy efficiency of the light vehicle fleet. Whilst pricing of petrol is a significant driver of demand (e.g. Europe) for more efficient vehicles, wide swings over time in petrol prices, as has occurred over the recent past, can increase the demand for more powerful, energy hungry vehicles. Mandatory pricing is important to continue to send price signals even as petrol prices fluctuate, but it is important to complement this with vehicle fleet efficiency standards to maintain the downward pressure on emissions in the transport sector.

Plug in hybrid and electrical vehicles are becoming more readily available and are viewed by the IEA⁵ as having a significant role in reducing emissions in the transport sector. However, this will only occur if the electricity is generated from low emissions sources. It is essential that policies relevant to one sector are matched by policies in related sectors.

Electric propulsion systems are not an option in the heavy road transport sector or in the airline sector. Australia is very dependent on these sectors. LNG may be an interim solution for heavy transport whilst biofuels could be of importance in the airline sector. We are of the view there should be no exemption from a mandatory carbon pricing, but that investment in an innovation agenda for these and other sectors may be required to provide technological or alternate solutions to minimise emissions – see discussion of Innovation above.

Questions 13 – 17 We are unable to provide responses to these questions.