Centre for Energy and Environmental Markets

AUSTRALIA'S CLIMATE POLICY OPTIONS

Submission in response to the Climate Change Authority's Special Review Second Draft Report

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The UNSW Centre for Energy and Environmental Markets (CEEM) undertakes interdisciplinary research in the design, analysis and performance monitoring of energy and environmental markets and their associated policy frameworks. CEEM brings together UNSW researchers from the Australian School of Business, the Faculty of Engineering, the Institute of Environmental Studies, and the Faculty of Arts and Social Sciences and the Faculty of Law, working alongside a number of international partners. Its research areas include the design of spot, ancillary and forward electricity markets, market-based environmental regulation, the integration of stochastic renewable energy technologies into the electricity network, and the broader policy context in which all these markets operate.

CEEM has been undertaking research into Australian energy and climate policy over more than a decade, with a focus on the electricity sector. More details of this work can be found at the Centre website – www.ceem.unsw.edu.au. We welcome comments, suggestions and corrections on this submission, and all our work in the area. Please contact A/Prof. Iain MacGill at i.macgill@unsw.edu.au.

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CEEM welcomes the opportunity to contribute to this important consultation process. Effective climate policy design has proven challenging for jurisdictions around the world over the past two decades, and particularly challenging in Australia. The lack of bipartisan consensus on the importance of addressing climate change was clearly a major factor. This was in large part an outcome of the role that carbon intensive exports, primarily coal, with large and influential stakeholders representing them, play in Australian industry policy. Europe and increasingly other countries such as China, see the opportunity for climate policy to also address energy security concerns arising from their heavy dependence on fossil fuel imports. On energy security, however, Australia is somewhat schizophrenic, recognising energy security issues in terms of liquid fuel imports, but effectively promoting greater dependence on fossil fuel imports for its current and prospective coal and gas customers.

The approach of successive governments towards climate change policy development has, however, almost certainly been an additional factor in Australia's limited progress. In particular, there has never been close integration between energy and environmental, particularly climate, policy despite the reality that all energy policies are also defacto climate policies – for good or bad – whilst most climate policies are invariably energy policies given the energy sector's predominant role in global greenhouse emissions. A particularly relevant example at present is that of US and Chinese energy policy efforts to reduce the air pollution impacts of coal-fired generation – efforts that are also providing valuable greenhouse emission mitigation outcomes.

There was an opportunity to integrate energy and environmental policy efforts through the parallel Ecologically Sustainable Development (ESD) and energy micro-economic reform agendas of the early 1990s – an opportunity that was squandered (MacGill and Healy, 2013). Ideally, the CCA would have the opportunity to revisit this broader context for the development of climate policy. If not, it would still be worth better highlighting the implications of undertaking climate policy development largely separately, and certainly incoherently, of energy policy development.

This submission broadly follows the structure of the Special Review Second Draft Report (the Report with the same headings used where possible). We provide responses to the questions raised in the Report as well as some feedback and recommendations on the Report's discussion of the concepts and options. These comments are made generally by exception, focusing on key matters of support or concern.

1 Report Introduction and Context

1.1 Purpose

While the Report does briefly cover its intended purpose, it would be worth flagging that Australia seems to be particularly vulnerable to climate change, and will therefore disproportionally benefit from effective global action to avoid dangerous global warming.

The risk management approach put forward by the CCA is certainly appropriate but could usefully be further extended, and better applied in the report. In particular, the consequences of failure to effectively address climate change would seem to greatly outweigh the risks of taking greater actions than turn out to be required. A key criteria for climate policy success, therefore, is the robustness of the response in terms of driving emission reductions despite the many uncertainties and challenges involved, rather than cost effectiveness as such.

Finally, noting the policy challenges that Australia has encountered to date, the CCA's role in providing independent expert advice to the Australian Government and Parliament is critical. Efforts by the current government to abolish the CCA are not a sign of its failure but, instead, its success in providing independent, unfortunately for the current Government generally unwelcome, advice.

1.2 About the Special Review

The Special Review is a very important opportunity to progress climate and energy policy development in Australia. The first stage of the review on emission reduction targets was certainly useful and has highlighted the inadequate targets that the Australian Government eventually took to Paris.

As the Report notes, the timing is certainly fortuitous given international developments including the recent COP meeting in Paris. We also now have further evidence of the success or failure of climate change policies such as carbon pricing in Australia and elsewhere.

It would be helpful to provide a brief summary of previous policy reviews undertaken in Australia including that of the Productivity Commission and the Wilkins Review. These both provided useful insights whilst also highlighting the potential weaknesses of such exercises; including for the Productivity Commission work, inappropriate reliance on abatement cost estimates and the significant assumptions required to undertake them; and for the Wilkins Review, a simplistic policy assessment framework starting with the idea that a carbon price is the first best policy option, with almost all other policies only adding to the risks of undesirable policy overlaps and higher costs.

Also, accordingly, a key gap in the Report is any analysis of the significant experience Australia has already had with carbon pricing over the two years 2012-2014. Such analysis is fundamental to this Review and should focus on the measurable costs and benefits of the policy, using an agreed policy assessment framework (on which we discuss further below).

The CCA's expresses the view that the Terms of Reference "are best met by considering emissions trading in context with a range of other policy tools, and considering their relative merits in reducing emissions across different sectors of the economy." and that "*In the past, the Authority has taken the view that there are advantages in using a toolbox of measures targeted to different sectors and emissions reduction opportunities.*"

We certainly agree with this broader approach. The scale and scope of effective climate change action will inevitably require a range of policies to address a range of market failures and to manage the many and varied risks in responding to climate change, even in the presence of emissions trading or other carbon pricing measures (Passey et al, 2012; Twomey, 2012a). There is a growing appreciation, certainly internationally, of the role of multiple overlapping policies to provide a more assured response to emission reductions.[1]

1.3 International context

The Report's discussion of the international context, and particularly what was then the forthcoming 21st COP, looks to have been validated by actual outcomes of the Paris meeting.

It would be useful to update this international assessment with reference to some of the work underway by initiatives such as Climate Action Tracker (www.climateactiontracker.org) comparing the targets and existing policy frameworks of different countries. The general consensus of such work is that Australia's current target is inadequate, and the policy framework currently in place to meet even these modest targets, is insufficient.

As noted above, it would also be worth highlighting how different jurisdictions are seeking to integrate their climate, and more generally environmental, policy efforts with their energy policy.

1.4 Domestic context

The Report states that Australia's total emissions remained fairly flat over the last 25 years, with emissions in 2014 being about 3 per cent below those in 1990. In reality, emissions have climbed significantly over these 25 years if LULUCF emission estimates are excluded – these estimates are of course very problematic in terms of emissions measurement and permanence. The key outcome of policy efforts in Australia, to date, therefore has been near complete failure to reduce national emissions, except for a brief period over 2012-2014.

It should also be acknowledged that while Australia has a significant decarbonisation challenge to meet current targets, Australia's targets are currently amongst the weakest from developed countries. Climate Action Tracker's assessment is that "*We rate Australia's INDC [intended nationally determined contribution] 2030 target to reduce greenhouse gas (GHG)*

[1] As an Australian example, some recent modelling (Easton, 2015) of policy options for reducing emissions from the Australian National Electricity Market has highlighted that a combination of policies can provide more certainty and hence will likely be more effective than an ETS alone at achieving a successful transition towards a low carbon electricity industry future, specifically the exit of high emissions generators.

emissions by 26–28% from 2005 levels including land-use, land-use change and forestry (LULUCF) by 2030 as "inadequate." After accounting for LULUCF, this target is equivalent to a range of around 5% below to 5% above 1990 levels of GHG emissions excluding LULUCF in the year 2030. All other industrial countries, except Canada and New Zealand, have proposed 2025 or 2030 goals significantly below 1990 levels. The "inadequate" rating indicates that Australia's commitment is not in line with most interpretations of a "fair" approach to reach a 2°C pathway: if most other countries followed the Australian approach, global warming would exceed 3–4°C."

There may be considerable international pressure for Australia to increase its level of ambition in coming years. While current negotiations have been largely based on the burden of mitigation being undertaken by different countries (relative change), there is a strong argument that supports principles based around equal per-capita emissions rights, and the idea of distribution of effort based on historical responsibility.

The Report provides a useful summary of current climate policies in Australia and notes that "As the Government has indicated, additional policies will be needed to reach its 2030 target." Firstly, such summaries should be cautious about ascribing emission reduction estimates to particular policies. As noted later in the Report and as emphasised in our submission, there are serious questions about the additionality – that is, assured emission reductions arising from some policies, notably the Emission Reduction Fund (ERF).

More generally, the Report would seem to understate the policy challenge involved. The Climate Action Tracker notes that *"Australia stands out as having the largest relative gap between current policy projections for 2030 and the INDC target. With currently implemented policy measures, Australia's emissions are set to increase substantially to more than 27% above 2005 levels by 2030, which is equivalent to an increase of around 61% above 1990 levels. Australia's Direct Action Plan does not put Australia anywhere close to a track that meets its INDC 2030 target.*
The additional funding announced in August 2015 by the Government for post-2020, should it be re-elected in 2016, would reduce this projected increase by only 2%, to around 25% above 2005 levels (equivalent to 57% above 1990). Of the nine industrialised countries assessed, Australia ranks eighth on its projected rate of reduction in per capita emissions, exceeded only by Russia, and eighth on projected improvement in emissions intensity for the period from 2012 to 2030, with Canada ranking worst.
In July 2014, against international trends, the Australian Government abolished its nascent Carbon Pricing system by partly repealing its Clean Energy Future Plan, which marked a negative turning point in Australia's climate policy. Before the repeal, Australia's climate policy was projected to bring Australia halfway towards the announced INDC 2030 target (5% above 2005 levels)."

Finally, while the Report flags questions about current Government BAU emissions, it would be useful to reference the work undertaken on this question which suggests that current BAU projections are significantly overstated (eg. Reputex, 2015), and might therefore suggest greater policy success than what is actually delivered over future years.

2 Principles for Assessing Options

Q1. The Authority proposes assessing policies primarily 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?

CEEM welcomes the Authority's emphasis on setting an appropriate assessment framework for the Review. The framework proposed in the Report could be improved as follows:

2.1 Cost effectiveness

While certainly a key objective of policy development and hence policy assessment, the Report's focus on 'least cost' (specifically direct implementation, transaction and indirect costs) is too narrow in our view, particularly with regard to the CCA framing that *"A cost effective policy toolkit is one that meets Australia's emissions reduction goals at least cost to the community."*

The key 'cost effectiveness' issue is that of benefits and costs across society and across time arising from different levels of effort, and specific mixes of policy measures. Questions of co-benefits from climate action including local environmental improvements and greater energy security are receiving growing attention in jurisdictions around the world, if not apparently in Australia. Given that climate change is a long-term yet urgent challenge, these costs and benefits also need to be considered over considerable future time scales. A broader framing of cost-effectiveness, economic efficiency, is also an opportunity to highlight the importance of dynamic efficiency – that is, facilitating longer-term investment and innovation – for climate change as well as the more commonly discussed allocative and technical efficiency measures. This framing needs to include consideration of the cost of insufficient action and the benefits that will arise through structural changes in the decarbonising economy. As part of a cost-effective policy suite, the benefits of removing or correcting for distortionary subsidies that are currently in place should also be considered (for instance state and federal government subsidies for energy resource extraction).

The Report also states that *"to keep total costs low over the long term, there needs to be a degree of flexibility as to the level of emissions in any given year. Insisting on a strict limit in each year would be likely to have higher costs than sticking to the same overall emissions budget over say five or ten years with some flexibility over annual emissions."* While correct in one sense, this framing of policy timing could be improved: the key issue is total emissions in the atmosphere given the long-lived nature of key greenhouse gasses. Intermediate targets are crucial in terms of cumulative emissions, so the preferred trajectory should aim to have emission reductions early to avoid the need for steep reductions later, to reduce risks of potentially strengthened reduction targets given our evolving understanding of the climate science, and to provide a margin of error if overall carbon budgets are exceeded. A more incremental approach to emissions reductions can be undertaken at lower cost, while early development and adoption of technologies that are key to global efforts could provide Australia with innovation opportunities for the longer term.

Finally, the Report notes, *"Another [possible approach to keeping indirect costs low] is to implement a policy that keeps indirect costs relatively low in the first instance by limiting*

increases in the price of emissions-intensive goods and services (such as an emissions intensity ETS)." Whilst there are important political challenges that might suggest limiting the rate of change of prices and other impacts, the adverse implications of this in terms of effectiveness should not be under-estimated. If the view is that market pricing has a key role in policy, then meaningful prices are required.

2.2 Environmental effectiveness

The Report's acknowledgement that additionality is a key measure of effectiveness is welcome, given the limited consideration that additionality has received in a number of policies in Australia such as the ERF. As such, transparent measurability, or its difficulty, is a key factor in ensuring environmental effectiveness. In general, more abstracted policies involve more difficult measurement challenges.

We differ with the Report's view that *"[T]he location of emissions makes no difference to the effect they have on the climate. Accordingly, consideration of Australia's policy options should extend to those that involve achieving genuine emissions reductions in other countries."*
While the location of emissions may not make a difference to the level of warming, it can certainly makes a difference in terms of driving international agreement and progress on mitigation. Caution should be used when considering paying developing countries to reduce their emissions. The value of capacity building in developing countries must be balanced with the need to ensure distributive justice in rights to emit. First, relative targets need to be considered. Second, there is a potential moral hazard of making payments to the poor to allow us to pollute; it would seem uncomfortably close to earlier Church trading in indulgences. Finally, if Australia does not take action domestically, we will be saddled with a legacy of old polluting technology and high costs to transition quickly when we eventually choose, or are forced, to decarbonise ourselves. In addition, there are challenges with offset certificates, particularly in relation to baselines, additionality and perverse incentives. These problems have contributed to moves to phase out the use of CERs in the EU ETS and some other schemes internationally.

The Report states that *"To ensure the environmental effectiveness of Australia's efforts to reduce emissions, policy needs to take account of the potential for carbon leakage."*
Leakage is certainly an issue, however, it is important to avoid carbon leakage that goes the other way. For example, at present, new aluminium smelters in countries with far lower emissions intensive electricity industries may not be being built due to competition from Australian smelters that are currently purchasing high emissions electricity from an industry that faces no carbon pricing. In practice to date, policy efforts claiming to address carbon leakage have generally involved giving favoured emissions intensive trade exposed industries a free pass from taking emission reduction actions, and placing the burden on less favoured stakeholders. Genuine efforts to address carbon leakage will work in both directions, and ensure that all emissions intensive sectors still contribute towards societal emission reduction targets.

2.3 Equity

Again, the emphasis of the Report on Equity as an assessment criteria is welcome given the importance of establishing and maintaining social consensus on the transition to a low carbon economy. Fairness is a critical issue in such societal consensus. Furthermore, a range of climate

policies in Australia and internationally have had adverse equity impacts, particularly with regard to favouring large and politically influential stakeholders over the general public.

The Report notes that "One approach [to mitigate distributional inequity] is to design a suite of policies to be as cost effective as possible, and use compensation measures to address equity concerns; another is to build equity considerations into the choice of policies, provided this can be done without substantially increasing costs."
The potential trust issues associated with the first approach, and inefficiencies associated with the latter are well discussed. One possible consideration in this choice beyond those discussed, is that of transparency. In particular, the use of compensation can generally be made more transparent than 'direct' incorporation of equity considerations which has been the general approach taken to date, and proven difficult to fully identify the scale of costs moved between stakeholders.
Furthermore, structural changes occur in the economy all the time, as technology changes. This should not necessarily be a basis for compensation, particularly as the climate risk, and the global intention to take action has been known since at least 1994 when the UNFCCC agreement (ratified by Australia), to limit the emissions of developed countries to 1990 levels by 2000, entered into force. Excessive compensation, which is a particular risk in relation to industries with strong lobbying power, can reduce the cost-effectiveness, environmental effectives and equity outcomes of virtually any policy measure.

Finally, the Report makes the valuable point that "…*while considering distributional equity of the costs of carbon policy, the equity implications on developing countries and future generations of Australia's success or failure to achieve appropriate abatement over the coming decades should be a primary consideration.*" We agree.

2.4 International competitiveness

International competitiveness is certainly an important issue. However, the Report states that "*The main issue of policy concern is that emission reduction policies could place Australian firms at a competitive disadvantage relative to firs in countries that do not face comparable measures.*"
In our view, the risk that inadequate emission reduction policies could place Australian firms at a competitive disadvantage in contributing to, and benefiting from, a global clean energy transformation is perhaps even more significant.

2.5 Other possible principles that should be applied

In our view, the Report's assessment criteria need to be more broadly scoped. In particular, the policy challenge facing Australia and all jurisdictions is far broader than the development of particular policy measures. Given the scale and speed of emission reductions required, Australia requires a coherent and comprehensive set of policy measures across the energy and climate domains. Particular policies need to be assessed in terms of their potential contribution within such a framework, rather than just individually. Critically, beyond questions of cost effectiveness and environmental effectiveness lies the key issue of robustness - the ability of a chosen policy framework to deliver assured emission reductions of the scale and speed required despite the many uncertainties involved. A robustness framework can significantly alter policy assessment – for example, what might be considered two overlapping and hence

inherently inefficient policy measures might in practice provide robustness against unforeseen circumstances that adversely impact the effectiveness of one of them.

3 Policy Options

3.1 Mandatory Carbon Pricing

Q2. What lessons can be learned from Australia and overseas on the effectiveness of mandatory carbon pricing, and its interaction with other climate policies?

Q3. How does mandatory carbon pricing perform against the principles of cost effectiveness, environmental effectiveness and equity? Which type of pricing scheme is likely to be more effective and why?

The literature on the Australian carbon pricing experience, and that of other jurisdictions is large and growing. Australia provides a particularly interesting example in having introduced and then removed a significant mandatory carbon price. The EU ETS offers over a decade of experience now, whilst schemes elsewhere in the world have chosen a range of design features. Detailed discussion is beyond the scope of this submission. However, we do provide some very brief and general comments as follows.

To summarise the experience of mandatory carbon pricing, these approaches to date would seem to have proven *'good in theory but bad in practice'*. Despite the many perceived efficiency advantages of broad carbon pricing, the experience to date has been modest in most jurisdictions to date with regard to cost effectiveness, environmental effectiveness and equity. Australia's scheme was, as it happens, one of the more successful implementations despite its flaws. Still, the policy process struggled to effectively manage rent seeking behaviour by large and powerful incumbents.

Of the three general options, cap and trade schemes with auctioning of all permits offers the most transparent and likely effective approach as long as equity concerns can be appropriately managed. Baseline and credit ETS suffer from the challenges of establishing baselines for powerful incumbents while the key limitation of emissions intensity ETSs is that avoiding dangerous global warming depends on reducing physical emissions to the atmosphere, not just reducing them with respect to output.

It seems likely that carbon taxes are a more appropriate pricing mechanism. Emissions trading schemes invariably involve very high levels of abstraction with the mistakes and deliberate hiding of devils in the details that such abstraction involves. Tax can also be similarly abstracted as the arrangements of international corporations operating in Australia highlight. However, we do have more experience in tax than 'designer' emissions markets. They also overcome a particular challenge with ETSs which can reduce the ability of some stakeholders to try and undertake additional actions that drive emission reductions below the set cap within covered sectors (Twomey et al, 2012b). While carbon taxes could be simpler to design, and less vulnerable to manipulation by special interests, in practice carbon taxes around the world tend to have been set conservatively (Ecofys 2014). In addition, industry is often exempt, to avoid

impacting international competitiveness or causing carbon leakage, so the tax burden falls on households.

3.2 Voluntary Carbon Pricing

Q4. What lessons can be learned from Australia and overseas on the effectiveness of voluntary carbon pricing, and its interaction with other climate policies?
Q.5. How does voluntary carbon pricing perform against the principles of cost effectiveness, environmental effectiveness and equity?

The experience to date in Australia with such approaches such as the NSW Greenhouse Gas Abatement Scheme (GGAS) have been very mixed. This experience might best be summarised as 'poor in theory and in practice'. As the report notes, additionality has proved a very vexed challenge. While there have been some assessments of the additionality, or lack of it, with some existing schemes such as GGAS and various State Government energy efficiency targets, it would be very helpful for the CCA to undertake an assessment of the most recent incarnation of such approaches in Australia – the ERF.

Preliminary assessements of the additionality of the ERF by ourselves and others have certainly raised concerns. The additionality requirements laid out in the act specifies that eligible projects meet newness, regulatory additionality (the project is not required to be carried out under law), and program additionality (would be unlikely to be carried out under another Commonwealth, State or Territory government program or scheme in the absence of a declaration of the project as an eligible offsets project) requirements. These can be over-ridden by particular methodology requirements. There are also so-called offset integrity standards, largely based on the idea that projects should result in "*abatement that is unlikely to occur in the ordinary course of events*" whatever that means.

Note that these do not come anywhere near meeting the additionality requirements specified under the highly transparent, rigorous and yet still problematic UNFCCC Clean Development Mechanism. The fact that a project is new, isn't a regulatory requirement, isn't already supported under another government project and doesn't reflect 'the ordinary course of events' doesn't mean that it delivers genuine additional abatement from what would otherwise have happened.

3.3 Other Mandatory Price-based Policies

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?

Q7. How do renewable energy targets and energy efficiency targets perform against the principles of cost effectiveness, environmental effectiveness and equity?

Renewable energy targets are now amongst the most widely deployed climate and energy policy drivers around the world (Ren21, 2015). The underlying policy measures to drive deployment are varied including feed-in tariffs, production tax credits, green certificate

schemes such as the RET here in Australia, and tenders. Evidence suggests that all of these approaches can work or fail depending on the details of how they are implemented. They might be summarised as *'poor in theory but good in practice'*.

Australia's reliance on a green certificate scheme is quite unusual. Green certificate schemes were deployed in a number of European jurisdictions over the past two decades with fairly mixed outcomes. The higher rates of return required by private investors given the risks associated with such schemes, as well as the power they gave large retailers (known as suppliers in Europe) to determine the success or failure of the scheme were particular points of concern (MacGill and Passey, 2009).

By contrast, the Australian scheme performed reasonably well over its first decade, within the constraints of a very modest target. In recent years, the political discord regarding the scheme has seen investment falter, and highlighted the potential limitations of the mechanism. There are now suggestions of a 'capital strike' by the three large retailers that may well mean the 2020 target will not be achieved. If this becomes likely it will be necessary to revisit the scheme and look to make changes that ensure investment actually occurs.

It is also interesting to note that the design of the scheme has, apart from its more significant target, likely gone backwards over the past decade, certainly in terms of equity outcomes. In particular, changes to the scheme made by the Rudd government reversed the earlier scheme principle that electricity users should pay according to their usage, by allowing favoured large energy users to escape liability. Households and unfavoured businesses were required to make up this shortfall (Cludius et al, 2014).

The state based energy efficiency targets have also proven rather problematic in practice, particularly with respect to additionality – a particularly vexed issue with energy efficiency given the wide range of cost-effective opportunities that are not currently taken up by energy consumers (Betz et al, 2013).

3.4 Regulation

Q8. What lessons can be learned from Australia and overseas on the effectiveness of regulation, and its interaction with other climate policies?

Q9. How could various types of regulation perform against the principles of cost effectiveness, environmental effectiveness and equity?

As previous Australian government UNFCCC communications have highlighted, regulatory energy efficiency has delivered the largest estimated abatement of any programs, and likely took place with negative costs. While carbon markets are theoretically more efficient as companies and individuals have better information about abatement opportunities, regulatory approaches appear to be less vulnerable to rent seeking (although certainly not immune as the glacial pace of energy efficiency standards demonstrates), and less politically controversial.

In sectors with significant non-price barriers, such as energy efficiency, regulatory approaches are the most important policy tool. Not only do they introduce a minimum standard for consumers, they act to motivate suppliers of equipment and appliances to produce more

efficient equipment. There remains plenty of scope for Australian appliance and building energy efficiency standards to be ramped up, as they are relatively weak compared to the majority of developed countries. This makes Australia vulnerable to dumping of low efficiency appliances that can no longer be sold in other countries.

The EEO policy was applied to 300 companies which collectively represented around 57% of Australia's total energy use, and was estimated to have voluntarily undertaken energy efficiency activities that saved 1.2% of Australia's total energy use in 2007-8 and 1.6% of Australia's energy-related CO2 emissions (DRET 2010). This regulatory policy was cited as best practice by the IEA and copied by the UK government as it successfully targeted information barriers, resulting in cost-effective emissions reductions. It is not clear why the relevant legislation was repealed in 2014.

In the electricity sector, emissions intensity standards have been introduced in a number of countries. In the Australian NEM, an emissions intensity standard could force the exit of some generators, or require them to undertake retrofits that reduce their emissions. Modelling of investment transitions in the Australian NEM (Easton, 2015) has shown that due to difficulty in encouraging the exit from the market of the highest emission generators, which are also the cheapest, an emissions intensity limit was more effective than carbon pricing or renewable energy targets at achieving target emissions reductions. It should be noted that the best outcomes were achieved under a combination of policy tools.

Because of the significant non-price barriers to energy efficiency, regulatory approaches are a very cost-effective option, not subject to the problems of measurement and additionality that white certificate schemes and carbon offsets suffer from.

3.5 Innovation Support

Q10. 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?

Innovation policies such as R&D funding and commercialisation support are important for overcoming the significant market failures that prevent optimal investment in early stage technologies, and are also required to bring market-ready technologies into deployment, especially in relation to integrating with existing technical systems, markets and regulatory environments. These emerging technologies will be required to meet the future challenges of decarbonisation cost effectively.

However, they are not a panacea that lets you avoid the hard work of developing and implementing mandatory policies. The example of California is illuminating in this regard. While it is certainly a centre of clean energy innovation at present, this has occurred in a policy environment that likely has the most stringent regulatory drivers and greatest market incentives for clean energy deployment.

While the rationale for R&D and commercialisation support is well understood, the value of R&D is sometimes questioned because of the high risk of failure. Research, however, shows that benefits of a few successful projects outweigh the costs of a portfolio of R&D investments (IPCC 2011). R&D across a range of promising options can in some ways be considered as a hedge against the inevitable failures of at least some of these options.

Significant cost reductions have been achieved in low-carbon technologies, notably in the photovoltaics industry, where costs have been reduced more than five-fold over the past decade through investment in R&D around the world, including in Australia. These R&D investments have interacted with deployment policies that have brought scale economies and learning-by-doing benefits. Governments have been particularly keen to invest in renewable energy innovation in order to be part of the development of future profitable industries.

While the global benefits of developing low emissions technology is clear, questions might be raised about the benefits to Australia of these public investments, especially given the modest scale of our investments compared to countries like the US, Japan and China. R&D offers opportunities for Australian research to be applied to Australian issues. RD&D policies generally promote collaboration – governments tapping into potential financiers, investors and innovators. In particular, applied R&D can produce specific knowledge to assist cost reductions in the Australian context.

Commercialisation funds early learning investments to overcome first mover disadvantages, but also to help overcome the advantage of incumbents and institutional inertia. Also required is enabling policies for early stage deployment, such as gathering data, grid access, standards development, education etc.

Demonstration programs tend to be attractive in terms of government announcements – e.g. flagships – whilst be less successful in ensuring actual deployment outcomes. Rigorous and transparent tendering schemes can offer useful advantages in this regard and are seeing growing use in Australia and elsewhere.

Financing assistance for low emissions technologies is needed to address financing gaps due to the capital intensive nature of many of these projects, requiring long tenor debt, and the lack of experience with these technologies amongst institutional investors, in particular.

Through assorted programs and agencies, such as ASI, ARENA, and CEFC, Australia has significant experience with R&D, demonstration and commercialisation investments. Lessons learnt include:

- On-off R&D support is less cost-effective – we need continuity of people and infrastructure;
- Successful integration into the existing energy sector arrangements is as critical for technology success as progress on the underlying technology; and
- Knowledge sharing is challenging and agencies must insist on transparency in return for funding.

4 Sectors and Policies

Q12. What policies do you consider are best suited to which sectors and why?

We will focus our comments on the electricity sector which is our key area of policy work. For this sector, the key learning of the past two decades would be that major industry transformation will require a coherent and comprehensive climate and energy policy framework. We note that the recent Review of Governance Arrangements in Australian Energy Markets, run by the COAG Energy Council, recommended that climate policy be set outside of energy industry policy strategy (Vertigan et al, 2015). An indication of the significance of this will be whether energy industry organisations actively participate in this Review, to the same extent they would if it were part of the energy policy framework. There runs the risk of energy policy being developed in isolation from climate policy.

Q13. Are there sectors that are better suited to voluntary pricing in the short term and mandatory policies in the longer term and why?

The usefulness of voluntary pricing mechanisms is so uncertain that it likely doesn't have a particularly useful role to play in effective climate action, certainly in the medium to longer term. Beyond the poor measurability of many proposed types of projects, there is the very real risk of what is effectively carbon leakage between stakeholders undertaking actions that reduce emission and participating in such schemes, and those that are undertaking actions that increase emissions and aren't.

5 International Competitiveness

Q14. Which international competitiveness impacts are most important to designing Australia's climate policy toolkit, and why?

Q15. What is the current risk of carbon leakage, in light of the Paris climate conference and associated national commitments?

Q16. Which sectors are most likely to face adverse impacts on their international competitiveness from climate policy and why?

Q17. How do you think these impacts should be addressed?

As noted earlier, whilst this concern is generally couched in terms of carbon leakage from Australian industry due to policies here not present with our competitors, the more significant risk may well be the chance of Australia being left behind as other countries seize the economic development and investment opportunities of low-carbon innovation.

6 References

AEMO (2012) National Electricity Forecasting Report.

Betz, R., Jones, M., MacGill, I. F., & Passey, R. (2013). Trading in energy efficiency in Australia: What are the lessons learnt so far?. In *eceee 2013 Summer Study : Rethink, renew, restart*. Belambra Presqu'île de Giens, France.

Cludius, J. M., Forrest, S., & MacGill, I. F. (2014). Distributional effects of the Australian Renewable Energy Target (RET) through wholesale and retail electricity price impacts. Energy Policy, 71(August 2014), 40-51. [Q1, IF 3.402]

Easton S; Bruce A; MacGill I, 2015, 'Generator investment transition in the Australian National Electricity Market with increasing penetrations of renewable energy', *Asia Pacific Solar Research Conference 2015*, Brisbane, 8 - 10 December 2015

Ecofys (2014) *State and Trends of Carbon Pricing for the World Bank*, Washington DC, May 2014

IPCC (2011). Policy, Financing and Implementation. *IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation*.

MacGill, I. F., and Healy, S. A. (2013) "Is Electricity Industry Reform the Right Answer to the Wrong Question? Lessons from Australian Restructuring and Climate Policy," in *Evolution of Global Electricity Markets: New paradigms, new challenges, new approaches,* ed. F.P. Sioshansi, Elsevier.

MacGill I.F. and R. Passey (2009) *CEEM Submission to the Senate Economics Committee Inquiry into the Renewable Energy Bill*, A submission to the Australian Senate Committee, August.

Passey, R. J., Bailey, I., Twomey, P., & MacGill, I. F. (2012). The inevitability of 'flotilla policies' as complements or alternatives to flagship emissions trading schemes. *Energy Policy*, 48(Sept 2012), 551-561.

REN21 (2015) *2015 Renewable Energy Status Report.*

Reputex (2015) *Analyst Update - Australian GHG Projections Overstated,* June 2015.

Twomey, P. (2012a) 'Rationales for Additional Climate Policy Instruments Under a Carbon Price', *The Economic and Labour Relations Review:* ELRR 23. 1 (Feb), p7-31

Twomey, P., Betz, R. A., & MacGill, I. F. (2012b). Achieving additional emission reductions under a cap-and-trade scheme. *Climate Policy*, 12(4), 424-439. [IF 1.675]

Vertigan, M., Yarrow, G., & Morton, E. (2015). Review of Governance Arrangements for Australian Energy Markets Final Report.