Australian National University

To Dr Alan Finkel

Chair of Australia's Independent Review into the Future Security of the National Electricity Market

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Dear Dr Finkel,

I would like to take the opportunity to share selected research-based insights and views relevant to your review. This contribution touches on just three aspects.

- I discuss the choice of policy instruments to achieve lower emissions in the electricity sector and argue that an EIS deserves pursuing, given the present circumstances and in the context of the longer term desirability of a broad based carbon pricing system.
- I discuss options for decarbonisation and argue that overall, renewables plus storage and demand-side integration are likely superior to investment in gas fired electricity generation.
- I suggest the creation of an open platform for analysis and modelling with open data access and full transparency about assumptions, in order to effectively support debates about Australia's energy and climate change policies.

1. Policy instruments to achieve lower emissions in the electricity sector

An emissions intensity scheme should be pursued if and while a broad-based carbon price is not politically feasible.

A broad-based *carbon price* (implemented through an emissions trading scheme) remains the economically preferred instrument to steer investment to lower-emissions energy options at lowest cost to the economy. However it appears politically out of bounds at least in the short term. Consequently, mechanisms that are effective and that can be integrated or transformed into longer-term more comprehensive policy approaches should be pursued.

An *emissions intensity scheme (EIS)* could be a viable sector-specific approach in electricity generation. An EIS has disadvantages compared to broad- broad-based emissions pricing, including the intrinsic lack of fiscal revenue from the policy instrument and lack of carbon price signal to electricity demand. However an EIS could be effective in shifting investment decisions towards lower-carbon options. It also would shift electricity dispatch within the fossil fuel generating fleet towards lower-emissions plants, by providing a relative advantage to more efficient coal and gas plants, and to gas plants over coal plants.

Given the perceived political difficulty of re-instating a comprehensive carbon pricing scheme, support for an EIS is widespread within the energy sector and among electricity sector and climate change policy analysts. Given the difficulties that Australia's climate change and energy policy has experienced in recent years, a policy mechanism that enjoys relatively broad-based support and holds promise to be effective is worthy of support. It would be possible for future governments to adjust the ambition of an EIS (expressed as the targeted annual reduction in emissions intensity of power supply), and also to integrate or transform it into a more broadly based mechanism.

Thus it is my opinion an EIS is worthy of recommendation within the terms of your review, in particular as your review is set to remain influential beyond the short term and beyond present political constraints at the federal level.

Other options under discussion include a *low-emissions electricity target* (LET), to replace the Renewable Energy Target (RET). Such a mechanism would in principle have similar incentive effects as an EIS. However in my analysis it has a number of drawbacks compared to an EIS. As a stand-alone policy instrument it would be less integrated with the electricity market; it would be more complex for governments to calibrate targets; and given the experience with the RET, a LET may suffer doubts by investors over the longevity of the mechanism and parameter settings.

Depending on policy choices and settings, provisions to facilitate *orderly exit of old power plants* may also be needed. There are options to facilitate exit in industry-funded schemes (as per Jotzo and Mazouz 2015)[1]. Arguments can also be made in favour of regulated closure. If a regulatory route such as age-based operation limits was chosen, this should be complemented by market-based flexibility mechanism (for example trading of remaining power generation rights) to avoid unnecessary efficiency costs of inflexible rules-based regulation.

Whichever policy mechanism is implemented, it is of great importance that it brings a broad-based expectation of stability and longevity. Australia's energy sector has long been exposed to significant investment uncertainty due to pervasive *policy uncertainty* about climate and energy policy. Such uncertainty has detrimental effects on the investment climate and potentially on the cost effectiveness of any investment that does take place (Jotzo, Jordan and Fabian 2012)[2]. For an effective and efficient low-carbon transition, stable and predictable policy settings are needed.

2. Decarbonisation of the power sector and the role of renewables versus gas

Australia's electricity sector can and should be almost fully decarbonised by mid-century, based renewables plus storage and demand-side integration.

The technologies for full decarbonisation are available, and the ageing generating infrastructure allows full replacement over the next three decades. There have been rapid advances and cost reductions in renewable energy generation, storage technologies and flexible demand responses. The replacement of coal fired power over coming decades can be based almost exclusively on renewable energy, and this may turn out to be the cheapest option.

A low-carbon transition in power generation is central to achieving significant cuts in national emissions reductions, coupled with electrification of most activities that currently directly burn fossil fuels (*Deep Decarbonisation Pathways* report - Denis, Jotzo et al 2014)[3]. Many analyses have shown the viability of an electricity system based on

[1] Jotzo, F. and Mazouz, S. (2015), Brown coal exit: a market mechanism for regulated closure of highly emissions intensive power stations. *Economic Analysis and Policy* 48: 71-81.

[2] Jotzo, F., Jordan, T. and Fabian, N. (2012), 'Policy Uncertainty about Australia's Carbon Price: Expert Survey Results and Implications for Investment', *Australian Economic Review* 45(4): 395–409.

[3] Denis, A., Jotzo, F., Ferraro, S., Jones, A., Kautto, N., Kelly, R., Skarbek, A. and Thwaites, J. (2014), *Pathways to deep decarbonisation in 2050: how Australia can prosper in a low carbon world*, ClimateWorks/ANU.

renewables in Australia, among them modelling prepared by the CSIRO for the Australian Deep Decarbonisation Pathways report (Graham and Hatfield-Dodds 2014)[4].

In this context it is important for policy at the federal and state level not to encourage or facilitate excessive investment in gas-fired power generation. Gas peaking plants have an important role in helping ensure supply security in the short to medium term. However medium to longer term renewable power generation plus storage (probably in a mix of large centralized and smaller scale decentralized facilities) are likely to be the economically desirable alternative. There are also mounting opportunities for demand-side integration to help make optimal use of intermittent renewable energy sources.

Furthermore, gas based systems are also incompatible with genuinely low carbon trajectories, unless power stations are equipped with carbon capture and storage - which on present indications would be far more expensive than complementing a renewables-based system with storage and demand-side flexibility.

3. Creating an independent, open platform for energy policy analysis and modelling

Independent, transparent analytical capacity needs to be fostered and given an institutional and organisational framework that allows comparability and open access to data.

The debate on Australia's energy and climate policy typically transition has relied heavily on stand-alone commissioned modelling studies. These modelling exercises are often of 'black box' nature regarding detailed assumptions, and do not allow direct comparison with alternative assumptions or analytical frameworks. Examples abound in the modelling of emissions reductions policies over the last decade by successive governments, independent agencies such as the Climate Change Authority, think tanks and NGOs, as well as industry associations and large commercial players.

As a result there is a risk of lack of trust in such analyses as they cannot be readily replicated and compared with the results from alternative approaches. Further, the dominant approach typically results in a narrow scope of scenarios and policy options analysed, as reports are usually commissioned ad-hoc and with the interest of the particular commissioning entity in mind.

Australia's public and policy debate on energy policy, including in the context of climate change policy, would be served by the creation of an entity such as an '*Energy analysis and modelling open forum*'.

The objective would be to create an institutional and organisational framework where technically capable players come together to conduct relevant analysis and energy sector modelling in a comparative mode, work to understand differences in assumptions and results, and make the assumptions, underlying data and results available publicly. A guiding principle would be open access to all scenario assumptions and headline results, and open access to all data unless precluded by commercial confidentiality.

Such a forum would convene stakeholders to decide about relevant analysis and modelling to be undertaken; facilitate participation by any group that brings relevant analytical tools and expertise; initiate and conduct comparative analysis, for example through dedicated reports and series of research papers; and organise outreach and engagement activities, including with government. Beyond convening modelling

[4] Graham, P. and Hatfield-Dodds, S. (2014), Electricity sector, in *Pathways to deep decarbonisation in 2050: how Australia can prosper in a low carbon world – Technical Report*, ClimateWorks/ANU.

comparisons and related analysis, such a forum could also serve as a venue for open exchange between stakeholders from industry, government, interest groups and the research sector.

Such a forum would ideally be located at one or more of Australia's universities, thus providing convening power free of commercial or policy pressures, and a clear focus on impartial analysis and free access to data and information.

A well-known model is the Energy Modeling Forum based at Stanford University, which for decades has convened modelling comparisons for global climate change mitigation scenarios, and in doing so has brought together researchers, industry and governments. Many other initiatives internationally provide similar functions, and open access to assumptions and data is a principle of many of them.

In my judgment it would be desirable and possible to establish such a forum in Australia. Preliminary discussions with selected stakeholders indicate that there would be significant interest in such a forum. It could build trust, help arrive at shared broadly shared understanding of facts and scenarios, and ultimately assist in improving energy policy outcomes for Australia.

I would be pleased to provide further information if desired by you or your team.

Sincerely,

Frank Jotzo

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