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Electricity Plan: DCCEEW Discussion Paper

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This note records, and on a couple of points expands upon, my discussion of the Discussion Paper on the Electricity Plan with DCCEEW officials on 3 April. The note is being provided by The Superpower Institute as a submission on the Discussion Paper. The note makes 9 points:

1. **Poor Statements of Objectives:**
   The Discussion Paper lacks clear definition of the problem that is to be solved, or a framework for addressing problems. The Plan will be much more useful if it is structured around a clear definition of objectives.

I suggest that the central objectives are for Australia's plan for the electricity sector to:

(i) maintain established standards of security and reliability of electricity supply to Australian users of power through and beyond the energy transition.

(ii) support Australia contributing its fair share as a developed country, and as much as possible consistently with (iii), to the global effort to achieve the Paris goal of holding temperature increases as close as possible to 1.5 degrees above pre-industrial levels, and

(iii) in particular, support Australia in meeting its commitments to the UNFCCC and more broadly to the international community, to reduce emissions by 43 percent on 2005 levels by 2030 and to net zero by 2050, and also its commitments on renewable energy expansion and reduction in coal use and methane emissions, and

(iv) support the highest possible average real Australian incomes consistently with achieving objectives (i), (ii) and (iii) through its contribution to investment, employment and the cost-effective supply of electricity to users.

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Australia can contribute a great deal to global decarbonisation by expanding exports of zero-carbon goods based on its rich natural endowments for producing renewable energy and sustainably harvested biomass. Large-scale expansion of renewable electricity generation and use underpins the opportunity. Australian export of zero-carbon goods is especially important to decarbonisation in the densely populated industrial countries of Europe and Northeast Asia, which account for over 40 percent of global emissions. Playing this larger role can underpin growth in average Australian incomes over the next several decades, at levels substantially above what would be possible with an inward-looking approach to decarbonisation in Australia.

This potential for large-scale exports of zero-carbon goods is Australia's opportunity to be the renewable energy Superpower of the zero-carbon world. Australia's utilisation of this opportunity is centrally important to objectives (ii) and (iv), and potentially helpful to (i) and (iii).

2. **Definition of Superpower and its Links to Electricity:**
   The Discussion Paper makes many references to the Government's commitment to making Australia a Renewable Energy Superpower. It does not discuss what this means, or its relationship to electricity sector policy and development. The Electricity Plan to follow the Discussion Paper will be stronger if it defines the Superpower opportunity, and its links to decarbonisation of the established electricity system.

The Superpower opportunity derives from Australia's abundance of resources for generating renewable energy and growing biomass at large scale and low cost, relative to the country's economic size and domestic demand, and to these ratios in the rest of the world. Australia's relative endowments contrast sharply with the densely populated, highly industrialised economies of Northeast Asia (Japan, Korea and China) and Europe, which have strong comparative disadvantage in production of zero-carbon goods. These economies taken as a whole have no realistic possibility of achieving zero net emissions in the absence of large-scale imports of zero-carbon goods from countries with comparative advantage in production of these products. Australia is the most important of the potential suppliers of zero-carbon goods to Northeast Asia and Europe.

There is a close relationship between electricity policy in general and Australia's Superpower opportunity. Building even the most limited versions of the Superpower would require an increase by several times current Australian electricity supply. Full utilisation of

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the opportunity would require an increase by around ten times current Australian electricity supply.

There will be several advantages for established users of power where the new Superpower industries draw on the same grids as established users. The capacity for the new users to vary demand through the day and over time can provide the main means of firming intermittent renewable energy supply. This is most obviously true for hydrogen electrolysers, which are likely to draw a majority of the power generated in Australia as a renewable energy Superpower. The linkage to immense large-scale generation capacity will assist in lowering average costs of wholesale power to established users. Major reform of established approaches to supply of transmission services is required for the established grid to play this role and for established users to benefit from linkage to major new industrial users.

3. **Draw Links Between the Electricity Plan and General Economic Policy**
   The combination of decarbonisation of the established electricity system and building the Superpower would see the electricity sector and the sectors which it supplies with power become the main focus of investment and impetus to Australian economic development over the next several decades. Successful Australian development underpinned by a strong budget and open multilateral trade is essential for the building of the Superpower.

It follows that the Electricity Plan must be developed as a component of general economic policy, and not as an isolated sectoral programme. It would be helpful for the Plan to spell out two strong links between general economic policy and electricity policy: the importance for electricity of maintaining a strong budget; and the importance for the electricity sector of multilateral free trade on both the export and import sides.

A strong budget:
Returning Australia to sustained rising productivity and living standards requires a strong budget, to support a competitive cost of capital, a competitive real exchange rate, and a buffer against external instability. Each of these is crucially important for the zero-carbon transition and for building the Superpower. Programmes that channel fiscal resources to the electricity sector but substantially weaken Australia's budgetary position may not promote even the electricity sector.

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Open multilateral trade:

It is essential that businesses seeking to build and operate zero-carbon electricity assets are able to purchase equipment and services from the world's most cost-effective sources. Requiring developers to purchase assets made in Australia or designated friendly countries when they would otherwise have chosen other sources would increase Australian electricity costs and the Australian cost of living and reduce the global competitiveness of the Superpower industries. It is essential that Australian trade policy and diplomacy secure the widest possible access to overseas markets for zero-carbon goods, receiving green premia on equal terms with zero-carbon goods produced locally in the importing countries. The best outcomes would be more likely with domestic carbon pricing at rates comparable with those in markets generating large green premia—at this stage, European markets. Where national security objectives are thought to justify constraints on open trade, the constraints should be based on analysis, transparent public explanation, and limited to what is demonstrated by analysis to be necessary to achieve security objectives.

4. **The Status of the 82 percent Renewables Goal:**

   The Discussion Paper gives prominence to Australia's target of 82 percent renewable energy in total electricity supply by 2030. It says little about the base to which the "82 percent" refers. Eighty two percent of what? Nor does it provide guidance on how policy will respond if electricity demand diverges from levels anticipated at present. The Plan should note the possibility that demand for power will grow beyond what is currently anticipated, and outline possible responses to such a development.

Eighty two percent of what?

It is likely that demand for electricity will grow strongly over the next six years after a decade and a half of stagnation. The sources of growth will be:

(i) The electrification of many activities in which demand is currently met in other ways. This includes growth in use of electric vehicles and substitution of electrical for gas heating; and the beginnings of use of green hydrogen in industry.

(ii) The explosive growth in demand for electricity with expanded applications of information technology and artificial intelligence. This development appears already to have substantially increased electricity demand in the US, and shows signs of doing so in Australia.

(iii) The beginnings of growth in Superpower export industries, initially drawing renewable energy from the grid when prices are exceptionally low.

(iv) Electricity absorbed in the round trip of electricity storage (batteries or pumped hydro-electric) before its sale into the market.

It is likely that demand for electricity in 2030 will be much higher than current levels. To the extent that the cause is (i), (iii) or (iv), a shortfall on 82 percent renewables supply is likely to be associated with an increased Australian contribution to the global effort to constrain climate change. To the extent that the cause is (i), it is likely to be associated with reduced total Australian emissions. In neither of these cases would there be a climate policy reason to constrain growth in total electricity demand to achieve 82 percent renewables. To the extent that the cause is (ii)--higher electricity demand from general economic growth and structural change causing a shortfall on the 82 percent-- rigid adherence to the 82 percent would involve sacrifice of Australian income growth.

I suggest that the Electricity Plan focus on provision of incentives for high and efficient investment in renewable electricity generation and storage, aiming to achieve over 82 percent in likely circumstances, but avoiding rigid adherence to the announced ratio. Possible policies are discussed in 5 below.

In this context, I note that fugitive emissions growth from LNG and coal production, and possibility from transport, is much more likely to derail Australia's achievement of 43 percent reduction in emissions by 2030 and net zero emissions by 2050 than underperformance on reduction of electricity emissions.

5. The Plan Should be Built Around a Framework for the Role of Government:

The Discussion Paper lacks a framework for defining the role of Government in the electricity sector, to achieve objectives (i), (ii), (iii) and (iv). The Discussion Paper asks for suggestions on the appropriate role of Government on a number of specific issues. The requests relate to separate, ad hoc interventions. It would be desirable for the Plan to provide a general framework for the role of Government, covering the range of policy issues. That framework would recognise:

--the central role of a general measure to penalise generators of electricity for the damage that their emissions impose on others;

--the important role of support for innovation that confers benefits on others;

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--the importance of early confirmation of the continuation of current wholesale market design;
--the important Government role in provision of transmission and distribution services that have the character of natural monopolies; and
--the role of public supply of reserve generation capacity to ensure that reliability is maintained at optimal levels in the face of extraordinary shocks to supply or demand for electricity.

The same policy framework would serve established users of power and those Superpower projects that are linked to the common user grids.

Securing a Large Role for Markets.
Change affecting electricity demand and supply at the pace, complexity and scale that is required over the next several decades is possible only with heavy reliance on competitive markets in allocation of resources. Good outcomes are likely only if market exchange is relied upon wherever competition is feasible. Government interventions should be limited to two sets of circumstances: the correction of market failures so that competitive markets can work their magic; and securing adequate quantum and terms of supply of transmission and other services provided within natural monopoly structures.

Markets can operate efficiently only if Government corrects incentives where untrammelled private exchange leads some decisions by firms to impose large costs on others, or to confer large benefits on others. The most important external cost in the electricity sector is the damage that carbon emissions impose on others through climate change. The most important external benefit in the transition to net zero emissions is the knowledge and restructuring of the operating environment that the pioneer in new industrial processes confers on others.

Providing a green premium.
Markets will only serve the public good if the carbon externality is corrected by Government action. Markets will work most effectively if the correction is achieved by putting a price on carbon through a carbon tax or emissions trading scheme. In the electricity sector, the Renewable Energy Target introduced by the Howard Government and strengthened by the Rudd Government has provided a second best means of securing a green premium from production of electricity. This has been crucial to the rapid expansion of renewable generation since the abolition of the Australian Emissions Trading Scheme a decade ago. With the Renewable Energy Target to expire in 2030, its influence on expectation of returns

on renewables investment has fallen year by year. This has been a major cause of recent falls in renewables investment. It is essential that a new measure to secure a green premium—a higher price for zero-carbon than for carbon-intensive generation—is announced so that its availability from 2030 is taken into account in decisions on long-term investment.

Why is a green premium required now when the levelized cost of renewable is lower than the levelised cost of carbon-intensive power? There are two main reasons. The total cost of new renewable generation has to compete with the operating costs only of established gas and coal generators. And increased supply of intermittent solar and wind power reduces the price of power when it is available in large quantities but not at other times, lowering the price of renewables output much more than it lowers the average cost of power. Both of these disincentives to investment in renewables will fade over time.

The operating costs of coal and gas generators will rise over time and the plants will eventually need to be replaced. At this point, the much lower levelized cost of renewable energy will be decisive without a green premium. The need for a green premium is transitional, extending to the time when almost all carbon-intensive power generation capacity has been retired.

The contemporary large variation in wholesale prices—often negative when the sun is shining and the wind blowing in the middle hours of the day, and high at other times--has introduced powerful incentives for investment in battery and pumped hydro storage. And low and negative prices when solar and wind power are available in large quantities is providing an incentive for early establishment of Superpower projects which have the ability to vary use of power through the day. The expansion of storage and Superpower production will gradually increase incentives for investment in renewable relative to carbon-intensive power generation Over time, the importance of the green premium in maintaining incentives for renewable investment recedes.

So there are a range of mechanisms through which we could expect lower-cost renewables to replace higher cost carbon-intensive generation over time, with or without a green premium. But we don’t have time. To avoid prolongation of the recent slump in renewable power generation, mechanisms must be introduced soon to establish expectations of a green premium for zero-carbon power generation from the expiry of the Renewable Energy Target in 2030.

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The expanded CIS announced in November 2023 is not such a mechanism. It differentially favours investment in some renewable power generation. But it supports only renewable generation selected for underwriting by the Commonwealth Government. The increase in demand that it promotes independently of power prices in the market actually reduces prices of power from all other established and new renewable energy projects. This reduces, perhaps to near zero, new investment that is not supported by Commonwealth underwriting. Low levels of renewables investment outside the CIS would mean that decisions by Commonwealth officials administering the CIS replace market assessments in allocation of investment across locations, times and technologies.

The announced volumes of generation capacity to be supported by the CIS fall well short of the amount required to achieve 82 percent of historical levels of power demand—let alone 82 percent of the substantially increased demand that is likely. The CIS as described so far in official accounts is unlikely to secure anything like the required expansion of renewables capacity.

The Carbon Solutions Levy suggested by Rod Sims and I at the National Press Club on February 14 would introduce the necessary green premium if its operation from 2030 were announced soon. As we suggested on February 14, much analysis and discussion must precede general acceptance of such a measure. A levy confined to the electricity sector may pass tests of community scrutiny more quickly. Such a levy would meet the requirements for establishing a differential price between zero-carbon and carbon-intensive power. Coal and gas generators would pass on the increased cost to users, as they did with the carbon price under the emissions trading scheme 2012-14. The proceeds of the levy could be allocated to reducing the cost of wholesale power to users. The overall effect may be marginally to lower the wholesale price affecting users of power. The Superpower Institute is analysing price effects and results will be released when available.

Such a levy would introduce the necessary green premium at no cost to the budget. It would assist acceptance of Australian zero-carbon goods in the most promising early markets for the Superpower industries.

The Plan will need to discuss the source of the green premium after 2030 and the role of the CIS. In the meantime, the rules for operation of the CIS will have a large effect on levels of renewables investment and their allocation across locations and technologies. The rules have yet to be announced. It is important that they be general rules, known well in advance. It is important that they leave private investors' decisions to determine the location, timing

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and technologies of investment underwritten by the scheme. Rod Sims and my National Press Club speech suggested operating rules for the CIS that would maximise the influence of private decisions through competitive markets and minimise discretionary decisions of officials.

Support for Innovation.

Markets will only serve the public good if the benefits that one firm's innovation confers on others is rewarded. The Australian Renewable Energy Agency has provided support for innovation in renewable electricity since its establishment over a decade ago. For the electricity supply sector, it can continue to play this role. Its activities need to be complemented by other mechanisms to reward innovation in the Superpower industries using renewable energy.

Electricity Market Design

With the other Government interventions in place, the best design for a wholesale electricity market is the one we have now. That is fortunate, as changing market design would introduce uncertainty that would lead to extended low levels of investment in generation and storage while Governments work out what they are doing, and market participants learn what changes Governments have in mind and explore the implications of the changes for their business decisions.

The wholesale market as it operates today reflects the true economic value of power at different regional locations and times. Power now has negative value in the middle of sunny days in the states in which solar power generation represents a large part of power supply. This is driving a boom in storage investment in South Australia. Superpower investors can bring together short-term advantages from low power prices for long enough each day to justify investment in hydrogen electrolysers. This encourages absorption of power in those places at those times. Higher average daytime prices in NSW and Queensland maintain some incentive for investment in grid-scale solar, at least while the Renewable Energy Target continues to offer a green premium in the early years of operation. Incentives across times and regions change promptly in response to changing supply and demand conditions.

The continuous operation of the electricity market for several decades has supported development of derivative instruments that allow suppliers and users of power to hedge a wide range of risks in large volumes.

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Many things in the Australian electricity sector need reform. The design of the wholesale market is not one of them. Let's not disturb the one part of the Australian electricity system that is working well. No design operating elsewhere would serve Australian objectives as well as what we have in place today.

There is a disturbing reference in the Discussion Paper to consideration being given to implementation of a new market design post-2030. While there is always room for incremental improvement, contemplation of major change creates uncertainty and on such a fundamental matter that alone will radically reduce investment in generation and storage. I strongly recommend that the Electricity Plan defines the market design that will be in place from 2030.

A Commonwealth Reliability Reserve.
One incremental change could improve the operation of the market without severely disrupting it. There are very large social costs in any absolute failure of reliability, when sudden changes cause supply absolutely to fall short of demand for a short period that leads to failure of the whole electricity system.

Opportunities in the established markets are leading to high and accelerating investment in storage capacity. This is contributing strongly to reliability of the power system.

However, private markets will never generate rewards for reserve capacity commensurate with the value that Australians place on high levels of reliability through all extreme supply and demand conditions. There is high public insurance value in the Commonwealth supporting the holding of some generation or storage capacity out of the market in reserve. A simple Reliability Reserve, explicitly directed at meeting community reliability standards, could ensure that adequate power is available to meet demand at some specified high price. I describe a possible design for a reliability reserve in Appendix 1.1 of The Superpower Transformation: Making Australia's zero-carbon future.

Electricity Transmission and Hydrogen Natural Monopolies.
The remaining essential role of Government is to ensure that the electricity transmission services that have the character of natural monopolies are supplied in adequate amounts in the right places at the lowest economically feasible prices. The current regulatory system has led to electricity transmission services being currently the most important bottleneck to efficient supply of renewable energy. The Discussion Paper ignores the big transmission problems. This omission must be corrected in the Plan. Examining the possible solutions and

choosing amongst them is a major undertaking. Rod Sims and I in our National Press Club presentation suggested that the Government initiate a Productivity Commission review of the transmission issues.

Hydrogen transportation and storage will be immensely valuable in the Superpower economy. An efficient Superpower economy would have multiple nodes of production and industrial use of hydrogen. There would be at least one in each state and in the Northern Territory. Each of these nodes could be the location of many hydrogen electrolysers and many users or exporters of hydrogen. Opportunities for short-term trade in hydrogen and for sharing storage would substantially reduce costs. Hydrogen transportation and storage, like electricity transmission, has the character of natural monopoly. It is important that we establish appropriate ownership, regulatory and access structures from the start. That will be easier and less costly than unwinding the natural monopoly management mistakes of the past in electricity transmission. The Plan could usefully recommend approaches that get these important dimensions of the new hydrogen economy right from the start.

6. **Security and Transport Fuels.**
   The Paper contains a curious discussion of security of supply of transport fuels. It suggests that security may require measures to secure continuity of supply of large quantities of petroleum liquid fuels into the long-term future. There is discussion of special arrangements for imports of green transport fuels.

This ignores the reality, that Australia's natural renewable energy and biomass resources gives it strong comparative advantage in zero-carbon transport fuels: for road transport, electricity for batteries, hydrogen for long distance trucking, and green diesel and methanol; for shipping, methanol and perhaps ammonia; for civil aviation, electricity for batteries and hydrogen over short distances and various green hydro-carbons over long distances. European and Japanese shipping and civil aviation companies have recognised Australia as the reliable, clow-cost supplier of the immense quantities of zero-carbon transport fuels that they will need to buy.

The Plan will do well to recognise that production of green transport fuels is an Australian Superpower industry. The road to transport fuel security is through early development of this potentially great Australian strength. Australia will be secure from instability in overseas suppliers of fuel for road transport, shipping and civil aviation when its cars, trucks, ships and planes are running on Australian zero-carbon hydrocarbons, electricity and hydrogen. Its people will also have higher real incomes from that time.

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7. **Social Licence.**
   The Discussion Paper is on the right track in its highlighting of social licence issues related to renewable power generation and transmission.

The Plan could add one dimension to the Discussion Paper. Local community support for solar and wind farms and transmission lines is stronger when the large-scale developments are not simply moving power from rural Australia to large and growing industrial cities on the coasts. Using the renewable energy in local industry to provide some good, long-term local jobs makes a big difference. Many industrial activities using renewable energy and biomass are commercially viable at a modest scale in smaller towns. Decentralisation of some of these activities have the additional advantage of lower transport costs to local markets: urea and other chemical fertilisers; green transport fuels; explosives for the mining industries. Systematic utilisation of these opportunities will create employment in rural Australia on a scale that is small by the standards of industrial opportunities in Gladstone and the Upper Spencer Gulf, but substantial in relation to local development.

8. **Labour and Skills.**
   The Discussion Paper is on the right track on skills and jobs. Its use of the report of the Jobs and skills Agency is appropriate.

One false note can be removed. The offshore wind industry is said to be especially suitable for Australia because it is "jobs rich". Australia's challenge in the energy transition and building the Superpower is a shortage of workers and skills, not a shortage of jobs for skilled workers. "Job-rich" suggests Australian comparative disadvantage. It is not obvious why offshore wind is peculiarly jobs rich and therefore unsuitable for the Australian environment. If it were, the commendation in the Discussion Paper should be reversed.

9. **Interactions with Consumers.**
   The Discussion Paper is on the right track.