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THE CENTRE FOR INDEPENDENT STUDIES

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Select Committee on Nuclear Energy

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Submitted online via www.aph.gov.au

Submission to Select Committee on Nuclear Energy: Inquiry into the consideration of nuclear power generation in Australia

Dear Committee Members,

The Centre for Independent Studies (CIS) welcomes the opportunity to make a submission to the Select Committee on Nuclear Energy regarding the inquiry into nuclear power in Australia.

The CIS is a leading independent public policy think tank in Australia. It has been a strong advocate for free markets and limited government for more than 40 years. The CIS is independent and non-partisan in both its funding and research, does no commissioned research nor takes any government money to support its public policy work.

For decades, Australians have had access to affordable, reliable electricity from a system that was largely reliant on coal power. Current government plans propose transitioning away from coal to a system that derives the vast majority of its energy from solar and wind. While there has been rapid progress in Australia with wind and solar to levels approaching 40%, there is no evidence this progress will continue easily without significant cost increases, or reliance on firming infrastructure for support. The reason for this is an inescapable quality of weather-dependent energy: its uncontrollable pattern of occurrence. Increasingly more wind and solar energy will be excessive at certain times and places, and will require more ancillary systems — such as storage and transmission — to move the energy to where and when it is needed.

Nuclear power has the potential to provide a more affordable pathway to reduce the carbon intensity of the electricity grid. This is because it is a controllable and reliable power source. Like coal, it produces energy at times and places of our choosing. Unlike coal, it does so without carbon emissions. It makes far more effective use of our existing transmission and distribution, is both clean and safe, and can support significant industrial baseload. However, it needs to be done well to provide these benefits. The CIS has published a paper detailing the four key lessons Australia can learn from the global experience of building low-cost nuclear. Section two of this submission provides a summary of these four lessons. For more detail, see the attached paper *How to Build Low-Cost Nuclear: Lessons from the world*.

Yours sincerely,

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While plans make renewables appear cheap, they are not

The pathway Australia has chosen to get to net zero is making electricity increasingly unaffordable. This has come as a surprise to policymakers and the public because the official plans present a renewables-dominated system as the least-cost system. In fact, these plans exclude significant costs, have underlying flaws in their modelling, and are constrained by government policies that essentially determine their output.

AEMO's Integrated System Plan (ISP) is the masterplan for building transmission over the coming decades. The ISP requires sophisticated modelling of our energy system. AEMO currently presents this plan as being the least-cost pathway for decarbonising the whole electricity system, and it is frequently cited by energy ministers as expert support for their policies. However, the ISP is almost entirely determined by the very policies it is cited as providing support for, and it has a significant number of flaws.

AEMO has constrained the ISP model so it must reach state and federal renewables targets, carbon budgets and other policy targets regardless of their feasibility or cost. The 82% renewable energy target is currently the most significant constraint. For more detail on the ISP's appropriateness as a masterplan, see the Centre for Independent Studies' *Primary Submission to the Select Committee on Energy Planning and Regulation in Australia*.

The ISP's flaws mean it not only fails to find a least cost system, but also seriously understates the cost of the system it proposes. The flaws are:

1. Failing to test whether expanded REZs in catchments with adjacent storage connected to load centres is a better renewables plan than massive interstate transmission. Strong correlation in weather patterns between sites across the NEM means transmission is of limited use in ensuring reliability during bad weather;
2. Using an overfit model that assumes perfect foresight of the weather decades in advance and builds just-in-time flexible gas capacity before years predicted to have poor weather for renewables. Overfitting occurs when models conform too closely to a limited set of inputs and fail to account for the variability of the real world. In reality, the grid will have to be prepared for almost any weather every year; requiring greater investment in firm capacity to ensure reliability, and thus reducing the value of interstate transmission;
3. Double-counting benefits of transmission projects. The method used to determine the value of individual projects does not treat the energy system as an integrated whole (i.e. a system of smaller sub-systems) but rather a collection of parts largely independent of one another, allowing uneconomic projects to be approved and costs passed to consumers;
4. Manipulating the selection and weighting of scenarios to exclude the only baseline scenarios without a binding renewable energy or carbon target in favour of ambitious (and in some cases, practically unachievable) targets. This manipulation began in the 2022 ISP and has become more problematic in the 2024 ISP, forcing a faster timeline than necessary for transmission projects
5. Using hydrogen as an unrealistically flexible sink for solar energy;
6. Relying on rooftop solar and home batteries to provide generation and storage but excluding their costs. Rooftop solar and home batteries and EVs provide a significant portion of generation and storage respectively;
7. Excluding the cost of recycling wind turbines, solar panels and batteries — thus making renewables appear cheaper than they are over their lifetime;

8. Excluding emissions from the manufacture of wind, solar and batteries, thus making them seem cleaner than they actually are. This restriction of 'Scope 1' emissions means the ISP will increasingly export emissions to China, while creating the appearance of meeting net zero ambitions locally; and
9. Treating government-committed projects with costs yet to be sunk as locked in without assessing their benefits, making transmission projects that link these assets seem more valuable.

For a full analysis of these flaws, see the Centre for Independent Studies' *Supplementary Submission 2 to the Select Committee on Energy Planning and Regulation in Australia*.

Low-cost nuclear deployment depends on four decisions

Nuclear power has the potential to provide a more affordable pathway to net-zero. However, nuclear energy can either be very cheap or very expensive. While much ink has been spilled recently attempting to establish what the true cost of nuclear is (as though it is fixed), in practice, it varies significantly and depends directly on how nuclear energy is planned, procured, and operated. Getting this right is key to delivering nuclear energy so that it can help deliver affordable electricity for Australians.

CIS research shows that successful countries:

1. **Use a limited number of designs**. Maintaining a diverse range of designs appears to be difficult, probably because it dilutes industrial experience and stretches supply chains more thinly across different concepts. Rather than 'testing' multiple different designs or insisting on an original design, Australia should select a design that has worked well overseas.
2. **Build more reactors at fewer sites**. This allows for 'learning by doing' and economies of scale at each site. It allows for economies of scale because a substantial portion of the costs for nuclear energy are on a 'per-site' basis, and include civil works, establishing water access, transmission corridors, attaining social license, and various safety and regulatory overheads. Australia should focus on building larger nuclear plants at a limited number of sites. For example, one large nuclear station could replace the two or three smaller coal plants that support Sydney and Melbourne in the Hunter and Latrobe valleys. Where possible, existing water and transmission assets should be used with modest changes.
3. **Align the interests of designers, builders, operators, and owners**. This is commonly achieved by vertical integration of these roles, frequently to the extent that a single company is responsible for every stage. This ensures the plant is designed to be built as quickly as feasible to commence safe, reliable, and efficient operation. In small- and medium-sized countries, the nuclear industry may have the characteristics of natural monopoly. In other words, there is not enough demand for multiple vertically integrated firms to produce at a low average cost, and the advantages attained by competition are outweighed by concentrating experience and capacity in one company.
4. **Involve governments**. Governments are better positioned to capture the national security, environmental, and power system benefits provided by nuclear energy, which private companies find hard to recoup. Governments also own and control the risk of regulatory changes, meaning they are better placed to invest in nuclear power in Australia than private companies from a risk perspective. They also have longer time-horizons than private firms, which generally require returns within 30 years despite nuclear plants lasting two to three times as long as that. Government borrowing costs are also lower, reducing the cost of capital-intensive and long-lived projects such as nuclear plants. With the exception of the United States, every country with an established nuclear power industry has had either significant

government ownership in its first reactors or established regulated monopoly rights for a private company to advance nuclear power.

The above factors have a strong enough effect that countries like South Korea and Canada with around 620 TWh of electricity consumption each year are able to deliver nuclear at half the cost of countries like the United States that have markets nearly an order of magnitude larger (4,250 TWh). These lessons are therefore all the more critical for Australia, where annual energy needs are only 270 TWh and the entire annual demand for electricity could be met by tens of reactors rather than hundreds, or thousands.

See the attached paper *How to Build Low-Cost Nuclear: Lessons from the world* for our full analysis.