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Mr Adrian Tembel
Presiding Commissioner
South Australian Productivity Commission
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**Premier's Climate
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Dear Mr Tembel

Re: Draft report of the Inquiry into South Australia's Renewable Energy Competitiveness

I am pleased to provide a submission from the Premier's Climate Change Council (the Council) in response to the South Australian Productivity Commission's draft report (attached).

The Productivity Commission's draft report finds that South Australia has some significant natural advantages in terms of renewable power, and highlights some of the barriers to the state's ability to capitalise on these natural advantages.

As noted in your terms of reference, this is a highly competitive environment and South Australia must act now to capture the opportunity.

The Council submission builds upon its initial input paper provided in February 2022 and provides feedback on the findings and on potential approaches to addressing the barriers to South Australia's renewable energy competitive advantage, as well as highlighting some of the economic opportunities.

I invite you to meet with me should you wish to discuss the Council's submission.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Martin Haese'.

Martin Haese MBA
Chair, Premier's Climate Change Council

Premier's Climate Change Council (PCCC)

Response to the draft report of the Inquiry into South Australia's Renewable Energy Competitiveness

1. South Australia's renewable energy advantages.

South Australia has a significant renewable energy advantage, including:

- A global reputation for renewable energy leadership, including developing hydrogen projects and in hydrogen safety and regulation.
- Significant investment into renewable energy production infrastructure over the last decade.
- Abundant renewable energy resources (wind and solar) along with abundant natural resources (including rare earths and other key minerals vital for new technology industries).
- Capacity and potential to achieve a level of renewable energy that is more than 500% of current local grid demand by 2050¹.
- Increased renewable generation and reduced costs of renewable energy have lowered wholesale electricity prices in South Australia; and South Australia has been a net exporter of electricity in recent years².
- Lower cost renewable energy enables opportunities to grow low emissions industries including value added minerals processing and products, hydrogen production and other energy intensive manufacturing, industry and agricultural opportunities.
- An appetite from within the business community to uncover profit generating enterprises in the low emissions economy.
- Measurable and visible positive outcomes resulting from efforts to stabilise the electricity grid with increasing security and reliability supported by; grid-scale battery storage; highest per capita installation of distributed batteries; virtual power plants; pumped hydro-storage; and installation of synchronous condensers³.

1.1 How could the State secure a competitive advantage from renewable energy?

South Australia has the capacity and potential to achieve a level of renewable energy that is more than 500% of current local grid demand by 2050. Growing demand by attracting and growing local industries as well as export to increase supply and reduce costs will be a key issue.

All businesses and industries, including those looking to increase mining extraction activity and processing, will be sensitive to the need for 'firm' supply and will want to look at the cost comparison of options in considering increased investments.

Opportunities for growing demand include:

- attracting and growing low emissions and energy intensive industries deploying renewable electricity and hydrogen
- expanding low emissions industrial and agricultural development in regional areas such as the Upper Spencer Gulf
- demonstration of the optimisation of grid stabilising technologies such as concentrated solar thermal (CST) and green hydrogen
- diesel replacement with green hydrogen within micro grids
- continued electrification of transport, including ongoing investment and incentives to increase public and private usage and uptake of electric transport modes

¹ [South Australian Government Climate Change Action Plan 2021-2025](#)

² Professor Ross Garnaut, 2020, [South Australia's Climate Change Challenge and Opportunity](#).

³ Professor Ross Garnaut, 2020, [South Australia's Climate Change Challenge and Opportunity](#).

- promoting community use of green hydrogen through agriculture, farm machinery, industrial applications and transportation to create circular economies that consume excess hydrogen production from hydrogen hubs
- export of excess energy via interconnection nationally and potentially internationally via undersea cable (requires interconnection to the Northern Territory and Western Australia), and/or in the form of clean hydrogen
- opportunities to improve productivity in intensive agricultural production e.g. greenhouses, horticulture and dairy.

2. Further actions the South Australian Government could take to create or enhance the actual or potential competitive advantage.

The state government can choose from a wide range of policy interventions and financing measures to support the transformation of energy and industrial systems and build competitive advantage. This needs to be well planned, given priority across government, and integrated with broader economic policy and planning. Providing the regulatory and policy environment for renewable energy, and low emissions industries and production of goods and services must be a key priority of the government's broader economic agenda.

Some further actions that the South Australian Government could consider are outlined below.

2.1 A well planned and integrated approach: The opportunities and barriers cross a number of different portfolios. This highlights the need for cross-agency coordination, planning and implementation to address them and to account for key dependencies. This should be informed by clearly articulated and shared objectives.

2.2 Engage industry in building a vision and identifying measures: Engagement with industry and business to develop a vision for South Australia as a renewable energy and low emissions economic leader; and to identify key measures for addressing barriers and unlocking opportunities. As part of this engagement the government could explore holding a Clean Industry and Business Summit in Adelaide with international as well as local speakers and participants.

2.3 Develop a clean energy and industry development roadmap: Engage across government and with industry and business (e.g. through industry taskforces) to develop a coordinated roadmap and resource its implementation. The road map would set out plans for industry and government to strengthen South Australia's renewable energy competitiveness and to support clean (low emissions) economic development for key areas of the economy.

Some matters to consider in developing the roadmap include:

- Commission sound analysis and market scoping to better understand the value of each potential market opportunity (i.e. green manufacturing, hydrogen development, energy firming projects, ammonia, desalination or water purification). This work should inform identification of measures; and prioritisation of effort to utilise and direct increasing energy supplies to the markets and products with high value-add with opportunities for wider and local economic growth. Attachment 1 outlines potential focus areas for renewable energy and economic opportunity.
- Aligning maximisation of value-add economic opportunities with maximising emissions reduction, setting bold renewable energy targets and outlining the steps to achieving them (e.g. 200% renewable energy penetration by 2030 and 500% penetration by 2050).

The broader social and environmental co-benefits are an important aspect in the consideration of high-value economic growth opportunities. Much of the current and future renewable energy generation is located in regional locations. Thought and planning must be given, not only to reducing social and environmental impacts but delivering gains in these areas (i.e. ensuring that regional and remote communities and the environment benefit appropriately from technology advancements and economic gains associated renewable energy and economic growth).

Thought must also be given to adequately planning for a just transition for workers in carbon intensive industries which face closure or will require significant changes through decarbonisation or due to increased renewable energy penetration.

2.4 Raise the profile of clean (low emissions) economic growth in government: The government could consider establishing a Ministerial or Chief Executive level mechanism to consider strategic and policy matters relating to clean economic growth, climate change and sustainable energy generation and use.

2.5 Send a clear signal to market and build South Australia's brand and reputation: Bold renewable energy and emission reduction targets (as above) with a clear and strategic roadmap for clean energy and industry development would send a clear signal to the private sector and markets about the seriousness of the government's intent to act, and provide greater confidence to invest in low-emissions technology and diversify into low-emission industries.

2.6 Dedicated effort to develop projects and partnerships aligned with sources of funding: Actively invest effort into opportunities to partner with South Australia's universities, the private sector and the Australian Government to develop, fund and deliver projects. For example leveraging opportunities through the Heavy Industry, Low-carbon Transition Cooperative Research Centre (HILT CRC) as well as the proposed Green Hydrogen CRC. Optimising South Australia's access to new opportunities for Australian Government funding (including a National Reconstruction Fund - \$15 billion and Powering the Regions Fund) as well as existing opportunities such as ARENA. Leveraging private sector co-funding to assist in scaling new industries and research and development.

2.7 Explore a clean (low emissions) industry growth fund: Explore the opportunity to establish a clean industry growth fund to co-invest with industry and other governments to grow the state's renewable energy competitiveness and clean industries. For an examples see the Net Zero Industry and Innovation Program in New South Wales.

2.8 Create an enabling business environment: The state government could explore further action to develop a regulatory and incentive structure that promotes low-cost renewable energy, reduces renewable energy costs, promotes clean growth opportunities, and attracts further investment. This includes supporting research and development and providing education and information to business.

2.9 Green Growth Economic Zone: Establish the state's first green growth economic zone in the Spencer Gulf. Green growth economic zones can provide shared access to cheaper infrastructure and renewable energy and capacity to link businesses to improve economies of scale and enable circular use of resources (known as industrial symbiosis). These zones typically involve strong government support and promotion to attract the desired business activities, such as:

- reliable renewable energy at a guaranteed low price
- skilled labour and training programs tailored to the needs of the precinct
- streamlined planning and approval processes
- incentives such as research and development support; demonstration projects; tax breaks or other financial incentives
- upgrades/access to critical infrastructure and connections to port, road and rail logistics.

3. If a competitive advantage exists or is attainable, recommend what areas of potential economic development warrant further thorough investigation by the SA Government.

3.1 Hydrogen Production and Use

- Industrial Use - Green Copper, Steel and Ammonia
- Production for export and gas injection (Port Bonython)
- Concentrated Solar Thermal (CST) providing energy for the photocatalytic conversion of water to green hydrogen (note initial work by CSIRO has shown that green hydrogen could be produced for 60c to \$1 per kilogram by this method). CST can also be used to supply electricity, for storage or heating
- Fertilisers and transport fuel

- Work with Japanese and Korean car manufacturers to use South Australia as a hydrogen vehicle testing ground, leading to supply chain development

3.2 New Energy Intensive Industry

- Develop new technology supply chains e.g. Battery Manufacturing -> EV Manufacturing -> Space -> Hi Tech related spinoffs
- Value added and low emissions processing of green (critical) minerals e.g. mining, processing and making products from minerals for that are in-demand for renewables and other e-technology
- Attraction of energy intensive industries and services seeking to reduce their emissions such as data centres, desalination, carbon fibre

3.3 Circular Economy

- Utilisation of excess renewables (including from various SA Water Desalination Plants) to produce hydrogen enabling SA Water to retail energy and water in remote areas.
- Diesel replacement program
- Remanufacture and recycling of high value materials such as batteries, solar panels, e-technology and steel (South Australia is well placed to lead in this area as a national leader in recycling, waste management and existing circular economy initiatives and policies)
- District heating and cooling programs utilising thermal heat from hydrogen production
- Blended gas for commercial business programs
- Blended gas for residential household's programs
- Renewable energy to transport (commercial and residential) programs
- Green growth economic zone with circular economy links between businesses

3.4 Climate Adaption and Low Emissions

- Develop feed additives for agriculture to reduce emissions
- Carbon neutral agri-food systems that diversify primary industries and improve market access e.g. low emissions proteins, carbon farming and biomass industries
- Blue Carbon Strategy
- City green canopy program

4. Further comments in relation to draft report and key findings

Does the State have a future competitive advantage in green hydrogen?

For South Australia to be seen as a leader in green hydrogen, there is a need to focus on the most cost effective production technologies. Into the future, technologies such as photocatalysis and plasmalysis are expected to be more cost effective than electrolyzers given the significant energy losses in the process to produce green hydrogen from green energy and then convert it back to renewable energy.

There is a significant potential for South Australia to be at the forefront of the development of cheaper hydrogen production processes, by building on current government and private research and development investments (Tonsley Park for example) to develop world class laboratories for investigating new hydrogen production technologies. The University of Adelaide and Flinders University already have considerable capabilities and activities in these areas.

Finding 1 - *Although average spot electricity prices in South Australia are now amongst the lowest in the NEM, the average prices faced by retail consumers remain higher than those interstate and, therefore, renewables are not currently delivering a competitive advantage to South Australian consumers in terms of price.*

Unlike New South Wales, South Australia does not have low cost coal firming as part of its energy supply. There is currently no disincentive relating to emissions from coal power generation, which must be a serious consideration as South Australia reviews its firming options.

Finding 2 – *Periods of very low demand are much more frequent in the South Australian electricity market. Analysis by AEMO and others suggests that this represents a risk to system stability, and it would be beneficial to have more daytime demand.*

All solutions to the problem of low daytime demand should be explored. Other firming/storage technologies such as concentrated solar thermal (CST) or thermal storage are well established in

international jurisdictions. CST for example, is able to provide a number of services within a single infrastructure, including power, heat, storage and energy for green hydrogen production. This presents enormous potential for energy users in regional and outback South Australia. As discussed earlier in this submission, increasing energy demand through the development of high value projects with other economic and social co-benefits, should be prioritised.

Further support for the uptake of electric vehicles, including incentives/regulatory support/ infrastructure to enable vehicle charging during times of over-supply (i.e. day time) should also be explored. This offers an attractive option to soak up excess energy whilst encouraging the shift to electrified, lower carbon intensive transport modes.

Under Finding 4 – *Meeting the current South Australian decarbonisation target of a 50 per cent reduction in carbon emissions by 2030 would require current renewable generation to be roughly doubled.*

The estimated doubling of current renewable energy generation to meet the state's 2030 emission reduction target will also significantly increase the need for firming technologies. South Australia needs to explore how a competitive advantage could come from optimising the integration of additional renewable energy output with the level of firming capacity required across all users. This could make our state a global exemplar but would likely require some incentives/investments in integrated projects.

State-wide decarbonisation targets will likely need to become more ambitious in order to support Nationally Determined Contribution commitments and meet global carbon reduction needs. In addition, the rapid electrification of other sectors will require additional generation. The transport sector alone is likely to require a more than doubling of current renewable generation. Requirements in this sector must be effectively managed to ensure that demand is tailored to generation and supporting rather than contributing to peak demand.

Finding 7 - *The PPA system means that there is no incentive for firms to relocate to South Australia to take advantage of its low carbon intensity electricity market as they can remain where they are and purchase PPAs to claim they are using green power'*

The ability for interstate firms to purchase PPA's from other states was a fundamental and deliberate feature design of the national measure introduced through Federal legislation.

Finding 9 – *The OTR requirements impose a significant cost burden on new renewables projects without achieving any obvious benefits in terms of system strength.*

The Office of the Technical Regulator (OTR) requirements were introduced to ensure security and reliability after dramatic events across South Australia. Further exploration of this issue is recommended before concluding there are no obvious benefits, noting the importance of energy safety and reliability across the broader economy.

Finding 17 - *As global demand for critical minerals increases, a number of deposits which are currently uneconomic may move into production. If South Australian deposits can be extracted at a competitive cost, the State may see a substantial increase in mining output over the next 30 years.*

Critical minerals is an area of real opportunity for South Australia particularly if developed in a way that was low emissions and sustainable.

The focus of the Heavy Industry, Low-carbon Transition Cooperative Research Centre (HILT CRC) is to optimise the energy supply technologies and processes for the heavy industry's transition to net-zero. The HILT CRC is a national centre based in Adelaide and has recognised enormous opportunities for the increase in processing raw material with green energy including green hydrogen. This will enable both increased value from additional processing activities and from exporting hydrogen in the form of green products such as green iron and steel. The HILT CRC is also the global Secretariat for Mission Innovation's Net-Zero Industries Mission where global collaboration will be coordinated. This strengthens an opportunity for South Australia to lead in the green hydrogen space with international exposure.

Background – South Australian Endowments: *a substantial proportion of the national wind farm investment driven by the Rudd/Gillard government's renewable energy credits was built in South Australia.*

The Renewable Energy Target Scheme was introduced by the Howard Government through *The Renewable Energy (Electricity) Act 2000*. The scheme came into operation in 2001 and was later

expanded by the Rudd Government. The scheme provides incentives in the form of a tradeable instrument called certificates not credits.

Background – This Inquiry

The Commission should be cautious in concluding that South Australia's competitive advantage can reduce the need for firming. Industries in need of a 'firm' supply of green energy may be concerned to hear this. Analysis to review the costs and benefits of increasing reliability and security of supply to industries needing firm supply, and indeed to all users through additional generation capacity, against firming/storage technologies is required. It is noted that outcomes differ due to a range of factors including location/resource strength, distance from market and the type of renewable energy technology.