19 June 2020

Ms Jo Evans
Deputy Secretary - Climate Change & Energy Innovation
Department of Industry, Science, Energy and Resources
Australian Government's Technology Investment Roadmap

Dear Ms Evans,

Submission: Technology Investment Roadmap Discussion Paper

We are pleased to provide a submission in response to the Australian Government's Technology Investment Roadmap Discussion Paper.

The Clean Energy Council (**CEC**) is the peak body for the clean energy industry in Australia. We represent and work with over 800 of the leading businesses operating in renewable energy and energy storage. We also represent over 7000 accredited solar and battery installers and over 1000 businesses approved through our Solar Retailer Code of Conduct. We are committed to accelerating the transformation of Australia's energy system to one that is smarter and cleaner.

The technology investment roadmap ('the roadmap') can make a valuable contribution to Australia's emissions reduction efforts through an assessment of the carbon abatement potential of current and emerging technologies, and identifying opportunities to accelerate the transition to a low-cost, zero-emissions economy. We recognise that it can play a particularly valuable role in identifying new and emerging opportunities for harder to abate sectors, such as agriculture and emissions intensive industrial processes.

For the electricity sector, which is the focus of this submission, we consider that the potential for the roadmap is to turbo-charge the deployment of technologies and infrastructure that can enable and leverage Australia's abundant, low-cost renewable energy advantage.

Ensuring however, that we have the right tools in the boot will not be enough to deliver us to our destination of a net zero emissions electricity sector and economy. The roadmap, and Low-Emissions Technology Statements to follow, must be delivered within the context of a comprehensive energy transition strategy that includes a strong emissions reduction target and effective policy mechanisms and initiatives.

In the remainder of this submission, we address a number of the key questions set out within the discussion paper to assist the Reference Panel with the task of shaping the forthcoming Low-emissions Technology Statement. The key points that we will cover in our submission are that:

- Decarbonising Australia's electricity sector in the lowest possible cost way should be our top priority, given the size of its contribution to domestic emissions, its potential to support the

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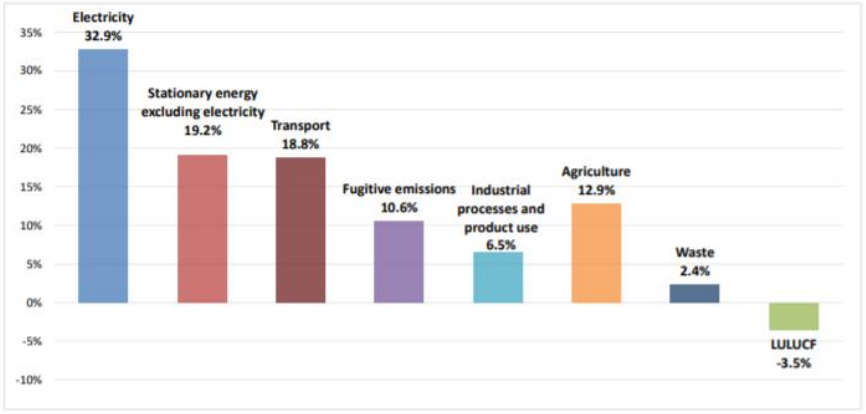
decarbonisation of other sectors and Australia's world-leading levels of investment in distributed solar energy.

- Solar and wind energy are the cheapest sources of electricity generation, and our technology priorities should leverage our comparative advantage and the mature industry built around these resources. Despite this, there remain a variety of challenges to the accelerated deployment of these technologies and solutions, which warrant strong and coordinated attention and strategy from all governments.
- In addition to prioritising wind and solar, the roadmap should also support renewable energy enablers (energy storage, grid-forming inverter technology, transmission network and integrated systems architecture) and the exploiters of renewable energy (in the form of hydrogen and electric and hydrogen vehicles).
- Technologies that extend the life of higher-cost, coal and gas fired generation should not be included within the priority shortlist, as they will increase risk in the energy sector and disincentivise new private investment in least-cost clean technology.
- The electricity sector needs a strong decarbonisation target. In addition to this roadmap Australia should have a clear strategy and set of priority initiatives to unlock this enormous clean energy potential and support deployment at scale. Without these, the roadmap will have minimal effectiveness, prioritising technologies which may have no clear pathway to commercialisation.
- The Australian Renewable Energy Agency (ARENA) is a competitive advantage to Australia, and it must play an even bigger role in pursuing our low-emissions technology agenda in the future.
- Accelerating the clean energy transition can jumpstart Australia's economic recovery and there is no reason for delay.

1) Decarbonising Australia's electricity sector must be our top priority

Australia has committed to playing its part in reducing emissions to limit global warming to under 2°C. The most logical and important place for Australia to start is with its electricity sector: at 174 million tonnes of CO2-e, the electricity generation sector accounts for the largest share (33%) of Australia's emissions.

Figure 1: Share of total emissions, by sector, for the year to December 2019



Source: Department of Industry, Science, Energy and Resources

Other characteristics also favour a strong, early focus on decarbonising the electricity sector:

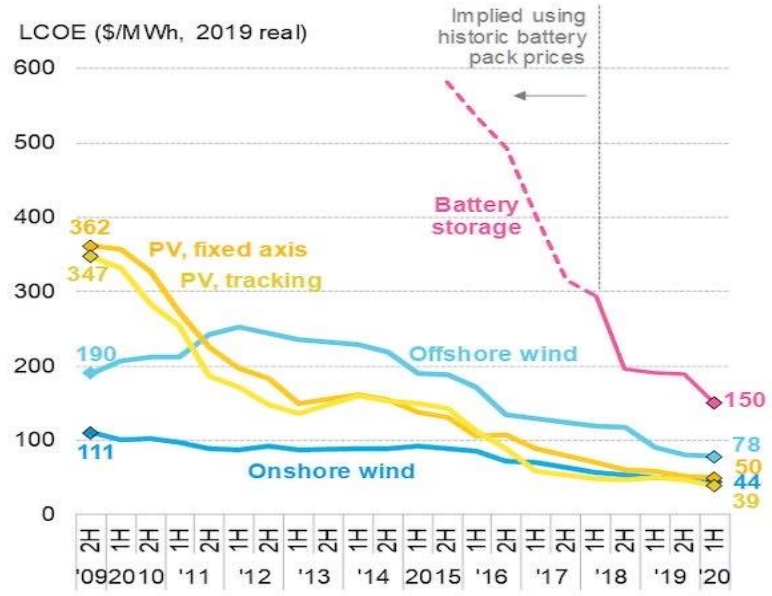
- The sources of emissions (thermal power stations) are relatively centralised and few in number
- The existing fleet of coal-fired generation is ageing and becoming less reliable
- Lower-cost technology alternatives are already available and the renewable energy sector has proven itself to be the most significant contributor to Australia's carbon abatement effort
- Renewable energy deployment has the potential to continue to do the heavy lifting in reducing national emissions, including assisting those other economic sectors where abatement is both more difficult and expensive.

Were the electricity generation and transport sector alone to both be powered by renewable energy today, the abatement potential would be 275 million tonnes of CO2-e, or almost 52 per cent of Australia's total emissions. For this reason, and given the potential of renewable energy technology, we believe that the roadmap must prioritise zero-emissions technology to ensure Australia delivers on its abatement targets at the lowest possible cost to the economy.

2) Solar and wind have won the race for the cheapest electron

The case for an accelerated clean energy transition is also supported by the steep declines in the costs of key renewable energy technologies over the past decade. As shown in Figure 2 below, the levelised cost of electricity (LCOE) of solar PV (fixed and tracking technologies) has fallen by almost 90 per cent and the LCOE for onshore wind has fallen by two-thirds (67 per cent). The cost of battery storage, which will be an important enabler for deeper renewable energy penetration, has also experienced a dramatic reduction[1] (by ~50 per cent in the last two years alone), and is expected to continue to fall.[2]

Figure 2: Levelised cost of energy, $/MWh[3]



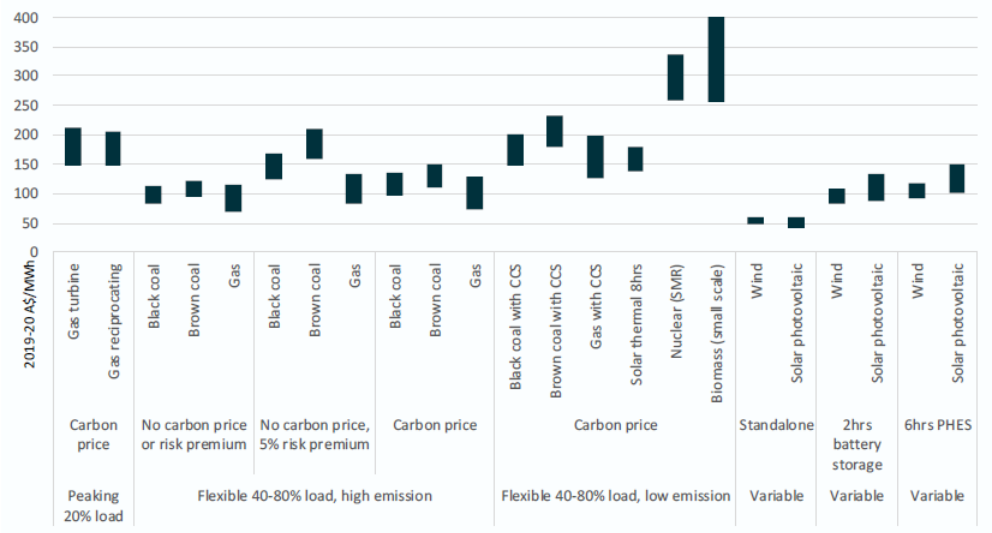
[1] The BloombergNEF $150MW/h global LCOE benchmark for battery storage is for systems with a four-hour duration.

[2] *GenCost 2019-20* (CSIRO), Paul Graham, Jenny Hayward, James Foster and Lisa Havas, May 2020

[3] BloombergNEF, 28 April 2020. Source: https://about.bnef.com/blog/scale-up-of-solar-and-wind-puts-existing-coal-gas-at-risk/

Figure 3 from the latest GenCost report, published in May 2020 by CSIRO, demonstrates that standalone solar PV and wind technologies now generate by far and away the cheapest LCOE among the wide range of electricity generation technologies. They are also becoming more and more competitive in price with coal and gas plants when short-duration storage is added.

Figure 3: Calculated levelised cost of energy by technology and category in 2020 (GenCost 2019-20)



This reality is being borne out in the market in which over 15 GW of new wind and solar energy generation has been added or committed since 2017, with very little in the way of new fossil fuel based capacity, and no carbon capture and storage capability, added to the system.

3) Follow the money

Government has a clear role to play in identifying, supporting and developing a suite of energy technologies that can deliver the low-cost zero-emission electricity system of the future. Inevitable in this task is the challenge of picking technology winners. One of the most effective ways to achieve this is for governments to recognise and monitor the levels and appetite of private investors to commit to different technologies and solutions.

In Australia's case, investors have made it very clear that renewable energy and energy storage is the preferred investment choice, committing over $20 billion into new wind and solar projects over the past three years alone. A roadmap that ignores the commercial reality and enormous investment appetite for renewable energy and prioritises technologies that are not investable would be a waste of time, taxpayer money and a distraction to the energy transition. Conversely, by prioritising those technologies and solutions where there is a demonstrable investor appetite can give government confidence that their support will be leveraged many times over by private investors and the power of commercial reality.

4) Australia's exceptional renewable energy resources provide a competitive advantage

The discussion paper places considerable emphasis on the need to leverage our comparative advantages within the global economy as we work towards zero emissions. The first among them must be our exceptional renewable energy resources. Notably, Australia has:

- the highest solar radiation per square metre of any continent in the world and consequently some of the best solar energy resource in the world.[4]
- some of the best wind resources in the world, with the greatest wind potential in the coastal regions of western, south-western, southern and south-eastern Australia.[5]

These world-class solar and wind resources, of which we have only accessed a small fraction, can produce electricity at a very low or zero marginal cost now. They therefore provide the obvious foundation for delivering ultra low-cost clean energy to households and businesses, and for supporting the competitiveness and expansion of local mining, minerals processing and heavy manufacturing.

These resource advantages are being leveraged by what is now a mature and sophisticated industry that has built the capability and capacity to accelerate the deployment of renewable energy technologies, supported by a strong supply chain that includes design engineering, finance and business model innovation capability, workforce, construction and maintenance capability.

5) Priority technologies must be those which enable and exploit our low-cost renewable energy advantage

The technologies which should be prioritised for accelerated development and adoption in the electricity generation sector, are those that can enable and exploit Australia's advantage in low-cost renewable energy resources.

This means, that we should prioritise energy storage, technologies that can provide grid-forming services, a stronger, better connected transmission network and an integrated systems architecture for the 21st century. These enablers will in turn support the electrification of other areas of the economy, and the development of renewable hydrogen and its derivatives and electricity export sectors.

Examples of enablers	***Examples of exploiters***
Energy storage	Renewable hydrogen and its derivatives
Grid-forming inverter technologies	Electric and hydrogen vehicles
Transmission network	
Integrated systems architecture	

The technologies cited above are a starting point based on what the CEC recognises to be the most significant technical barriers to wide-scale deployment of low-cost renewables at the present time, and the most significant opportunities for exploiting that advantage. These should be reviewed regularly to ensure that the roadmap continues to address the priority areas.

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[4] https://www.ga.gov.au/scientific-topics/energy/resources/other-renewable-energy-resources/solar-energy
[5] https://www.ga.gov.au/scientific-topics/energy/resources/other-renewable-energy-resources/wind-energy:

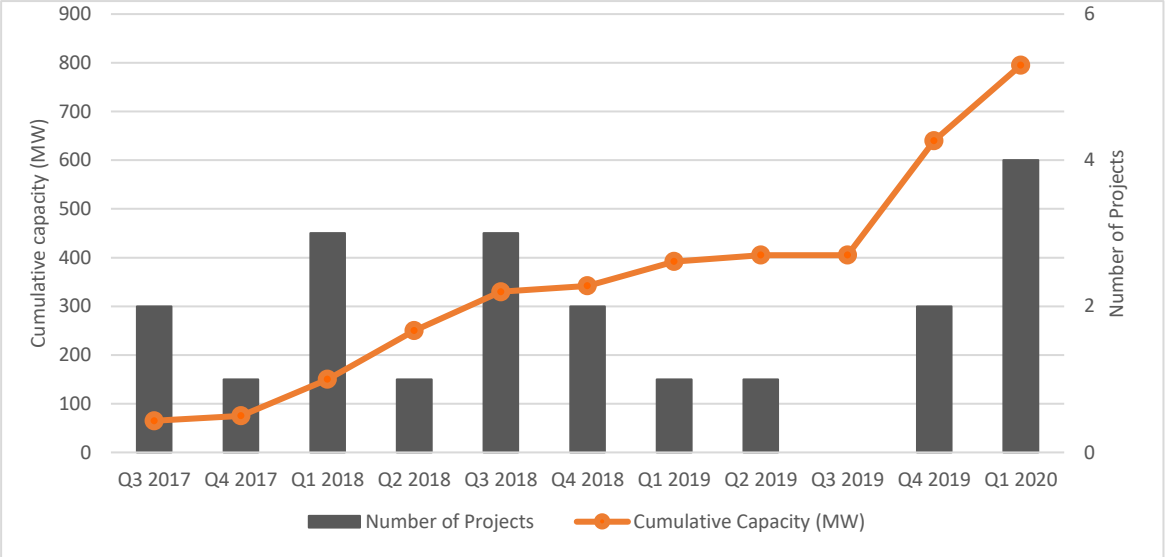
5.1) Enablers of low-cost electricity supply

Storage

Large-scale energy storage will play an important role in creating a flexible and reliable energy system and supporting the rapid deployment of variable renewable energy sources. The roadmap should prioritise both short and long duration energy storage. These have different characteristics and capability but are a significant complement to wind and solar generation which will inevitably dominate the future of the energy system.

Battery technology has proven to be incredibly effective at providing rapid system support, voltage and frequency control in the energy system. The technology is increasingly well-developed and proven, and private investors are steadily gaining confidence to commit utility scale battery projects as demonstrated below based on CEC analysis of commercial commitments.

Figure 4: Financially committed utility scale battery storage projects



Batteries are now being used to improve the performance of existing fossil assets, for example by reducing starts/stops of gas peakers as well as being effectively integrated with solar and wind projects to optimize scarce network connection capacity.

There are many different types of cost-effective thermal energy storage solutions commercially available today that can be used at grid scale and behind the meter to shift peak load. Mechanical and gravitational storage is also undergoing significant innovation, particularly at the grid scale.

Traditional gravitational storage using pumped hydro also has a role to play in supporting the renewable energy system of the future. While there are many traditional hydro and pumped hydro projects under investigation across the country, these are complex projects with long project development lead times that generally face the lack of clear energy policy, that both prices carbon costs and also recognises the additional value and benefits of these system services and characteristics.

Current market arrangements do not recognise the full system value and benefits of storage (including fast frequency response and inertial response, flexible capacity, operating reserve and/or ramping capability) and so while there has been some increase in the number of financial commitments to battery storage projects, the level of investment remains relatively low and will continue to be until market reforms are implemented and/or the cost of new storage capacity falls.

In the meantime, government support for these projects will remain critical, and the roadmap should give a high priority to supporting the accelerated deployment of energy storage solutions. It is also worth noting there are significant opportunities for Australia to develop a strong local supply chain across the various forms of energy storage, with the potential to become a significant export industry into the future. This could involve not only the local manufacturing of battery technology as well as R&D expertise, grid integration and software control systems and engineering and design expertise that are likely to become a competitive advantage for Australia should there be a strong storage industry developed over the coming years.

Emerging technologies to support stable voltage and frequency levels

Managing system strength (to maintain stable voltage levels) and inertia (to maintain stable system frequency levels) is a core technical challenge for the wider-scale adoption of renewable energy developments.

Technologies are emerging which have the potential to provide simulated inertia batteries and support system strength (grid forming inverters), but in both cases, these are still relatively novel and as observed in a recent Aurecon/AEMO report,[6] the capabilities of these technologies need to be further demonstrated and understood in order for these technologies to support system security. This makes them a clear candidate as a priority for this roadmap.

Transmission

A stronger transmission network will improve the reliability, security and resilience of Australia's energy system, as well as ensure that low-cost clean energy can be accessed and delivered to customers across the country, in turn lowering power prices.

Grid congestion and connection is the single biggest challenge facing new investment in large-scale renewable energy. Accelerating construction and expansion of the transmission network will unlock new private sector investment in large-scale renewable energy.

While many of the improvements to Australia's transmission network depend on reform to network planning and investment rules, there are also opportunities to enhance the network through the development of strategic high-voltage, direct current (HVDC) transmission links.

Advances in HVDC cable technology in recent years make it possible to efficiently deliver electricity across long distances (undersea or overland) at a significantly lower cost than alternating current (AC) transmission. Being an island nation, HVDC is particularly important as subsea high-voltage AC systems are typically not viable at distances greater than 60-100 km.[7] HVDC technology is increasingly being used for offshore wind connections and electrification of offshore oil and gas

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[6] Large Scale Battery Storage Knowledge Sharing Report, Prepared by Aurecon on behalf of ARENA, September 2019, https://arena.gov.au/assets/2019/11/large-scale-battery-storage-knowledge-sharing-report.pdf

[7] https://library.e.abb.com/public/1f143ad85488952ec1257d3800430a15/26-29%20SR425_72dpi.pdf

facilities. In China and northern Europe, HVDC technology has been selected to transmit impressive volumes of energy from renewable energy provinces to load centres.

Lower cost options for electricity transmission open up new opportunities for Australia to service neighbouring markets with our low-cost solar and wind resources. This is the basis of the Australia-ASEAN Power Link project currently being pursued by Sun Cable, connecting the Northern Territory to Singapore. Low-cost HVDC would also make greater interconnection within the domestic market more attractive, enhancing system flexibility, reliability and security.

Finally, it is worth noting that as a supplier of many of the materials required to manufacture HVDC cables (principally copper and aluminium, as well as steel and lead), coupled with access to low-cost electricity, Australia would have a comparative advantage to become a centre of manufacturing for cutting edge HVDC cable technology.

Integrated Systems Architecture

Australia's electricity system is ultra-complex with its architectural underpinnings largely established in the very different context of the early-mid 20th century. As Australia's electricity system transitions to an increasingly decarbonised future, the full potential of a wide range of new technological solutions will be increasingly difficult and costly to realise. This is because the structure or architecture of any system fundamentally determines its 'performance envelope' and ability to adapt to new operating requirements.

Australia's competitive advantage in the 21st century will increasingly depend on the ability to efficiently integrate high levels of Variable Renewable Energy (VRE) and Distributed Energy Resources (DER). Both VRE and DER can provide a wide range of beneficial physics-based services to the entire system. However, enabling these will become increasingly complex without an objective evaluation of the end-to-end systems architecture of Australia's power system.

Several other nations yet to experience the scale of VRE and DER-uptake Australia is experiencing are investing heavily to advance such processes. These objective and multi-party processes are analysing how both large-scale VRE and mass-deployed DER may be most fully leveraged across all layers of their power systems (e.g. wholesale, transmission, distribution, retail, peer-to-peer, etc).

A key goal of such a process in Australia would be to identify the minimum essential enhancements needed to optimise the system's architecture to cost-effectively meet the nation's future needs. It would need to systemically evaluate how each of the following structural layers of the system's architecture will function interdependently in the future:

- Power topology / circuit layer
- Control / orchestration layer
- Communication layer, and,
- Markets / transactions layer.

Given that such an evaluation spans the jurisdiction of many entities, stakeholders and interests, it would need to be undertaken in an objective and multi-party manner as per the leading international example initiatives.

Ultimately such an evaluation is unavoidable in Australia because the original system's architecture of our electric system could never anticipate the profound changes it now faces. Many of these challenges are more pronounced in Australia than anywhere else in the world with the result that the system's performance envelope is progressively being exceeded.

Where such a process is not undertaken, the time, cost and complexity of continuous retrofit investments need to maintain the current, and attempt to enable the future, functions of the system will fast exceed the benefits delivered.

5.2) Exploiters of low-cost electricity

Renewable hydrogen and its derivatives

Renewable hydrogen, and its derivatives such as ammonia, could play an important role in the decarbonisation of Australia's energy and industrial sectors as an emissions-free alternative to natural gas for dispatchable zero carbon thermal electric generation, to our end uses in homes and businesses, to diesel in long-haul heavy vehicles, to natural gas or coal in the production of ammonia, and even to metallurgical coal in the steel making process. Renewable hydrogen also presents the only commercially viable pathway today to store renewable wind and solar for seasonal use – an application that will become increasingly more important as wind and solar deployment increases.

Today, hydrogen is a mature, globally traded industrial commodity around the world – approximately 70 million metric tonnes according to the International Energy Agency. If global hydrogen production were treated as a country, it would be the sixth largest carbon emitter, ahead of Germany. Most of this hydrogen is produced using fossil fuels – thus, finding ways to produce hydrogen from renewable sources to displace current commodity markets represents a significant decarbonization opportunity in itself. Hydrogen can also serve as a clean alternative fuel and as such many countries around the world are developing strategies for its use beyond current industrial applications, including innovative new industrial applications such as steel making, heavy duty transportation, thermal electric generation, renewables integration and multi day and seasonal renewable energy storage.

As identified by the National Hydrogen Strategy, if Australia can successfully develop and drive down the cost of renewable hydrogen, we could also open the door to a new clean energy export of hydrogen or ammonia to rival liquified natural gas, supplying our energy and land constrained neighbours throughout Asia and beyond. Renewable hydrogen is also a smart strategy for Australia to explore given its current electric transmission constraint and abundant renewable resources, as it opens the possibility to leverage gas pipeline infrastructure to transport low-cost renewable energy in rural areas to export terminals and demand centres on the coast.

Such deployment and exports of renewable hydrogen or its derivatives depend upon Australia achieving dramatic cost reductions in the cost of renewable electricity. BloombergNEF's recent Hydrogen Energy Outlook indicates that Australia could well be in a position to be within striking distance of the Government's commitment of producing H_2 under $2, delivering renewable hydrogen to local large-scale industrial users at approximately A$2.15 by 2030. This is based on expectations that solar PV can deliver a LCOE at US$21/MWh (or A$30/MWh at current conversion rates)[8].

[8] BNEF Hydrogen Economy Outlook, 2020. The forecast also assumes a large-scale alkaline electrolyzer with capex of $135/kw in 2030; 50% of total hydrogen demand passes through storage; salt cavern storage; transport costs are for a 50km transmission pipeline. Also includes compression and conversion costs.

Meeting this price target is also dependent on cost reductions in electrolyser technology, which requires a significant scaling-up of production volumes and electrolyser size. The $70 million allocated by ARENA to the Renewable Hydrogen Deployment Fund, together with the $300 million earmarked by the Clean Energy Finance Corporation (CEFC) for renewable hydrogen financing will get the industry off to a solid start. However, significant further government investment, coupled with policies that support demand, will be required in order to make renewable hydrogen projects a commercially viable proposition in the short-medium term.

But to do so, Australia must develop an integrated systems architecture that encompasses not only the power sector, but also the gas sector. New policy and regulation needs to be developed to encourage optimal use of both of these pre-existing asset bases. For example, injection standards for existing gas pipelines and appropriate tariff design for grid-integrated electrolysis. Australia should also support investment in research, development, demonstration and market facilitation of renewable hydrogen pathway analysis and including technoeconomic assessments in the following areas:

1. Calculating the system benefits of green hydrogen production – including power, gas and transportation sector co-optimization.
2. Opportunities for new industry creation and economic development, including distributed ammonia production for agriculture, green hydrogen delivery as an alternative to propane and diesel for emergency back up.
3. Developing market rules to enable grid resiliency and renewable storage via electrolyser and battery and other DER dispatch (eg. use of green hydrogen, renewables, batteries and fuel cells for microgrid islanding charging and discharging.
4. Technology RD&D to demonstrate use of microgrids and green hydrogen powered fuel cells to increase reliability and resilience, including support of hydrogen fuel cell electric vehicle recharging.

Electric & Hydrogen vehicles

The global automotive industry is going electric, and Australia needs to prepare the necessary infrastructure to support a growing electric vehicle fleet and encourage a faster transition. This will reduce air pollution, cut Australia's reliance on global oil prices and supply chains, and deliver lower emissions.

The accelerated rollout of public electric vehicle (EV) charging infrastructure can boost Australian jobs and local economic activity. It will also support the 30 per cent of Australians who live in rental housing to have access to vehicle charging points.

In addition, given Australia's large land mass and long required driving ranges, the electrification of transportation via hydrogen powered fuel cells should also be considered. Fuel cell electric vehicles produce no emissions except water, have a refuelling profile similar to gas/diesel and are particularly useful for high utilisation, heavy-payload applications with light duty and increasingly, medium and heavy duty vehicle models commercially available.

Establishing a domestic market and demand for battery electric and fuel cell electric vehicles will help Australia leverage its abundant renewable resources for further decarbonization. Addressing regulatory barriers and providing capital funding can leverage large amounts of private investment into charging infrastructure.

6) Technologies that extend the life of higher cost, fossil fuel generation should not be prioritised for investment

The Discussion Paper shortlists *'technologies that increase the efficiency of the existing thermal generation fleet'* and *'gas generation to firm variable renewables'.*

If the purpose of the roadmap is to accelerate the transition to low-cost, zero or low emissions technologies, then it should not afford investment priority to technologies designed to maintain the existing fleet of higher-cost, emissions-intensive power stations.

Doing so would be economically irrational, given that renewable energy can already operate more cheaply and cleanly than the ageing thermal fleet – even before taking into account the impact of retrofits/upgrades on the levelised cost of electricity of thermal power stations. Investing taxpayer resources to extend their lives would only serve to further disincentivise additional private investment in the electricity sector by creating further uncertainty as to the timetable for transition.

While gas-fired power may continue to play a necessary role in balancing renewable energy generation over the short to medium term, the roadmap should envisage a diminishing – rather than expanding – role for this fuel source over time, unless we can make significant progress in driving down the costs of renewable hydrogen or other green gases which can replace the use of natural gas.

7) Australia should develop a stretch goal for low-cost electricity generation

We welcome the discussion paper's request for feedback on economic stretch goals that could help establish pathways for the cost-effective deployment of priority technologies.

The most effective goal would be a strong emissions reduction target for the electricity sector, coupled with supporting policy and market reforms, to provide a clear destination and delivery mechanism. The Government's existing emissions reduction target lacks ambition and is doing little if anything to incentivise technology deployment.

In lieu of such a target and policy, narrower goals could encourage deployment, provided that they are backed by a Government commitment to provide the necessary support and removal of policy and regulatory barriers to build investment confidence.

A stretch goal that could be considered for the electricity generation sector as a whole would be a Levelised Cost of Energy (LCOE) for 2030, similar to the approach that has been taken in developing a target price for the development of a new renewable hydrogen sector (H_2 under $2). Such a target could be in the range of $30MW/h by 2030 (under $30 by 30). While this is an aggressive target, with the right policy drivers and regulatory reforms, this target is indicative of the level of cost reductions achievable over the next decade. These sort of cost reductions would also help put Australia on track to produced H_2 under $2.

8) ARENA provides a competitive advantage to Australia – it must be extended and strengthened

With technology and innovation as the cornerstone of the Government's emissions reduction strategy, the role for Australia's innovation and research institutions will only need to increase.

ARENA, which was established in 2012, has been crucial to the rapid rates of learning in the large-scale solar sector, the early deployment of utility-scale storage, and smart grid technologies. Australia is also depending on it playing an important role in getting the country's first large-scale renewable hydrogen production facilities off the ground. It is, without doubt, already providing a major competitive advantage in our ability to attract and shape private investment, and build local capability. ARENA plays a complementary role to the CEFC, another institution that has, and will continue to play a critical role in the evolution of clean energy technology and the business models that drive its deployment.

Regrettably, ARENA will have exhausted the current funding available for new investments by the end of 2020, ahead of its statutory dissolution date of 2022. As such, the significant and deep expertise that ARENA has accrued over many years is now at considerable risk of being lost if its remit and funding are not extended and renewed as a matter of urgency.

We urge the Australian Government to retain and strengthen ARENA's role at the centre of the country's low-emissions technology agenda and a critical institution to the delivery of the roadmap.

9) Accelerating the clean energy transition can jumpstart Australia's economic recovery

Clean energy has delivered an enormous economic boost to Australia during the past few years as a result of unprecedented investment in large-scale wind, solar and storage as well as a record number of Australians investing in the installation of rooftop solar and household battery solutions.

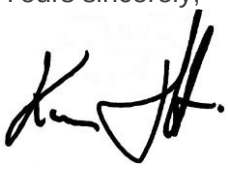
While Australia has averted the worst of the health impacts of COVID-19, the economic recovery will take years. The CEC has released a report entitled A Clean Recovery, setting out a wide range of policy options for getting renewable energy investment moving following COVID-19. In doing so, it could bring forward the enormous pipeline of wind and solar projects across Australia to:

- Create over 50,000 new direct jobs - and many more indirect jobs - in the construction of these projects, and an additional 4,000 ongoing jobs in operations and maintenance.
- Triple the amount of large-scale renewable energy installed in Australia. Over 30,000 MW of new capacity would be built, on top of the existing 16,000 MW of renewable energy generation in the National Electricity Market, accelerating Australia's shift to a grid dominated by clean energy.
- Inject $50 billion worth of investment into the Australian economy, particularly into rural and regional areas where these projects are located. This investment would be delivered by investors and allow government to direct scarce taxpayer funding to other essential services and areas.

Many of the measures set out within A Clean Recovery involve smart regulatory reform that will unblock massive pent-up private investment, while others are highly cost-effective with minimal demands on government funding or impost on electricity customers. These measures can and should complement the roadmap as part of a wider agenda to position Australia as a clean energy superpower.

We welcome the potential of this roadmap and, along with our members, look forward to working with the Government and the Ministerial Reference Panel on accelerating the deployment of clean energy technologies.

Yours sincerely,



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