



26 April 2024

Submission on the development of Australia's Electricity and Energy Sector Plan

The Clean Energy Council (the 'CEC') welcomes the opportunity to provide a submission on the Electricity and Energy Sector Plan discussion paper.

The CEC is the peak body for the renewable energy sector in Australia. We represent and work with around 1,000 businesses operating in Australia across solar, wind and hydro power, energy storage and renewable hydrogen. Our mission is to accelerate Australia's clean energy transition.

The development of sectoral decarbonisation pathways to net zero emissions is an important process for identifying the range of policies and solutions that Australia will need to meet its legislated commitment of net zero by 2050, building on the important steps that have already been taken by the Albanese Government since coming to office in 2022.

The electricity sector has made substantial progress towards decarbonisation over the last decade. Electricity sector emissions have steadily declined since 2016¹, as renewable energy generation has displaced higher-cost fossil fuel generation. The energy industry is working hard in partnership with all levels of government and key stakeholders to achieve the 82 per cent renewable energy by 2030.

The CEC considers that the decarbonisation of the Australian electricity sector is feasible by 2035, and that the Australian Government should set itself the goal of achieving this, noting that a net zero emissions electricity sector will deliver lower electricity prices to consumers and prove a drawcard for energy-hungry industries over the decades and indeed, century, ahead.

As outlined in the Australian Energy Market Operator's ('AEMO') Integrated System Plan ('the ISP'), the lowest cost way of replacing retiring coal-fired power generation is through the deployment of solar and wind, backed by energy storage (including batteries and pumped hydro), a minor back-up role for gas-fired power generation, and the augmentation of our transmission network. It is vital that the generation, storage and transmission capacity is deployed ahead of coal generation retirements, in order to support a smooth transition and avoid electricity market volatility and price spikes.

Small scale solar continues to outperform expectations and other forms of renewable electricity generation development, with Australians investing over \$20 billion in consumer energy resources to date. In 2023, 11.2 per cent of Australia's total electricity generation was produced by rooftop solar² for the first time, and this segment now represents the second largest category of generation within Australia's renewable electricity share. AEMO

¹ Australia's emissions projections 2023 | DCCEEW

² [Clean Energy Australia 2024](#) | Clean Energy Council

predicts continued growth in consumer energy resources and forecasts that the capacity of rooftop solar will quadruple by 2050.

While we need to see an acceleration in large-scale generation deployment (addressed later in this submission), we have seen stellar investment levels for large-scale storage over the past two years. 2023 concluded as the most successful year on record for large-scale energy storage projects, with a total of 3,949 MW / 9,095 MWh, and \$4.9 billion worth of investment commitments³.

The Australian Government's commitment to ensuring that actionable transmission augmentation projects under the ISP are delivered through the Rewiring the Nation fund is also providing greater confidence to the market.

There is some discussion of the role of gas-fired power generation in the electricity market, in the consultation paper. As discussed in-depth later in this submission (see page 9), we expect gas will represent a very small source of electricity in the National Electricity Market by 2030, given its higher cost and the increasing competition from zero/low emissions long-duration energy storage alternatives, such as pumped hydro, compressed air and thermal energy storage.

In the remainder of this submission, we highlight that:

1. Clear, long-term goals and stable and predictable policy mechanisms are crucial to achieving an efficient and effective transition to clean energy and net zero emissions.
2. A conducive investment environment requires investment in a range of enabling measures, from a renewables ready grid, to efficient planning & environmental assessment processes, a skilled workforce and a reliable supply chain.
3. Investment in electrification and long-duration storage solutions will be critical for phasing out fossil fuel based gas.
4. Development of clean fuel alternatives will support decarbonisation for hard-to-abate sectors, and reduce Australia's vulnerability to supply shocks
5. Australia must plan and invest in new green energy exports, not expand or extend the lives of sunset industries, and
6. The Electricity & Energy Sector Plan should take into account our renewable energy superpower opportunity.

1. Clear, long-term goals and stable and predictable policy mechanisms are critical.

A significant factor in the growth of the renewable energy sector over the past decade (and longer) has been the Renewable Energy Target (RET) and the Small-scale Renewable Energy Scheme (SRES), both of which are backed by market-based certificate schemes.

The RET's success has been in providing a clear (and legislated) long-term objective, backed by a transparent and predictable market-based mechanism enabling investors to make investment decisions in long-life, capital intensive infrastructure projects. This policy framework unleashed significant investment over the past two decades including an

³ [Renewable Projects Quarterly Report Q4 2023](#) | Clean Energy Council

'investment megacycle' of more than \$20 billion in investment in clean energy projects in the three year period between 2017 – 2020⁴.

The recently revamped Safeguard Mechanism is another good example of this policy approach. Its clear, legislated emissions reduction target for large-emitters over the medium to long term, and a carbon credits trading scheme to enable industry flexibility in the way in which emissions reductions are achieved, will enable industries and investors a clear line of sight in relation to their longer-term obligations, stimulating investment and mitigation solutions.

These policy frameworks are complemented by access to concessional financing, via the Clean Energy Finance Corporation, and support for clean energy innovation through the Australian Renewable Energy Agency (ARENA), which has also played a valuable role in driving down project costs and accelerating the scale-up of emerging technologies.

In considering Australia's sectoral decarbonisation plans, it is critical that we draw on the lessons of past policy successes, and seek to create clear, predictable, and long-term policy frameworks that can enable private capital to invest with confidence.

We commend the Australian Government's commitment to supporting accelerated deployment of large-scale generation and storage deployment and acknowledge the expansion of the Capacity Investment Scheme to bring forward 23 GW of generation projects and 9 GW of dispatchable/energy storage projects.

We note that the scheme – with its forward auction schedule between 2024 and 2027 for 15-year underwriting contracts – is designed to ensure the achievement of the target of 82 per cent renewable electricity generation by 2030. While this addresses the near-term target, it stops short of providing a comprehensive policy framework for the full decarbonisation of the electricity sector. This will need to be delivered via the sectoral decarbonisation plan.

2. A conducive investment environment requires investment in a range of enabling measures

The investor appetite for investing in renewable energy projects depends not just on financial incentives, but on an enabling environment, including:

- the ability to reliably connect to the transmission network and to access revenue streams for connected assets
- the capacity to move through the planning and environmental assessment processes in a methodical, efficient and generally predictable manner
- access to a skilled workforce and supply chain capacity, and
- the ability to secure community support.

⁴ Nelson, T. Nolan, T. and Gilmore, J. (2022), '[What's next for the Renewable Energy Target – resolving Australia's integration of energy and climate change policy?](#)', Australian Journal of Agricultural and Resource Economics, Vol. 66, No. 1, pp. 136-163

We explored these areas in the [Power Playbook](#) released by the CEC in October 2023 and we highlight the key messages below:

1. Developing new markets and addressing grid connection challenges impacting large-scale generation investment and addressing the under-investment in network capacity to address congestion and constraints.

Australia, and particularly the National Electricity Market ('the NEM'), is currently playing catch-up on the necessary transmission augmentation after a decade of insufficient planning and investment. The infrastructure investment will require a large and sustained effort over many years (indeed decades) by many different parties working across multiple projects and regions.

The CEC believes that a co-ordinated national delivery plan for all transmission projects of national significance could assist to deliver cost and time efficiencies. Greater co-ordination could support increased bundling of large equipment orders to reduce costs and long-wait times, and enable co-ordination of works scheduling to maximise Engineering, Procurement and Construction (EPC), plant and workforce availability.

The CEC also notes the importance of effective market frameworks to provide sustainable and predictable revenues for new projects. The CEC continues to work closely with the AEMC, AEMO and networks to develop these new markets for system strength, inertia and the many other valuable services needed to support a stable and resilient power system. However, challenges remain, particularly the continued focus on the Transmission Access Reform package, the current design of which is likely to have particularly harmful impacts on investment.

Further work is also required to modernise Australian technical processes for connection of new generation and maintenance of power system resilience. The CEC continues to work with AEMO and the AEMC to progress this critical area.

2. Predictable assessment pathways and regional environmental assessments will help new renewable energy projects progress faster

Predictability of both process and timelines are valued highly by developers and investors.

Governments can support efficient project development by undertaking region-wide environmental and social assessments of prospective renewable energy zones/regions, which will help direct development activity to suitable areas and reduce upfront costs and overall development timeframes for proponents.

The Commonwealth, state and territory governments need to build additional capacity within their planning and environmental assessment units and referral agencies in order to expedite assessment processes and provide transparency and clarity to projects as quickly as possible.

Greater coordination of assessments within government would also help ensure more consistent and predictable process, using a concierge or case-management style approach to handling each project application.

3. Evaluating vocational and higher education funding and resources to align their needs with the renewable energy industry coupled with strategic planning to anticipate and respond to future industry workforce needs.

Clean energy projects are currently experiencing skill shortages in critical occupations including electricians and construction workers. For example, the 2023 Skills Priority List (SPL) found that 73 per cent of electrotechnology and telecommunications trades and 100 per cent of construction and trades worker occupations are in shortage nationally⁵.

Jobs and Skills Australia (JSA) found that Australia needs an additional 32,000 electricians and 450,000 construction jobs to 2030 to meet legislated 2030 decarbonisation targets. It concluded that current policy settings will not deliver the workforce needed to meet existing targets and found that while clean energy will provide a pathway for some transitioning workers, this workforce is too small to supply the rapidly growing needs of industry.

Understanding future demand is essential for workforce planning across the supply chain and the Electricity and Energy Sector Plan must be clear on the level of aspiration of a potential superpower scenario. Clean energy exports have the potential to create a substantial number of jobs and understanding future demand is essential for workforce planning across the supply chain.

Modelling of the workforce needed to deliver ISP scenarios found the peak electricity sector workforce under the Hydrogen Superpower scenario to be over double the peak workforce under Step Change. Without meaningful direction on the timing, size, scale and potential locations of export industry infrastructure, effective workforce planning and policymaking is impossible.

4. Securing and maintaining strong community support for the clean energy transition will facilitate this major economic transformation more smoothly and efficiently if communities are supportive.

Securing and maintaining community support for the clean energy transition is essential. Any major economic or industrial change will proceed more smoothly and efficiently if communities are supportive. While many Australians have already chosen to install solar panels on their own roofs, large-scale projects typically involve greater change in the landscape.

At a high level, the emerging social licence challenges for large-scale projects are in part due to the success of the industry: more projects are being built and developed, meaning more people and communities are coming into contact with these projects. The creation of REZs means an increasing geographic concentration of projects. This makes sense from the perspective of economic efficiency of investment in network infrastructure, but it inevitably also creates a geographic concentration of impacts: more communities will deal with multiple nearby projects, which can lead to a range of cumulative impacts on communities and the environment.

At the scale of individual projects, communities raise a range of concerns, namely:

- Visual impacts
- Concern that the use of agricultural land (especially for solar farms) will reduce agricultural production in a region, affecting its character and potentially the viability of food processing facilities

⁵ [2023 Skills Priority List: Key Findings Report](#). | Jobs and Skills Australia.

- Environmental impacts. These are usually greater for wind farms, primarily due to impacts on bird/bat populations and the fact that wind speeds are typically higher along ridge-lines or on hills, which are less likely to have already been cleared for agricultural production.
- Noise pollution
- Concern about end-of-life and how projects will be decommissioned and materials recycled
- Confusion/stress on landholders when having to deal with legal agreements with energy companies, sometimes with multiple companies interested in the same land.

Some of the CEC's recommendations to improve and maintain social licence include:

- Industry and governments should partner to jointly develop a best practice framework for community benefit sharing for large-scale generation, storage and transmission projects to ensure that host communities, including farmers and First Nations, enjoy the benefits of Australia's clean energy transformation.
- State Governments, supported by the Federal Government, should develop comprehensive programs to clearly communicate the importance of Renewable Energy zones, and renewable energy projects to communities in these areas.
- Federal and State governments should jointly fund REZ Readiness Plans that assess local capabilities (e.g. Business capacity to support/supply projects, accommodation availability, skills/training needs), regional logistical constraints and community needs, to identify barriers and solutions to ensure smooth project deployment in each REZ and a reduction in disruption to local communities.
- The Federal Government should create the Prime Minister's Prize for Renewable Energy Innovation. This major funding round or competition would fund innovative utility-scale projects (not pilots) that demonstrate and measure how renewable energy can be deployed in ways that are "net positive" on their local environment. Funded projects should identify the incentives and reforms required to ensure these approaches and practices can be adopted commercially in the future.

We also emphasise the importance of high-quality engagement with First Nations people and communities. In February, the CEC co-authored with KPMG the first comprehensive national guide on meaningful engagement, consent, participation and benefit-sharing with First Nations people, titled [Leading Principles: First Nations and Renewable Energy Projects](#).

3. Investment in electrification and long-duration storage solutions will be critical for phasing out fossil-based gas and liquid fuels

As noted in the discussion paper, two thirds of Australia's final energy consumption is fossil-based gas and liquid fuels. Very little progress has been made in decarbonising these market segments to date (though the incoming New Vehicle Efficiency Standard will assist), and a major focus of the sectoral decarbonisation plan must be comprehensive strategies to phase them out.

The most important decarbonisation strategy for oil and gas is electrification, underpinned by renewable energy and storage, which can deliver energy efficiency gains and lower consumer costs across the economy. With high and volatile gas and oil prices over recent years – and the expectation that Australia’s east coast gas prices will remain elevated over the long term – there is no reason for delay.

Electrification of households and businesses

As summarised by Energy Consumers Australia in its 2023 report, Stepping up: a smoother pathway to decarbonising homes, the approximately 5 million homes connected to the gas network of the existing 11 million households in Australia will need to switch their home heating and cooking from gas to electricity within ~25 years. At the same time, 15 million passenger vehicles will need to be ‘swapped’ for electric vehicles with the necessary infrastructure in place to support them.

This change will involve higher upfront costs but will deliver substantial cost savings over the long term, as is shown in the chart below. The average fossil-fuelled household would spend \$2250 more in 2030 per annum than an efficient all-electric home. The savings would be substantially greater (a further \$1250) for a home with rooftop solar and a battery.

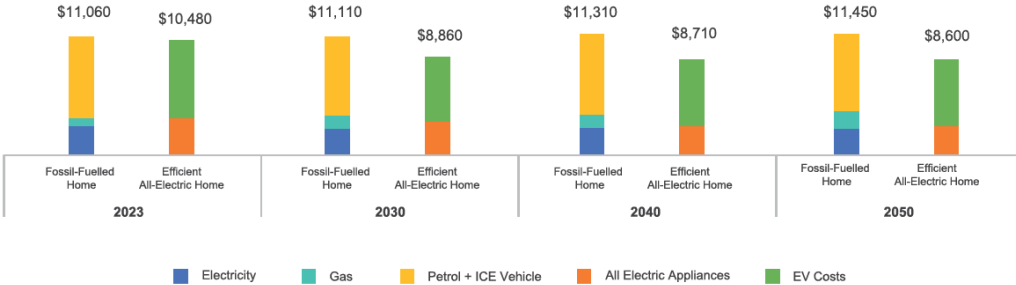


Figure: 1 Total household energy spending in select years – an average fossil fuelled home compared with an efficient all-electric home (Energy Consumers Australia, 2023)

The additional benefits of behind-the-meter battery deployment

Further modelling by Oakley Greenwood has demonstrated that households could expect annual bill savings of \$900-\$1000 with non-orchestrated batteries and \$1,150-\$1,500 with orchestrated batteries, as well as enjoying greater energy security and independence⁶.

The right price signals and incentives place Australia with the best chance of hitting AEMO’s ISP Step Change orchestration target of 80 per cent of home batteries being involved in a VPP. This will provide wider system services, including soaking up midday solar generation and increasing demand on the central system for filling storage capacity. We highlight there is an opportunity for the Government to consider implementing a national policy to accelerate the uptake of home batteries to maximise the value of rooftop solar within the electricity market.

The high up-front costs make consumer energy resources a significant investment for many Australian households, delaying a commitment to purchase. Governments should provide strong incentives for early movers, and assist low-income households to be among them, to replace combustion appliances with energy efficient electrified alternatives by closing

⁶ [It’s time to back home batteries | Clean Energy Council](#)

the replacement cost gap by implementing an accessible rebates or tax refund mechanism. These incentives can complement access to low-cost finance via the Clean Energy Finance Corporation, which the Government announced in the previous Federal Budget.

Renters should not be excluded from electrification, indicating the need for financial incentives for landlords to electrify rented homes. The expansion of the Home Energy Efficiency disclosure program⁷ for renters would promote transparency and inform potential renters of energy efficiency and likely average energy costs. This will encourage landlords to actively improve efficiency and consider installation of consumer energy resources technologies when paired with mandatory minimum requirements for energy efficiency.

Limited consumer understanding of the energy system and benefits of electrification remain an additional barrier for promoting better energy outcomes for people and businesses. This highlights the importance of ongoing education and engagement with consumers through Government-led and backed programs. Consumers often turn to trusted sources such as electricians and community members for information sharing, indicating the need to provide and find high quality education and awareness programs.

Finally, Governments can demonstrate leadership in the energy transformation, through the setting of transparent and measurable targets for transitioning their own stock. This would see the implementation of energy upgrades and installation of consumer energy resources, including rooftop solar and storage, on government owned assets. Social housing, hospitals, schools, and community recreation centres with energy upgrades and consumer energy resources technologies will present the opportunity for Governments support the transition and build social licence within communities.

We have set out a range of additional recommended actions that the Federal and State Governments can take to promote electrification and accelerate fossil fuel phase out in our [Power Playbook](#).

These include:

- Communicating end dates for the sale of combustion-based household appliances and vehicles. These timeframes should be set as soon as possible in alignment with achieving Australia's goal of net zero emissions by 2050.
- The banning of new gas connections for homes and light commercial businesses (e.g. retail, offices) on the distribution network across Australia.
- Introducing a tax write-off for landlords who opt to replace broken gas-based appliances with efficient electric ones.
- Employing regulation to enforce change by outlawing the sale of less efficient appliances and vehicles through tightening efficiency standards, as will gradually occur via the new fuel-efficiency standard for vehicles.
- Working with states and territories to invest in workforce attraction and development for electricians, plumbers and other related occupations who will be vital to competently and safely manage the electrification transition.

⁷ [National Framework for Disclosure of Residential Energy Efficiency Information \(dccceew.gov.au\)](https://www.dccceew.gov.au)

- Working with states and territories to invest strongly in clear and sustained public information and engagement throughout the electrification transition.

Industrial electrification

Electrification can and will also play an important role as part of industrial decarbonisation strategies, as shown by a number of studies in recent years. A significant study published by researchers at the Potsdam Institute for Climate Impact Research et al in 2020⁸ (ahead of the full impacts of COVID and the Russian invasion of Ukraine) on the energy use in 11 industrial sectors (representing 92 per cent of Europe's industrial CO₂ emissions) found that 78 per cent of industry's energy demand was electrifiable with technologies which were already established.

Meanwhile in Australia, the Australian Industry Energy Transitions Initiative, which studied pathways to decarbonisation for five major sectors of Australia's heavy industry, found in 2023 that in a 'co-ordinated action scenario', increased electrification and fuel switching could decrease emissions from the direct combustion of fossil fuels by 86 per cent. It also found that many of the required solutions were already mature and available for commercial deployment, including energy efficiency measures and electrification through heat pumps and electric boilers and a range of other technologies.

Critically for electricity system planning, the Initiative concluded that the shift away from fossil fuels and move to increased electrification *'would require Australia to more than double its current electricity generation...with almost 100 per cent of the electricity mix consisting of renewables by 2035, with solar photovoltaics (PV) and wind generation making up most of this.'*

Gas power generation and system reliability

The discussion paper states that *"gas is and will remain an important energy source for the electricity sector for backup generation and to balance renewable electricity supply"* in the context of supporting renewables in high demand periods as dispatchable generation.

While it is true that gas powered generation (here-in referred to as 'GPG') plays a role in the electricity sector today, it's important to acknowledge that the size of this role has been declining over time from around 12 per cent contribution to demand in the NEM in 2014, down to 4.8 per cent in 2023.

⁸ Silvia Madeddu et al, 2020, Environmental Research Letters, 15 124004, *The CO₂ reduction potential for the European industry via direct electrification of heat supply (power-to-heat)*. <https://iopscience.iop.org/article/10.1088/1748-9326/abbd02/pdf>

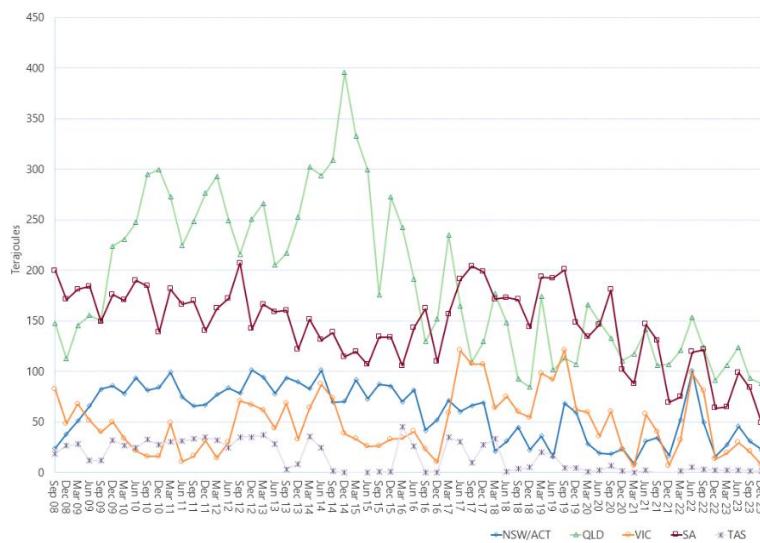


Figure 2: Average daily demand of Gas Powered Generators (GPGs) in the National Electricity Market (NEM)⁹ (Australian Energy Regulator)

The CEC appreciates why there is a strong push for GPG in the NEM. Governments have legitimate concerns regarding ongoing power system reliability. The CEC agrees it is critical to actively manage these risks. However, we consider that zero carbon technologies – particularly long duration energy storage – represents a more cost effective and sustainable way to maintain reliability.

The CEC acknowledges the rapidly changing nature of reliability risk in the power system, particularly in the short to medium term. We understand that AEMO has strong concerns regarding reliability during summer peak demand periods. These concerns are driven by the delays in connecting new replacement renewable generation capacity, exacerbated by the steady exit of coal generation and further worsened by the decreasing reliability of the remaining coal fleet.

Historically, GPG has been the main source of generation used by AEMO to maintain reliability in the face of these conditions. It's therefore reasonable that AEMO, as a system operator, would place emphasis on the role of GPG to manage these risks, particularly given issues with coal generation. That said, reliability risks in the power system are themselves changing, as seasonal supply shortfalls and 'dunkelflaute' issues begin to manifest from the 2030s onwards. Similarly, daily diurnal ramping – the 'duck curve' driven by increased PV penetration – may create new operational and even reliability risks.

The CEC highlights that the costs of using GPG to meet these changing reliability risks will be material. GPG is not well equipped to manage seasonal shortfalls. Operating these assets in this way means they will be used very infrequently however, when they do run, they will run very hard. Physically, this will strain both upstream gas production and pipeline capacity, which has been historically designed around steady production and offtake

⁹ [Average daily gas used for gas powered generation](#) | Australian Energy Regulator

patterns. Commercially, supply and pipeline charges will need to increase markedly, to allow for these very different kinds of usage.

The difficulties of relying on pipeline supplied gas to support GPG implies that many future GPG units will in fact need to be supported by onsite storage of liquid fuels including high volumes of kerosene or diesel. Liquid fuelled generation is far more expensive than GPG. Further, AEMO itself identifies that most existing GPG in the National Electricity Market does not have onsite liquid fuel storage capability. GPG is also a very expensive and carbon intensive way of managing diurnal demand spreads. Using these assets every day in this manner would markedly increase wholesale prices and would also make it difficult to meet carbon budgets.

The CEC considers that renewable energy storage solutions, including battery storage, pumped hydro and the various other forms of long-duration energy storage ('LDES'), will be a more cost-effective solution for maintaining a reliable supply of electricity than GPG. LDES solutions are well equipped to meet existing reliability challenges – they can ramp up and can provide sustained energy supply to meet traditional peak demand periods. They are also very well equipped to manage seasonal shortfalls, at a much lower cost than GPG.

LDES solutions also complement and support renewables, accelerating power system decarbonisation. Storage assets have long lead times, so while GPG may meet reliability needs in the short term, if we want LDES in the system in the long term we need to commence building these assets now. The CEC therefore encourages the Commonwealth Government to give full consideration to additional mechanisms to drive investment in LDES, to complement the Capacity Investment Scheme.

Finally, we also need to work with AEMO to support the integration of these assets into operational protocols. Operators need reliable and understandable 'levers to pull' to meet their main objective of keeping the lights on. The CEC is already working with industry, AEMO and policy makers to make this case.

4. Development of clean fuel alternatives will support decarbonisation for hard-to-abate sectors, and reduce Australia's vulnerability to supply shocks

For those decarbonisation tasks where direct electrification is not feasible or applicable – such as in as in heavy marine transportation and aviation, minerals processing and chemical processes – access to alternative clean fuels will be needed. Hydrogen and its derivatives such as ammonia, methanol and green e-fuels more broadly, as well as biofuels, are shaping up as playing lead roles as clean alternatives for substituting oil based liquid fuels, gas and coal.

Building our own capability in this area is important for supporting industrial decarbonisation, but also for increasing our fuel security and economic resilience. Australia is dependent on imported liquid fuels for more than half of our final energy demand. This leaves us vulnerable to international supply chain disruptions and price shocks, as can be seen from the sharp increase in petrol prices following Russia's invasion of Ukraine in February 2022 and OPEC's refusal to increase production – the highest retail petrol prices

observed in eight years¹⁰. While the high prices have declined somewhat, they remain elevated¹¹.

Australia must develop a comprehensive framework that will deliver the low and zero emissions solutions that will be required by the heavy industry and transportation sectors. While the Safeguard Mechanism may provide increased stimulus for clean fuels adoption over time, it will be difficult for industries to access these options if they are not readily available within the market at a manageable price premium. (Today for instance, the cost of green methanol represents approximately three times the cost of highly polluting bunker oil used in shipping.). This underscores the urgency for Australian governments to establish the supportive policy frameworks, and provide the necessary investment, to stimulate market development.

We have seen some initial government support for the emerging hydrogen sector through the \$2 billion Hydrogen Headstart scheme, which is intended to enable the development of at least two large-scale renewable hydrogen projects, and over \$520 million of support for regional hydrogen hubs across Australia. We will however need to implement a long-term policy framework and either mandates or incentives for investors to make the necessary, large capital outlays in new production facilities, and for buyers to contract offtake agreements for premium-priced fuels/commodities.

We note that 2023 analysis by Deloitte¹² of a range of policy support options found that hydrogen production credits were deemed to be an economically efficient way of supporting industry development. This analysis also found that a hydrogen production credit of AUD \$2/kg 'around half the level of the maximum credit in the Inflation Reduction Act for renewable hydrogen' – would be required, 'underlining Australia's underlying comparative advantage'. This would require Government investment in the order of \$15.5 billion in today's terms over a decade. We note that this quantum is broadly commensurate with Canada's investment commitment in response to the IRA (~\$20.6 billion). According to Deloitte, a \$15.5 billion investment would put Australia on track to produce almost 16 million tonnes of renewable hydrogen a year by 2050, with exports worth \$17.4 billion per year in today's terms.

In light of both the scale of the economic opportunity for Australia, and the importance of hydrogen for underpinning a range of other potential growth sectors (green iron for example), the CEC is calling on the Australian Government to allocate \$15-\$20 billion in revenue support for early mover projects over 10-15 years¹³, as part of a wider Clean Energy Transformation Investment Fund.

Beyond supply-side support, we also need demand side levers, to stimulate industry to fuel switch where a substantial price premium exists for a low or zero emissions alternative. Achievement of our decarbonisation goals cannot rely on voluntary action alone, as it simply will not be fast enough.

One positive example of such a demand-side policy framework is the New South Wales Government's Renewable Fuel Scheme. This scheme, due to come into effect from 2025 will place an obligation on large gas users to purchase a modest but increasing share of

¹⁰ [War in Ukraine and OPEC production limits pushed February petrol prices to eight-year high](#) | ACCC

¹¹ [Retail petrol prices remain relatively high despite falling in the December quarter 2023](#) | ACCC

¹² [Australia's Hydrogen Tipping Point](#) | Deloitte Australia

¹³ [Power Playbook: Accelerating Australia's Clean Energy Transformation](#) | Clean Energy Council 2023

certificates from green hydrogen producers over time. The NSW Government is currently considering expanding this scheme to include other biogenic fuels (e.g. biogas, biomethane, bio-liquid petroleum gas, biodiesel, and bio-sustainable aviation fuel) and is proposing the scheme include other industries such as liquid fuel users and mining operators.

We urge the Australian Government to develop a holistic framework through its Electricity and Energy Sector Plan and its Transport Sector Plan, that will enable the scaling up of a range of renewable fuel alternatives, deploying both supply side and demand side measures.

5. Australia must plan and invest in new green energy exports, not expand or extend the lives of sunset industries

The historic outcome of COP28 has signalled the beginning of the end of the fossil fuel era outlining the need for a swift, just and equitable transition, underpinned by deep emission reduction goals and a tripling of global renewable energy generation.

Australia's three largest exports today are iron ore, coal and liquified natural gas (LNG). Two of them – coal and LNG – collectively worth \$185 billion in exports to Australia in 2022, should now be treated by the Australian Government as sunset industries. As a minimum, they will have dramatically reduced – if not negligible roles in the net zero world of 2050.

Analysis from the International Energy Agency (IEA) highlights that fossil fuel demand will peak by 2030¹⁴ for oil, coal and natural gas due to increased demands for clean energy technologies across various sectors. Australia must plan and invest now in earnest for the new commodities and markets – such as green hydrogen and green metals – that can substitute the revenue and employment value of the LNG and coal industries over time.

We caution the Department from accepting the proposition that investment in carbon capture and storage ('CCS') is a viable mitigation solution for the decarbonisation of our fossil-fuel based energy sectors. Australian Governments have invested over \$1.3 billion of taxpayers' money in carbon capture and storage initiatives in the past two decades, with no large-scale operational projects to show for it. Meanwhile, the Chevron-operated Gorgon LNG facility in Western Australia, which is required to capture the emissions of its plant as a condition of its environmental licence, was sequestering less than 30 per cent of its design capacity in 2023¹⁵, years after it began operation.

The prevailing experience over the past two decades is that CCS is costly, risky and unreliable in most use cases. As such, we consider that it would be imprudent for the Australian Government to provide public funding/subsidies for CCS projects that extend the life of existing fossil fuel production facilities, or that justify the licencing of new ones. It is difficult to imagine a scenario in which large LNG facilities will enjoy the social licence to operate in one- or two-decades' time without very high rates of permanent carbon sequestration.

¹⁴ [World Energy Outlook 2023](#) | International Energy Agency

¹⁵ [Carbon capture and storage: Chevron's troubled burial of CO2 at Gorgon set to worsen in 2023 \(watoday.com.au\)](#)

6. The Electricity & Energy Sector Plan should take into account our renewable energy superpower opportunity

The Electricity and Energy Sector Plan must consider not just the domestic decarbonisation task for our current energy systems, but the broader role that Australia can play in the global economy as the locus of energy-intensive economic activities, and as a major exporter of green commodities.

The comprehensive [Net Zero Australia](#) study completed in 2023 indicated that completing the domestic decarbonisation task and pursuing ambitious goals for clean energy exports (replacing LNG and coal exports) would require \$7–9 trillion of capital investment, a skilled workforce in the order of 700,000–800,000 people and an electricity system in the order of 40 times the size of today's.

Other experts offer similar forecasts: renowned economist, Ross Garnaut, estimates the need for more than \$6 trillion of capital expenditure and an electricity system in the order of 50 times the size of the current National Electricity Market, in order for Australia to take advantage of its 'full superpower opportunity', including renewable hydrogen, onshore minerals processing and green metals production.

The Australian Government has outlined its aspiration for Australia to become a renewable energy 'superpower' and such a scenario has very large implications for our electricity system, requiring a dramatic increase in investment in generation, storage and transmission; a much larger workforce, a large uplift in supply chain volumes, and substantial new investment in shared use infrastructure and the social infrastructure required to support communities involved in new green industries.

Deep, strategic, economy-wide planning is required, and the CEC has been calling on the Australian Government to prepare a holistic plan – a Superpower Masterplan – which articulates the vision for Australia's role as a producer and exporter of clean energy products and green value-added commodities, and guides the allocation of public and private investment and resources. See an outline of the proposed plan in Appendix 1.

The Power Playbook¹⁶, released by the Clean Energy Council 2023, outlined a suite of over 45 recommendations aimed at both getting Australia back on track to achieving 82 per cent renewables by 2030 and realising our ambition of becoming a renewable energy superpower. We suggest that the Australian Government commit – as soon as possible – to a nation-building Clean Energy Transformation Investment Package capable of boosting and retaining Australia's international competitiveness as a producer of renewable energy and green value-added commodities. We expect that the scale of this fund would be in the order of \$10 billion per year for at least ten years.

Our overarching message to the Government is to 'go hard, go early'. This is relevant to the major infrastructure planning and investment required, the energy productivity improvements available to us through electrification of buildings, transport, and industry, and in terms of stimulating new green growth industries. Strong and early government investment is a downpayment on future economic growth.

¹⁶ [Power Playbook: Accelerating Australia's Clean Energy Transformation](#) | Clean Energy Council 2023

7. Conclusion

Australia has a transformative opportunity before it to leverage its tremendous renewable energy advantage for unprecedented economic expansion and green growth. We cannot rely on our natural advantages alone to capture this opportunity. It will require levels of planning, co-ordination, and investment the likes of which we have seen only in times of war or crisis.

The Electricity and Energy Sector Plan presents an opportunity for the Australian Government to outline our pathway to net zero that expedites investment in renewable energy technologies, unlocks new industries and employment opportunities in green commodities and leverages our natural advantages to deliver an efficient and effective economic transition for Australia.

Renewables paired with varying energy storage solutions and transmission represents the lowest cost pathway to replacing coal fired generation. Gas fired electricity generation is declining, given that renewable energy and storage can meet many of Australia's energy needs while enhancing productivity, reducing costs to consumers, and lowering our emissions.

The Federal and state governments must invest heavily in electrification to reduce our reliance on fossil fuels and gas within the economy. We therefore encourage the Government to continue to provide policy and program support to accelerate the net zero transition of the electricity sector and promote the rapid uptake of electrification.

For hard to abate areas, the government must establish the long-term policy frameworks and funding mechanisms to scale up the new clean molecule fuels (green e-fuels and biofuels), and ultimately drive down the costs of production. Both supply and demand side measures are needed.

The Government must also factor in our superpower potential as part of its plan, and we have recommended the development of a 'Superpower Masterplan'. It is vital that the scope of the plan is not limited to Australia's domestic decarbonisation journey, but factors in the larger role we can play in the world's future net zero energy system and supply chains.

We look forward to further engagement with DCCEEW and the Australian Government as you finalise the plan.

Yours sincerely



Anna Freeman
Policy Director – Decarbonisation

Appendix 1: Renewable Energy Superpower Masterplan outline

The Clean Energy Council is calling for a 'Renewable Energy Superpower Masterplan' to be developed for Australia. The purpose of the masterplan would be to articulate the vision for the role Australia intends to play as a producer and exporter of clean energy products and green value-added commodities, and to guide the allocation of public and private investment and resources.

The below Table of Contents outlines our view of the scope of this masterplan.

Indicative Table of Contents

1. Global demand for net zero products
2. Australia's **natural** advantages to meet global demand
 - 2.1. Land and waters, renewable energy resources, mineral resources
3. Australia's **strategic** advantages
 - 3.1. Proximity to Asia, established trade links, skilled energy and resources workforce
4. Assessment of global market opportunities for clean energy and green commodities
5. Criteria for assessing priority markets for Australia
 - 5.1. Compatibility with available natural resources
 - 5.2. Compatibility with strategic advantages
 - 5.3. Economic and regional development benefits
6. Identification of priority markets for Australia
7. Physical and social requirements and constraints for priority markets
 - 7.1. Land use – scale and location
 - 7.2. First Nations and community engagement
 - 7.3. Resources – energy, water, minerals
 - 7.4. Infrastructure investment – electricity generation, transmission, water processing and transport infrastructure, ports, roads, rail.
 - 7.5. Local social infrastructure - hospitals, housing, schools etc
 - 7.6. Supply chain – technology requirements, availability of equipment and risks to supply; opportunities for, and appropriate contribution of domestic manufacturing to meet equipment needs; circular economy needs to maximise efficiency of resource use and minimize waste.
 - 7.7. Workforce – workforce size and composition, localised needs, mobility and skilled migration; identification of skill gaps; assessment of the preparedness of education and training systems, and required capacity building.
8. Policy requirements for priority markets and green industrial zones/clusters
 - 8.1. Australia's current competitiveness within identified markets
 - 8.2. Assessment of existing policy settings
 - 8.3. Policy settings to attract private investment
 - 8.4. Regulatory/policy harmonisation opportunities across state/territory jurisdictions
9. Governance structures to deliver the vision for key markets
10. Monitoring and reporting of progress