Australia’s clean energy resources are the envy of the world. At the dawn of a new decade and in response to the profound economic impact of COVID-19, Australia has the opportunity to exploit these natural advantages to bring down the cost of electricity for households and businesses and position the country as the natural home of energy-intensive industries in the Asia Pacific. Clean energy has delivered an enormous economic boost to Australia during the past years as a result of unprecedented levels of investment in large-scale wind, solar and storage, as well as record levels of installation of rooftop solar and household battery solutions.

Clean energy can create thousands of new jobs, empower consumers, bring economic activity to regional communities, lower power prices and create the smart infrastructure of the future that can cement Australia’s place as a global clean energy superpower. More renewable energy investment is crucial for Australia to prepare for the inevitable exit of ageing coal generators over the coming decade, requiring the construction of at least 30 GW of solar and wind to replace coal generation by 2040.

This is just the very beginning of Australia’s enormous clean energy opportunity. According to former Chief Scientist, Dr Alan Finkel, if we were to power an ‘all-electric Australia’ we would need to increase wind and solar energy production in Australia by around 20 times to meet all our domestic energy needs with renewable electricity. And if we were to embrace the opportunity to develop a renewable hydrogen industry that rivals our liquified natural gas export sector, we would need another 700 GW of installed wind and solar capacity over the next 30 years. The opportunity is staggering in scale.

Yet while there has been massive investment in clean energy projects over the past five years, this investment has slowed dramatically since 2019 due to the expiry of the Renewable Energy Target, lower electricity prices, the inadequacy of Australia’s transmission network and significant barriers to grid connection. The long-term fundamentals of investment in clean energy remain strong and compelling, and the current circumstances highlight the need for a strong and coordinated strategy to better manage the transition to a clean energy system and unlock the enormous potential at hand.

Strong government leadership is crucial to manage the transition and facilitate private investment in low-cost clean energy, turbo-charging economic activity and job creation across Australia and accelerating our transition to becoming a clean energy superpower.

### ROADMAP FOR A RENEWABLE ENERGY FUTURE

**Australia can meet our domestic electricity demand with clean energy by 2030.**

This can be achieved by a comprehensive roadmap comprising nine key elements:

| 1 | Electrify Australia: power the Australian economy and industry with wind, solar, hydro, bioenergy and battery storage. |
| 2 | Empower customers and communities to make the switch to clean energy. |
| 3 | Build a strong, smart, 21st-century electricity network. |
| 4 | Maxmise the creation of quality clean energy jobs and a local supply chain. |
| 5 | Provide greater support and certainty for coal communities and industry as the phase-out of coal generation accelerates. |
| 6 | Modernise Australia’s energy market and its governance for the clean energy transformation. |
| 7 | Turbo-charge clean energy innovation. |
| 8 | Decarbonise Australian industries using clean energy. |
| 9 | Put Australia on a path to becoming a global clean energy superpower that exports renewable energy to Asia and beyond. |
POLICY RECOMMENDATIONS

• Set a clear target for Australia to be powered by clean energy by 2030.
• Commit Australia to net-zero emissions before 2050 and set strong interim targets for 2030 consistent with the latest climate science.
• Introduce strong, enduring clean energy policy mechanisms to deliver this target and coordinate state-based policy mechanisms. These could be in the form of a renewable energy scheme such as an extended Renewable Energy Target, a New Energy Target, revitalising the National Energy Guarantee or strengthening the existing safeguard mechanism.
• Establish a framework to ensure that voluntary carbon commitments from businesses can be delivered through clean energy projects.

Record levels of new investment in renewable energy and energy storage since 2017 demonstrate that there is an enormous appetite for private investment in clean energy in Australia.

However, a range of barriers are acting to stifle investment and undermine the ambition to meet Australia’s domestic electricity demand with clean energy by 2030.

Federal clean energy policy has been politicised and undergone significant change over the past decade. This – combined with a range of other challenges outlined in this roadmap – has added to substantial policy uncertainty for clean energy investors. State and territory governments have attempted to fill this policy and leadership void by introducing a range of policy mechanisms intended to increase investment confidence and facilitate the shift to clean energy. These initiatives have played an important role, but are no substitute for a clear and strong federal clean energy target and policy mechanisms that have enduring bipartisan support. This would provide the necessary confidence for private investors and put Australia on a clear pathway to an entirely renewable energy system by 2030.

Not only could Australia meet its domestic electricity demand with clean energy and storage by 2030, but it has the potential to greatly expand its supply to electrify other sectors of the economy currently dependent on fossil fuels (such as transport and heavy industry), and to export clean energy to the world. An immediate target should recognise and guide Australia to leverage the leadership of state and territory governments and set Australia on a path to meet all of our electricity demand from clean energy sources by 2030.

In 2018, $10.2 billion in private investment was put into large-scale renewable energy generation, adding 6 GW to the national grid. In 2020, that investment figure dropped to $3.8 billion, accounting for only 2.3 GW of new capacity. For a rapid transition to take place by 2030, the Australian Energy Market Operator’s Integrated System Plan modelling shows that 4.2 GW of utility-scale and behind-the-meter capacity will need to be added every year from 2022-2030 (inclusive of 2030). There is an enormous pipeline of potential large-scale wind, solar, hydro and storage projects throughout Australia. Bioenergy can also make a contribution to Australia’s future energy supply, making beneficial use of waste and reducing greenhouse gas emissions.

Unlocking this investment is critical to ensuring a reliable, flexible and low-cost energy system as Australia’s coal-fired power continues to become less reliable and closes.
Rooftop solar achieved record levels of installation in 2019 and 2020. This was driven by very strong consumer demand accompanied by increasing cost-effectiveness – higher retail electricity prices combined with lower costs for solar systems – and customer understanding and interest in solar power as a way of managing power prices and contributing to climate change action. While the business case for rooftop solar is very strong for many Australians, barriers remain for niche applications and customer segments, such as renters and low-income households or financing commercial and community-scale systems.

Household batteries have become increasingly popular, with 23,796 Australian homes installing a battery in 2020. While the cost of household batteries continues to fall, the upfront cost of systems remains a barrier for most Australians. There is a role for governments to incentivise battery solutions and drive innovation in business models to support the increased customer uptake of household battery systems.

POLICY RECOMMENDATIONS

• Set a target for every suitable and appropriate Australian building to have rooftop solar and a household battery by 2030.
• Implement a campaign to promote the uptake of GreenPower among Australian energy customers, particularly where GreenPower is a more efficient or effective solution than rooftop solar.
• Introduce a household battery program to reduce the upfront cost of household batteries and accelerate the deployment and development of the household battery industry.
• Commit to funding a solar system and battery in every public building, fire station, police station, hospital and school in Australia.
• Introduce a government program to support the uptake of rooftop solar in low-income households, including tax concessions for landlords, an upfront rebate program and low-interest loans.
• Establish a program to provide funding and technical support to community energy projects across Australia.

#2 EMPOWER CUSTOMERS AND COMMUNITIES TO MAKE THE SWITCH TO CLEAN ENERGY
POLICY RECOMMENDATIONS

- Establish a $20 billion fund to leverage private sector investment in grid infrastructure, including priority transmission projects as set out in the 2020 Integrated System Plan. This includes Project EnergyConnect, HumeLink, Marinus Link and the Central-West Orana Renewable Energy Zone Transmission Link.
- Reform planning processes to support the efficient location of energy storage.
- Expand funding to support innovation in grid-forming inverters, battery storage and pumped hydro generation.
- Reform the regulatory investment test for transmission to ensure it is fit-for-purpose.

A 21st-century economy needs a modern electricity network that supports reliability, security and low-emissions technologies and delivers low-cost energy to consumers.

The transition to a 21st-century energy system requires investment in Australia’s transmission network. Without it, new generation investment will be stifled, constraining existing generation and resulting in increased risks to energy security and reliability and higher power prices for consumers.

A strong electricity network with transmission connection to key renewable energy zones combined with a strong interconnection backbone is essential. The vast majority of transmission in Australia was built entirely by governments. While there is now strong private sector appetite to invest in transmission assets, outmoded regulatory frameworks are undermining financial incentives and have delayed and prevented progress on many of the priority transmission projects already identified. The existing regulatory framework that underpins transmission investment has failed and is in dire need of reform.

Funding support for innovative renewable generation solutions – including grid-forming batteries, large-scale storage and inverter-based renewables – could be achieved via a new capital fund or an expanded role for the Australian Renewable Energy Agency (ARENA). Alternatively, the existing (but not yet implemented) Underwriting New Generation Investments program could be repurposed to focus solely on energy storage and other innovative technologies such as grid-forming inverter technologies. This could complement the role of the Clean Energy Finance Corporation in providing competitive finance to energy storage projects.

There is a clear role for government to both accelerate the reform of this regulatory framework, while also immediately underpinning the capital-intensive private investment in transmission. A fund should be established to support the build out of major transmission assets to support the transition and decarbonisation of the energy sector. This is central to supporting the secure operation of the power system and to enable the ongoing reliable supply of energy to customers.

New market frameworks must be developed to harness the capabilities of inverter-based generation, batteries and other forms of energy storage. Governments should also review and amend planning processes to prioritise and fast-track energy storage projects and provide capital support and low-cost finance to underpin innovation and investment in the capabilities of renewable generation. This should include reform to planning processes to better support planning applications where storage projects are co-located with other generation.
The transition to a clean energy system will require an enormous and skilled workforce.

Australia currently lacks a clear national workforce development strategy to ensure the needs of the growing industry are being met now and into the future. Skills shortages in key occupations, such as engineers and electricians, are already a growing issue that will only be exacerbated as the industry grows.

There is a role for government to work with the education and training sectors to support career pathways for the renewable energy workforce. This will involve ensuring they are properly funded and resourced and identifying and ensuring the pathways out of declining industries are clear, achievable and well resourced. Understanding and consultation with relevant stakeholder groups is essential for understanding the needs of the industry now and planning for workforce needs by 2030 and beyond. Identifying the industries most impacted and the skills required across the sector – including electric vehicles, transmission, clean energy supply chain, recycling, green gas and steel, other heavy industry and the hydrogen sector – will be essential in understanding specific workforce needs.

Establishing a clear workforce development strategy for clean energy can ensure that a skilled workforce exists to meet future clean energy industry needs while maximising the transition of existing energy and associated sector workers into the jobs of the future. A strategy based on economic and jobs modelling, training and education, and community-based solutions will help ensure that Australia develops a strong and secure workforce and can maximise the opportunity for skills development, particularly in rural and regional areas.

There is also a role for government to collaborate with industry to ensure that Australia maximises local content and develops competitive and efficient local supply chains to meet the demand for clean energy.

**POLICY RECOMMENDATIONS**

- Establish a task force including industry, governments, unions, regulators and training and research bodies to understand and map future workforce needs and gaps and establish clear strategies to address these. This task force should also explore opportunities for transitioning workers into clean energy from sectors that will recover slowly (or may not recover at all) from COVID-19.
- Undertake a biennial survey of the energy workforce to inform the work of the task force.
- Fund research to map the opportunities for increasing local content and developing a competitive local supply chain across the clean energy sector, and commit to policy settings that support these opportunities.
- Establish a $200 million clean energy skills package that offers targeted support for training facilities to upskill regional workers in advance of critical transmission and renewable energy infrastructure development. This package would support training organisations to purchase or construct relevant equipment and infrastructure, fund a university Professorial Chair of Power Systems Engineering, increase incentives for electrical apprenticeships and provide scholarships for underrepresented labour groups to enter the clean energy workforce.
Approximately three-quarters of Australia’s coal-fired power plants are now operating beyond their intended design life.

The changing market dynamics, increasing competitiveness of renewable energy and energy storage, and the ageing nature of the existing fossil fuel generators are all accelerating the closure of these coal assets. Government has a clear role to play in ensuring that the transition away from coal-fired electricity is orderly, maintains energy security, avoids price spikes that have followed past closures, supports affected workers and communities, and ensures Australia meets its emissions reduction commitments.

Around 10,000 Australians are employed in the domestic thermal coal sector, with the coal workforce representing up to 5 per cent of the community in some regions. These communities need some level of certainty and forewarning about future coal generation closures, along with strong investment in re-skilling and creating new employment opportunities.

POLICY RECOMMENDATIONS

- Plan for the inevitable closure of coal. This would help local communities, workers and investors prepare for and anticipate the complex task of managing the energy transition.
- Establish a new authority with at least $1 billion funding to invest in transition initiatives in coal communities across Australia. This authority would take the lessons from the Hazelwood Power Station closure and act to coordinate and leverage resources and capability across local government, unions, training providers, universities and regional development initiatives.
- Commit to not funding, supporting or underwriting any new coal- or gas-fired electricity generation.

Funding would allow them to support targeted investment in the transition and stimulate new economic and employment opportunities in these regions.
Policy Recommendations

Australia’s energy market was designed decades ago, based on an overcapacity of thermal coal generation that had been built by state governments.

The Australian energy market is now overdue for fundamental reform and redesign in light of a future energy system dominated by renewable energy and energy storage.

The rapid rollout of massive volumes of renewable generation and storage has continued apace, with renewable generation now distributed widely throughout the network, coupled with customers who actively consume, produce and store energy.

These fundamental changes require a major modernisation of energy markets and many of the rules and regulations that define the operation, incentives, technical requirements and market operation of the National Electricity Market. While the Energy Security Board has commenced this process of reform, in partnership with the Australian Energy Market Commission (AEMC), there remains substantial reform necessary to address remaining barriers and discrimination facing renewable energy and energy storage investment and ensure that the energy market can facilitate the massive amount of private investment necessary to deliver the clean energy transition.

This fundamental redesign of the Australian energy market and grid requires a more modern and fit-for-purpose governance framework to deliver this rebuild in a coordinated manner at the lowest possible cost to consumers.

Governments can enable this coordination by redefining and recommitting to the Australian Energy Market Agreement (AEMA). The AEMA should set out a common vision and define the pace and mechanisms necessary to achieve it. This should help unite governments and regulators across Australia, which is central to supporting efficient investment in new energy generation and storage.

Underpinning this, government should legislate clear statements of expectation for the Australian energy market bodies: the AEMC, Australian Energy Market Operator and Australian Energy Regulator. The statement of expectations should firstly require each institution to define how it will actively facilitate the transition and decarbonisation through its statutory functions. This statement of expectation should clearly set out the separate role of each organisation and how each should specifically contribute to the overall objective of low-cost, secure and reliable decarbonisation. This should be coupled with regular reporting obligations to support transparency.
#7
TURBO-CHARGE CLEAN ENERGY INNOVATION

POLICY RECOMMENDATIONS

- Double government funding for clean energy research, development and demonstration to $200 million per annum.
- Review the Federal R&D Tax Credit Scheme to ensure eligibility and stronger incentives for clean energy investment.

Despite the well recognised benefits of innovation, public funding of research, development and demonstration in clean energy in Australia has fallen significantly over the past several years to less than $100 million per annum and the lowest level in 20 years. Increasing government investment in early-stage clean energy solutions should be a priority and policy support should focus on leveraging Australia’s private sector capability and capacity.

Australia now has the key technologies – wind, solar, hydro and energy storage – to decarbonise our electricity system.

While there remains a clear need and enormous opportunity to continue to drive innovation in these proven technologies, it is important that innovative new solutions are developed in the supply chains that help deploy these technologies, the smart control and integration solutions that maximise their contribution to the grid and the new business models that will allow easier access to clean energy solutions at all scales.

Driving this innovation will ensure a greater diversity of solutions, reduce costs, maximise the potential for Australia to benefit from local manufacturing and supply chain opportunities, and better support the integration of these technologies into the energy system. Australia can lead the way on crucial technically complex and innovative solutions and leverage this extraordinary export opportunity to demonstrate its position as a global leader.

This should include leveraging the strengths of existing institutions such as the Australian Renewable Energy Agency (ARENA), the Clean Energy Finance Corporation, CSIRO, industry-led CRC’s and a range of energy institutes and academic excellence centres.

There is clear scope for better coordination and collaboration of Australia’s entire innovation effort, combined with increased public funding to turbo-charge this exciting opportunity.
The extraordinary success of renewable energy in Australia has demonstrated that it can deliver low-cost power and carbon abatement at globally competitive prices. This presents an enormous opportunity to decarbonise and enhance the energy productivity of other sectors of the Australian economy. However, this will not happen by chance. It will require a deliberate strategy led by government to set targets for decarbonisation and support the demonstration and mass uptake of these proven solutions. This will help ensure that Australia benefits from its competitive advantage in renewable energy and secures its global competitiveness in these important sectors of the future.

For example, the transport sector accounts for nearly 20 per cent of Australia’s emissions. As Australia is the only OECD country without mandatory fuel efficiency standards for road passenger vehicles, the transport sector must decarbonise for the economy to achieve a significant cut in greenhouse gases.

POLICY RECOMMENDATIONS

- Establish a Green Industries Roadmap and Fund to systematically support hard-to-abate heavy industries – particularly those reliant on gas for process heat – to decarbonise, utilising renewable gas (hydrogen and/or biomethane), direct electrification and energy efficiency.
- Develop a decarbonisation plan for Australia’s agriculture sector, identifying the most effective and efficient pathways for emissions reduction, including technology development priorities, demonstration funding and support mechanisms.
- Set a zero emissions transport target for 2050 or earlier covering all forms of transport from the passenger vehicle fleet to heavy vehicles including buses, trains, trams, trucks and marine transport. The transition of government-owned/funded transport should be prioritised in order to build early demand for zero emissions technologies, including battery and fuel-cell electric vehicles.
Global demand for hydrogen exported from Australia is projected to be more than 3 million tonnes per year by 2040, which would inject up to $10 billion into the Australian economy annually. Australia’s world-leading renewable energy resources provide an enormous competitive advantage for Australia to unlock this significant opportunity. Further strong demand for clean energy across Asia also provides an opportunity for direct export of electricity via HVDC solutions. Several enormous projects are already looking to take advantage of these opportunities and have attracted substantial private investment interest. However, there is a clear role for the Federal Government to coordinate Australia’s response to these opportunities by accelerating regulatory and planning reform, leading workforce and standards development, establishing an effective guarantee of origin scheme to recognise the clean nature of Australia’s hydrogen, facilitating investment attraction and industry collaboration, and co-funding the development of hydrogen hubs and demonstration projects. This strategy should build on and ensure the delivery of Australia’s National Hydrogen Strategy while also ensuring supporting regulatory regimes for renewable energy hydrogen export facilities, international HVDC networks and offshore wind facilities.

In addition, bioenergy can improve the country’s energy and liquid fuel security, help decarbonise the gas industry, enhance waste recovery and reduce emissions in hard to abate sectors such as heavy transport and aviation.

**POLICY RECOMMENDATIONS**

- Commit $5 billion to a Green Hydrogen Hubs Investment Fund, expanding on the Federal Government’s existing $315 million commitment, to partner with the states on shared infrastructure for the most highly prospective renewable hydrogen hub locations to support future hydrogen exports.
- Establish a 10-15 per cent Renewable Gas/Hydrogen Blending Target for gas distribution networks, placing a requirement on gas networks to purchase a small and rising share of renewable gas/hydrogen for blending within their networks. This would help activate a local renewable hydrogen/gas market at a manageable cost, build local capability and efficiencies for an emerging hydrogen sector, and reduce the emissions intensity of gas consumption.
- Establish and appropriately fund a Hydrogen Co-ordinator General, supported by well-resourced teams, who can coordinate efforts across governments and industry and oversee progress against the delivery of the agreed actions within the National Hydrogen Strategy, ensuring that Australia delivers on our stated aim of becoming a top-three hydrogen producer to Asian markets.
- Deliver hydrogen and clean energy guarantee of origin schemes by 2022, enabling producers and prospective buyers to differentiate renewable hydrogen, renewable energy and biomethane from fossil-based versions.
- Establish an Australian Bioindustries Fund to ensure that projects identified by the Bioenergy Roadmap can progress immediately, prioritising industry development and job creation with the fund to be delivered through the Australian Renewable Energy Agency.
Phone
+61 3 9929 4100

Email
info@cleanenergycouncil.org.au

Web
cleanenergycouncil.org.au

Find us on

Twitter
LinkedIn
Facebook
Instagram