POWERING WA'S FUTURE

How Western Australia's energy transition can keep us competitive

JUNE 2026

Chamber of Commerce and Industry WA

INTRODUCTION

Humanity is in a race against time to reconfigure almost everything we do – how we move around, ensure food security, build, produce, and power production.

As a signatory to the Paris Agreement, Australia, along with 194 other countries, has committed to substantially reduce global greenhouse gas emissions to hold the global temperature increase to well below 2°C above pre-industrial levels, preferably 1.5°C.

While the term "energy transition" is now ubiquitous, the pathway to net zero is uncertain, with challenges in terms of technology and cost.

CCIWA and our members know that the energy transition is a significant challenge, **requiring the kind of industrial and economic transformation never before seen on this scale and complexity.**

The challenges are particularly intensified in a state like **Western Australia.**

While all levels of Government have invested in the energy transition to date, WA is a trade-dependent and energy-intense economy. **Our emissions reduction task remains profound.**

Our modern way of life is dependent on energy that is **reliable and affordable.** In order to progress decarbonisation over the coming decades, the critical task for WA is to identify the practical goals and milestones to progress toward net zero with reliable and affordable energy, while simultaneously growing and diversifying our economy. **And we must do this while ensuring WA's ongoing international competitiveness and market access.**

The challenge is enormous. Electricity systems have been designed around baseload and dispatchable generation. Wind and solar do not fit either category, as they are variable and non-dispatchable. As inverter-based sources, they provide limited inherent inertia, reducing the system's ability to absorb short-term imbalances without additional controls.

Given these challenges, the supporting investments and reconfiguration of the electricity system required to underpin renewables is unprecedented. Storage is a new element of investment, helping to deploy power generated during the day.

Battery systems can respond quickly to provide dispatchable power, but often cannot sustain output for extended periods without recharging. CCIWA notes that there are valuable lessons from around the world, and it is important that Australia learns from them. Germany has aborted its attempt to simultaneously eliminate nuclear energy and fossil fuels, with a degree of reversion to coal-fired power to combat concerns around gas supply. And California, with its abundant solar assets and aggressive push into renewables, now faces some of the highest energy prices in the United States.

Further complicating the transition is **WA's role in global decarbonisation.** On one hand, WA's resources and energy sectors are key to supporting other countries to lower their emissions, on the other, these sectors face unique barriers to decarbonisation.

Back home, our energy-intensive industries - iron ore, critical minerals and manufacturing sectors – are **crucial to building the transmission infrastructure, wind turbines, solar panels, and batteries needed to underpin the global transition.** Future industries such as **green iron, data centres, carbon capture** and **hydrogen export** are also energy intensive. It is balancing these objectives with various interplaying factors that will determine WA's success **[Figure 1]**.

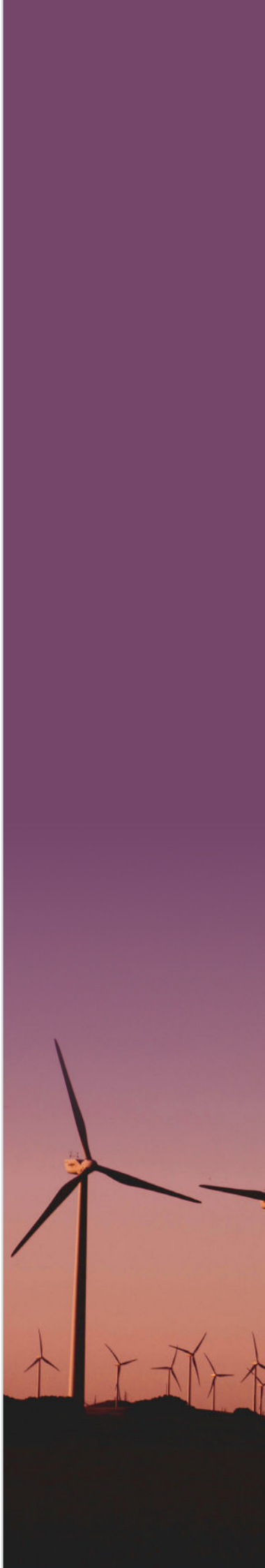


Figure 1: Factors which CCIWA believes will determine a successful energy transition for WA

ENSURING WA'S COMPETITIVENESS IN INTERNATIONAL MARKETS

Maintain energy reliability and affordability

Support WA's economic growth and diversification

Decarbonise the energy system in a practical and progressive way

LOCAL CONSIDERATIONS – NOW AND INTO THE FUTURE

WA's energy consumption is high compared to other Australian states, driven by the resources sector and operations of supporting industries.

Demand on resources remains a key factor. As the rest of Australia also progresses energy transition activities, demand for appropriately skilled workers, critical minerals, land and other inputs will continue to increase.

The State Government has a strong drive to **Diversify WA and grow the economy.**

Our production of natural gas, while contributing to local emissions, is helping Asia to reduce global emissions. WA's gas supply will need to remain consistent in the short term to maintain energy security in WA and help reduce higher emissions elsewhere.

Sustained growth in energy consumption from growth in existing industries and development of new industries. Large amounts of firmed power are required to keep the industrial sector moving forward.

EXTERNAL PRESSURES

Trading markets: Some markets place a uniform pressure to decarbonise, which increases competition for low or no emissions energy generation. WA is at the end of supply chains, which raises the risk of delays in accessing new energy infrastructure manufactured elsewhere. Without access to international markets, WA will lose capacity to generate revenue - taking an economic hit.

Geopolitical tensions: The global economic outlook remains uncertain, as tensions continue regarding the Middle East crisis, impacts of tariffs and other geopolitical tensions.

Policy: The Federal Safeguard Mechanism mandates large facilities reduce emissions. Other countries do not have similar policy settings, which results in WA businesses experiencing greater costs compared to businesses elsewhere.

Green premium: A green premium is not living up to expectations. WA businesses and industry need to maintain commercial competitiveness, while also meeting net zero commitments, which is expected by some key markets.

About this report

As we face the energy transition head on, there are two critical issues that policy makers and industry must consider:

(1) how WA transitions our domestic energy supply toward a lower emissions footprint, while maintaining reliability and affordability; and
(2) how WA capitalises on the economic and industrial opportunities that the energy transition presents.

To answer these questions, CCIWA has gathered insights from our broad membership, both energy generators and consumers, and analysed data from a WA-specific version of Deloitte's Energy System Pathways model.*

The model is calibrated using data from the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Australian Energy Market Operator (AEMO), and industry sources, and takes a technology agnostic approach. The model takes into account the cost of technology uptake, the pace of technological change, and government policy.

The model does not comment on the source of investment, only the magnitude required. CCIWA believes, based on our discussions with industry, there is a general acceptance industry will need to lead investment in energy generation, storage and abatement in the future.

This presents industry and government with choices to be made, and in turn results in many ways to achieve a net zero energy future while maintaining reliability and affordability.

* This report has been prepared by CCIWA and various information contained within it is based on modelling provided by Deloitte.

Five scenarios were developed to examine some of the various pathways.

With this, **the model should not be viewed as a forecast, but instead as a way to illustrate the scale of the task that is required**.

CCIWA has identified five core themes:

(1) **Energy generation:** how much energy generation is required, and what the optimal energy mix looks like, such as renewables, gas turbines, or other energy sources.
(2) **Fuel mix:** the inputs that power future transport and provide industrial heat.
(3) **Energy storage and transmission:** how we bank and share electricity to ensure reliability of supply.
(4) **Carbon abatement:** capturing or offsetting emissions which would otherwise remain in the atmosphere.
(5) **Public and private investment:** what is the public and private sector cost of building the generation, storage, transmission and abatement needed? This helps to understand the final delivered cost that consumers pay for energy, critically important for our ongoing competitiveness.

SCENARIO 1

Net Zero 2050

What is the least cost path for WA to achieve Net Zero by 2050?

SCENARIO 2

Accelerated CCUS

What happens if the cost of CCUS decreases?

SCENARIO 3

Early Gas Retirement

What if gas is made unavailable, and needs to be replaced by other generation technologies?

SCENARIO 4

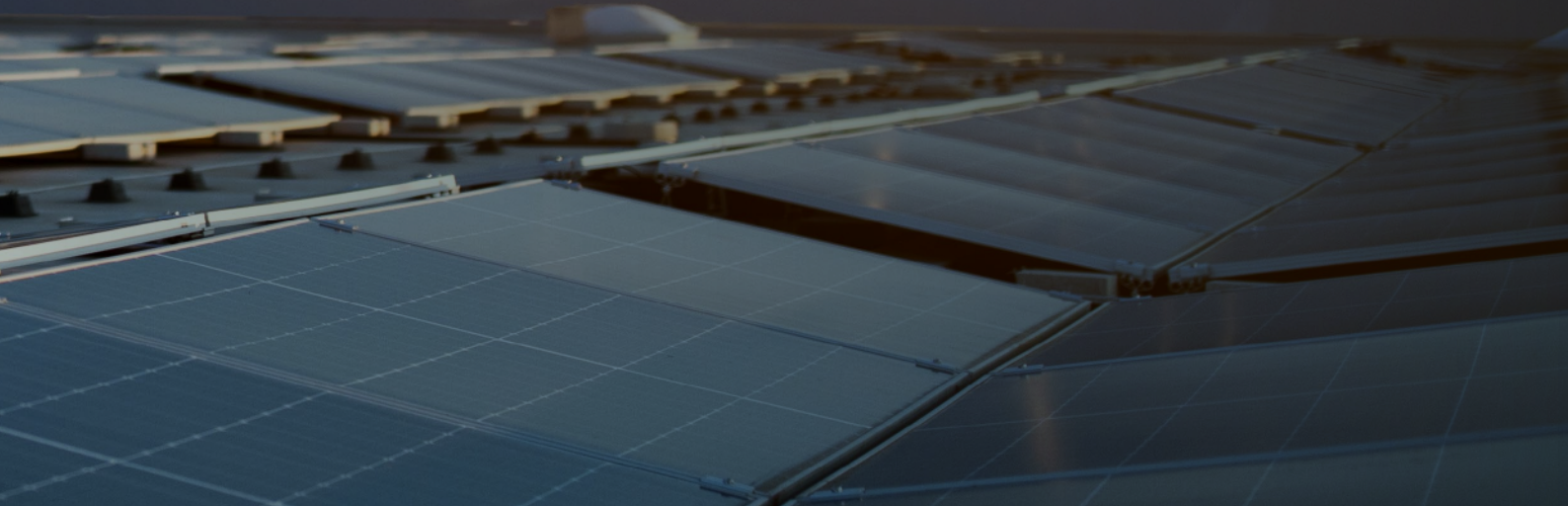
Diversified Industries

What if WA's diversification takes off? i.e. green steel, minerals processing and data centres

SCENARIO 5

Delayed Net Zero

What if we don't meet Net Zero by 2050?



Snapshot of energy investment in 2050

	Energy Generation[1]	Non-fossil Fuel Mix	Energy Storage[2]	Carbon Abatement[3]	Total Capital[4]	Land Use[5]
Net Zero 2050	90.2GW Total 49GW Solar 36GW Wind 6.2GW Gas	70% electrified 94PJ Biofuels 20PJ Ammonia 6PJ Hydrogen	143GWh	41MtCO^2 per annum	$216b Total $8.64b /year	3786km^2 (199 Rottnest Islands)
Accelerated CCUS	71GW Total 42GW Solar 18GW Wind 11GW Gas	65% electrified 102PJ Biofuels 13PJ Ammonia 6PJ Hydrogen	140GWh	68MtCO^2 per annum	$209b Total $8.36b /year	3206km^2 (169 Rottnest Islands)
Early Gas Retirement	**OPTION 1** 101.9GW Total 53GW Solar 45GW Wind 3.9GW Nuclear	**BOTH OPTIONS** 72% electrified 100PJ Biofuels 21PJ Ammonia 6PJ Hydrogen	128GWh	36MtCO^2 per annum	$218b Total $8.27b /year	5558km^2 (292 Rottnest Islands)
	OPTION 2 118.1GW Total 65GW Solar[6] 53.1GW Wind		146GWh	36MtCO^2 per annum	$220b Total $8.8b /year	6749km^2 (355 Rottnest Islands)
Diversified Industries	100.6GW Total 69GW Solar 25GW Wind 6.6GW Gas	70% electrified 92PJ Biofuels 19PJ Ammonia 10PJ Hydrogen	209GWh	44MtCO^2 per annum	$225b Total $9b/year	4924km^2 (259 Rottnest Islands)
Delayed Net Zero	34.9GW Total 9GW Solar 8GW Wind 10GW Gas	43% electrified 90PJ Biofuels 11PJ Ammonia 3PJ Hydrogen	19GWh	38MtCO^2 per annum	$189b Total $7.56b /year	1011km^2 (53 Rottnest Islands)

1 WA's grid has seen significant gains in rooftop solar, however, commercial solar is needed to grow the total proportion of solar generation. Rooftop solar was included in a behind-the-meter reduction in demand instead of a generation asset. Solar references utility-scale, commercial solar.

2 Energy Storage is primarily batteries under all scenarios.

3 Carbon Abatement refers to CCUS.

4 Total Capital refers to the capital cost, in billions, as opposed to capital and operational cost. For the purposes of modelling, capital cost is agnostic of the source of funding (private or public) and includes construction and installation of assets, transmission, and abatement. CCIWA notes that Delayed Net Zero is not reflective of the full cost of decarbonising, as net zero is not reached until 2070.

5 Estimates for Land Use calculated by CCIWA, using data from Deloitte and existing assets – Net Zero 3785.9 hectares, Accelerated CCUS 3206.3 hectares, Early Gas Retirement 1 5557.7 hectares, Early Gas Retirement 2 6748.7 hectares, Diversified Industries 4924.3 hectares, Delayed Net Zero 1010.95 hectares.

6 Due to the time needed to build capacity for nuclear, Deloitte ran the Early Gas Retirement scenario with and without nuclear. The caveat is that the Without nuclear option, 'Option 2' scenario, requires a much higher deployment rate, and CCIWA is of the view that this path may be unrealistic to achieve.


SCENARIO 1
SCENARIO 2
SCENARIO 3
SCENARIO 4
SCENARIO 5
WESTERN AUSTRALIA

ENERGY GENERATION

Electrification is king – for most.

CCIWA'S KEY POINTS

As more industries electrify to meet their decarbonisation targets, the grid will come under increased pressure.

Given this, we are not facing just an energy transition, we are facing an unprecedented energy addition.

The State faces significant challenges in updating legacy energy infrastructure, rapidly expanding electricity grids and renewables across the State.

CCIWA is of the view that, for WA to decarbonise effectively, the energy system needs to transform significantly. **The pace and scale of required energy system change is significant.**

In 2022, the total generation capacity in the South West Interconnected System (SWIS) was 5.9 gigawatts (GW), with approximately 1.2GW of wind and solar.[7] Under the *Delayed Net Zero* scenario, the least cost scenario, this needs to increase to 17GW.

If aiming to reach net zero by 2050, as in the *Net Zero 2050* scenario, then WA will need more than 97 million solar panels and around 12,000 wind turbines to be deployed by 2050.

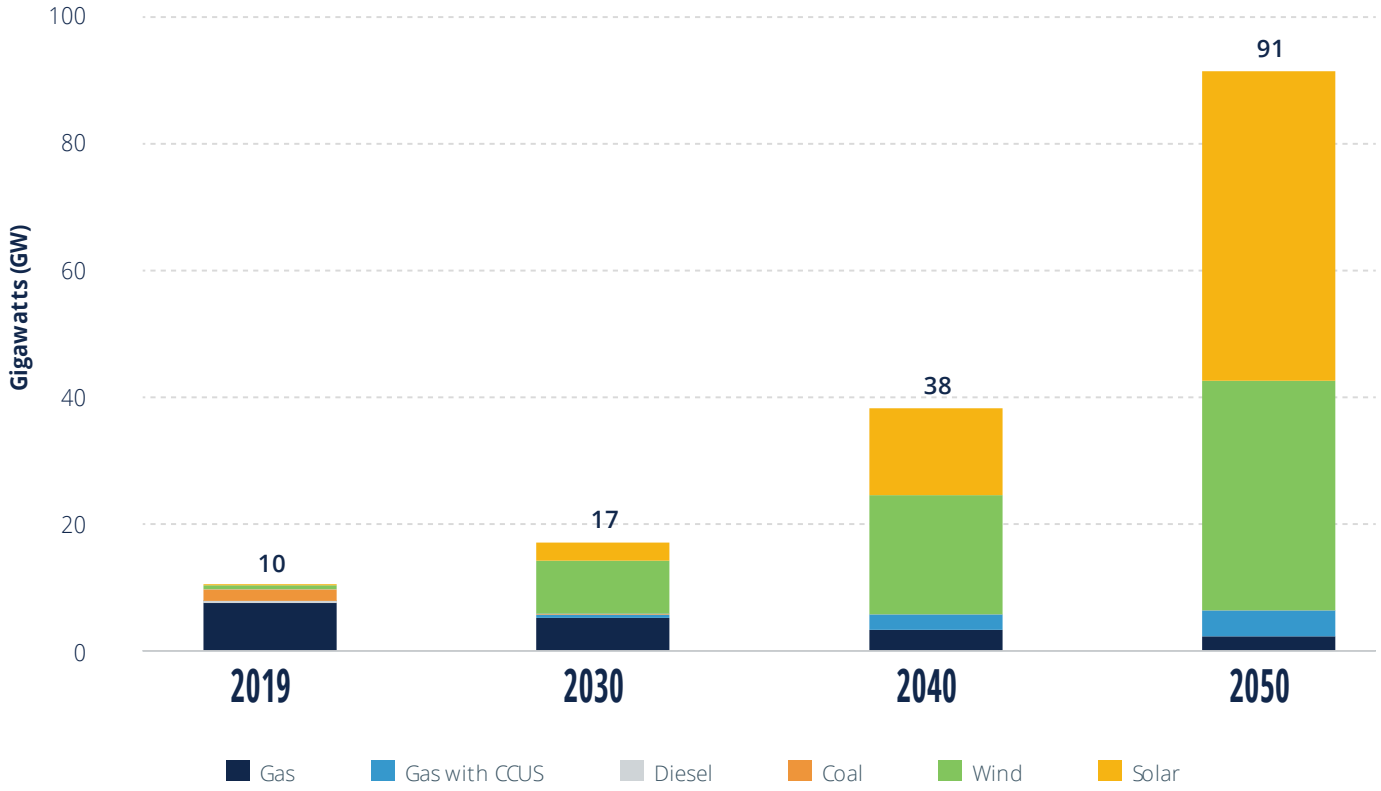
Under the *Diversified Industries* and *Early Gas Retirement* scenarios, **even more renewable energy generation is required [Figure 2].**

While renewable generation is set to supply most of the energy from the 2030s onward across all scenarios**, a firming power source is also needed to ensure reliable supply for existing industry and for future economic opportunities, such as green iron**.

With the retirement of coal power stations, **natural gas generators, supported by carbon capture and storage (CCUS), will become a key part of the generation mix**, providing dispatchable power and network stability. This will need to occur in conjunction with the deployment of batteries by 2050.

7 WA Government SWIS Demand Assessment 2023-42.

Figure 2: Installed capacity (GW) and electricity generated in the Net Zero by 2050 scenario



Note: CCIWA analysis of data output from Deloitte's Energy System Pathways model.

If we are to achieve net zero by 2050, **WA needs a step change** in its approach to planning, investment, approvals and infrastructure delivery to underpin these **extremely ambitious** renewable generation deployment rates.

WA will face significant challenges in updating legacy infrastructure and expanding electricity grids across the State's vast land mass to accommodate rapid development of renewable generation.

It will also require a **substantial alignment of diverse stakeholders** to address the factors that impede new renewable deployment in WA.

Therefore, deployment of renewable energy generation must occur in a staged and careful manner.

As seen in Spain and Portugal's significant power outage in 2025, energy systems can become unstable at short notice. Grid stability will need to be a key consideration for policy makers going forward. If WA gets the balance wrong, there is a **significant risk of WA businesses moving offshore in search of reliable and affordable supply of electricity.**

The development of grid-scale renewable generation also requires **large tracts of land.** CCIWA's analysis of the data from the Energy model found that the amount of solar and wind deployment outlined in the *Net Zero 2050* scenario would require around **180km² of land in WA by 2030, increasing to an estimated 1,150km² by 2050.** How renewable energy generation competes with productive agricultural land will be a key issue going forward.

FUEL MIX

Keeping WA moving requires traditional fuels and a bigger grid.

CCIWA'S KEY POINTS

With the size and composition of our economy, WA faces an immense challenge in shifting fuel production and distribution.

While electrification plays a critical role, not all processes/ industries can be electrified in a cost-competitive way. As such, alternative fuels will be critical in the transition.

Under all scenarios, despite electrification, fuel is needed to retain a modern way of life. However, the models predict a diverse mix of fuels – fossil fuels, biofuels and hydrogen. This diversity in fuel sources will require new infrastructure and supply mechanisms to be developed at scale.

As recent supply shocks have shown, fuel remains critical to the efficient functioning of our vast State and industrial economy. Most notably, our primary producers and mining companies need to move product to port, and ship from port to customer.

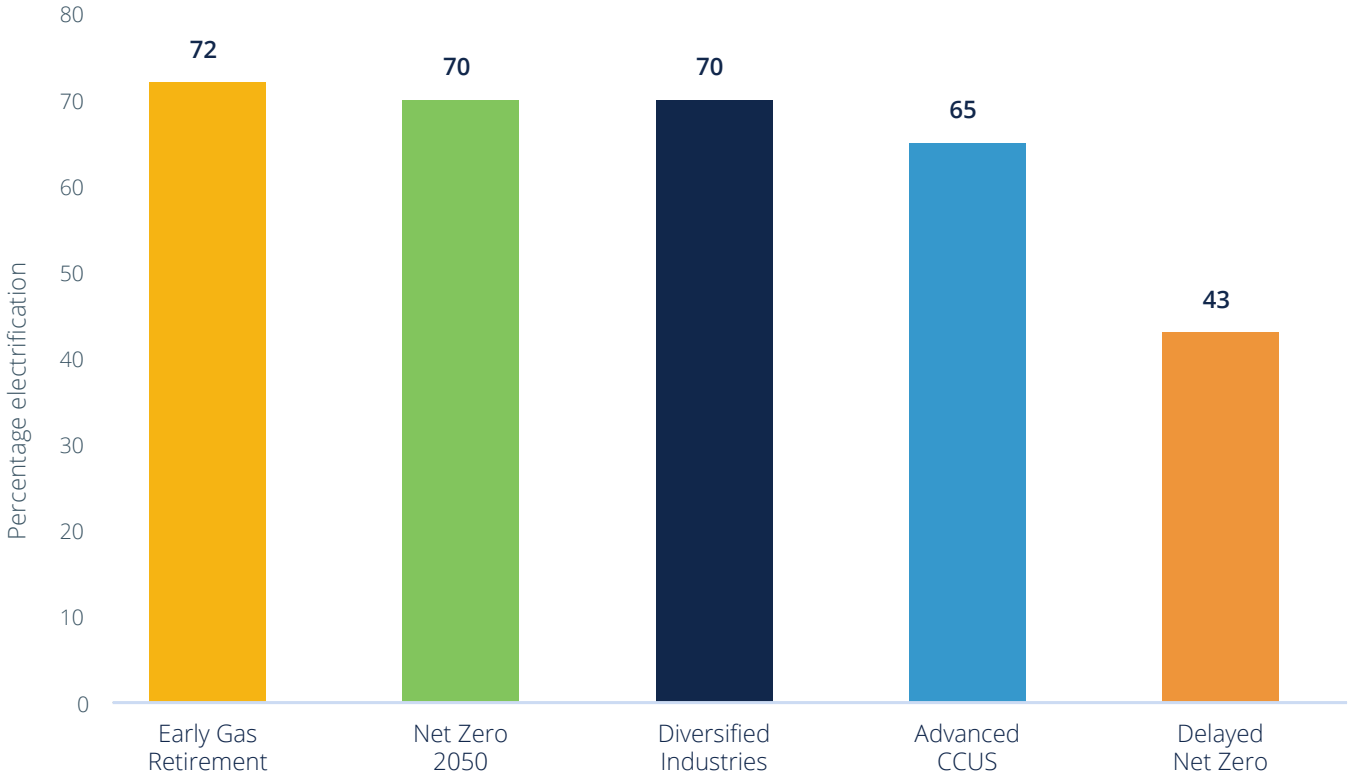
The sheer scale of our geography means that WA faces an immense challenge in shifting fuel production and distribution. There is also the added complication that, unlike built energy generation, fuels are embedded across a wide range of decentralised supply chains.

Electrification to replace fuel use is substantial under all scenarios. Most scenarios see a 65-72% electrification rate, with the exception of the *Delayed Net Zero* scenario, at 43% **[Figure 3].**

While electrification reduces emissions for the transport sector, there are still two key matters to address: **difficulty in replacing diesel for heavy machinery and the additional stress on the electricity grid**.

Diesel is typically used to power heavy machinery, including in marine settings and for back-up power generation across WA. CCIWA understands, based on industry anecdotes, that many of these assets have a long lifespan (e.g. farming equipment often operates for more than 20 years, while mining trucks have a lifespan of 10-15 years). Furthermore, the heavier the machinery, the more difficult it is to electrify. **This means that diesel will be required well into the future to keep powering WA's economy.** However there is a need to consider social licence and ongoing environmental impacts due to prolonged diesel use.

Figure 3: Percentage of electrification, by scenario[8]



Note: CCIWA analysis of data output from Deloitte's Energy System Pathways model.

CCIWA's analysis of Deloitte's model leads us to believe that diesel could be supplemented, and replaced in some circumstances, by biomethane, woody biomass, ammonia and biodiesel.

The model found that ammonia and hydrogen production for domestic use is lower than the amount assumed to be needed for export. Hydrogen consumption to be oriented towards export rather than domestic use, and hydrogen as a fuel was only cost-effective for some aspects of the economy. Hydrogen consumption ranged from 3 petajoules, under the *Delayed Net Zero* scenario, through to 10 petajoules, under the *Diversified Industries* scenario.

CCIWA heavy industry members advised that, there is currently **no commercially viable pathway to move directly from fossil fuels to green energy or renewable fuels.**

Hydrogen again has a role, albeit a minor one. There are logistical considerations to rolling out a new fuel network.

Widespread use is constrained, in part, by the cost of sufficiently ramping up hydrogen supply, and by the availability of more cost-effective options, such as battery-electric trucks.

Given that fuel powers the economy, the amount of fuel still needed is significant across all scenarios. While replacing fossil fuels with low-emissions technologies is technically feasible with the advancement of new technologies, **the most critical issue is that it will require a completely new physical supply chain**.

WA will not only need to accommodate electrification, but entirely new fuel production and distribution systems, as well as the replacement of energy and fuel infrastructure more broadly.

This includes:

- Vehicle replacements
- Fuel handling facilities
- Electrolysis capacity to create hydrogen and other fuels
- CCUS-enabled hydrogen production
- Large scale biofuel production facilities; and
- New pipelines, ports and storage infrastructure.

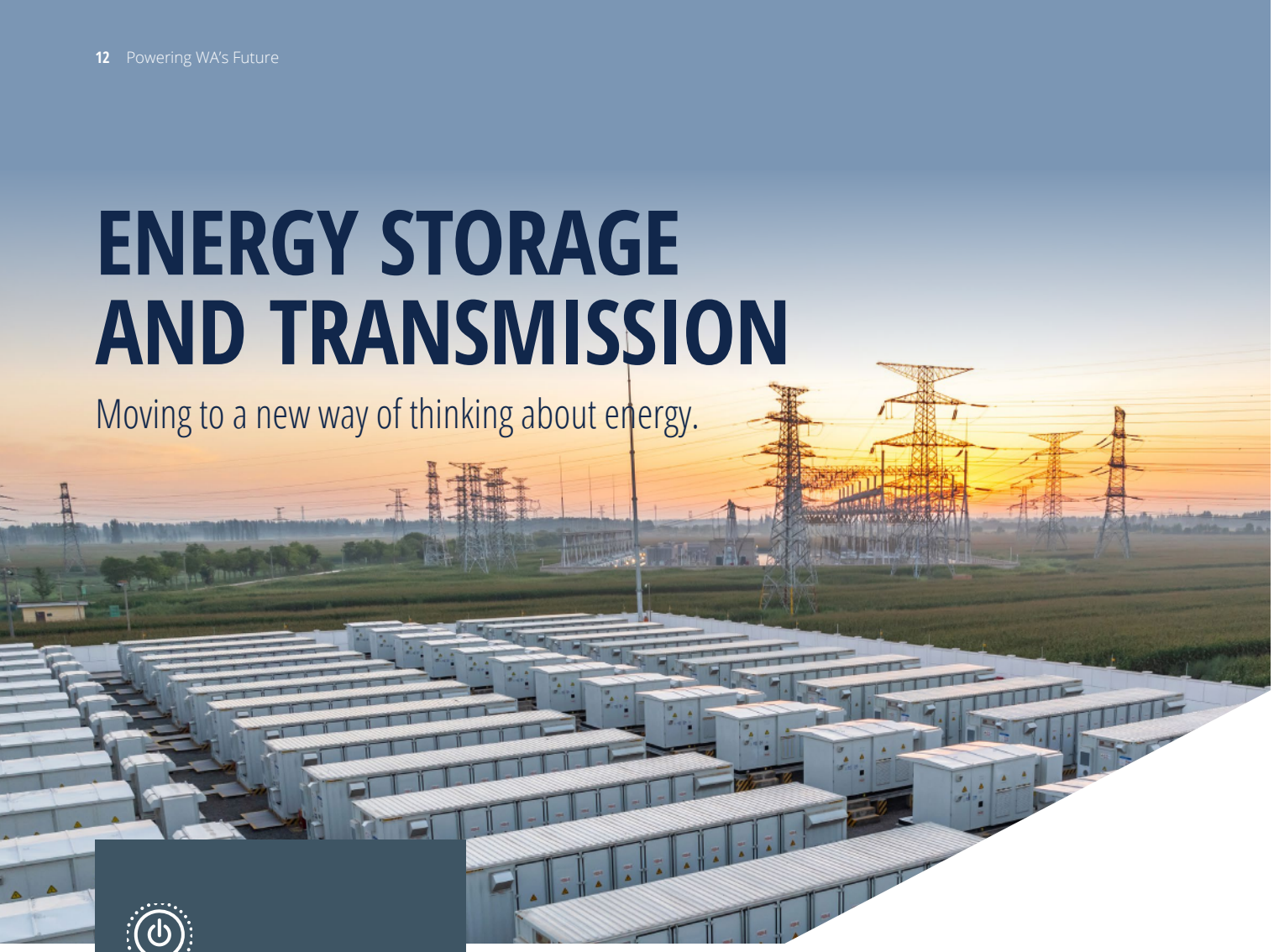
Improving logistics and supply chains can also drive down emissions. For example, road freight and passenger transport will be easier to electrify than heavy freight. These sectors also provide a large load opportunity to spur infrastructure development.

This represents one of the largest physical and logistical redevelopments of WA's industrial fuel system in our State's short history.

8 Electrification refers to the rate of transitioning equipment from using combustion energy to drawing energy directly from the electricity grid.

ENERGY STORAGE AND TRANSMISSION

Moving to a new way of thinking about energy.



CCIWA'S KEY POINTS

To meet net zero, battery storage will need to significantly increase.

While transmission build-out is integral to renewable generation, it must be delivered in the least cost way.

WA's primary challenge lies in securing its share of battery hardware amid intense global demand.

With renewables providing variable energy generation, **energy storage becomes critically important.** There are two main types of energy storage: batteries and pumped storage hydroelectricity (pumped hydro).

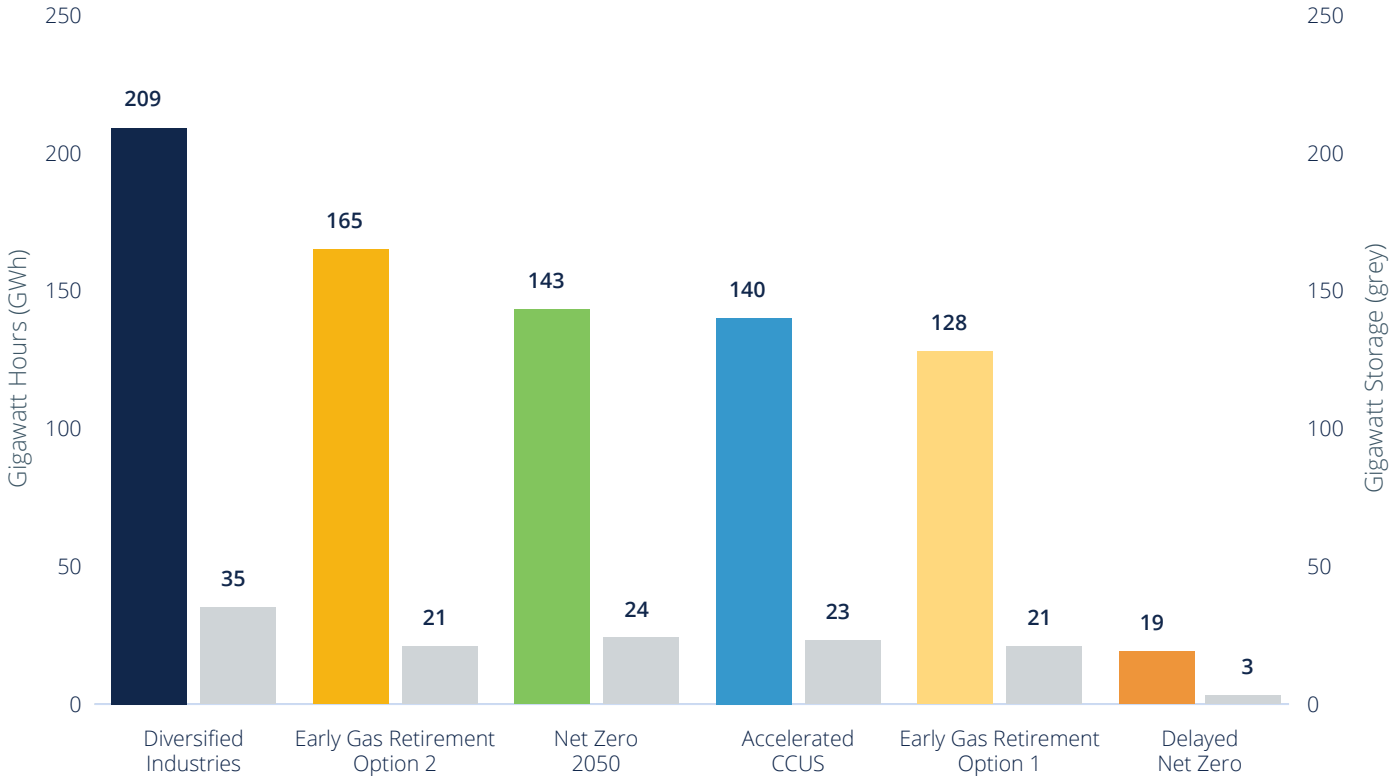
CCIWA research and analysis found that pumped hydro is unlikely to play a major role in energy storage in WA. This leaves batteries as the likely dominant form of energy storage for WA.

Grid-scale batteries are characterised by two key metrics, storage capacity (GW) and the storage capacity released over time (GWh). These two figures differ, as the storage capacity assumes a consistent drawdown of power. Greater power consumption will reduce discharge time. With current technology, based on an average power consumption, most batteries discharge in just four hours. However, improvements to lithium batteries and other emerging technologies, such as vanadium or salt flow batteries, could triple discharge potential to eight to 12 hours.

Even if battery duration substantially improve, the rate of battery deployment **must increase rapidly to keep up with the renewables roll out and ensure grid stability.**

For the Net Zero by 2050 scenario, WA would need at least 143GWh (24GW) of battery storage, increasing to 209 GWh (35GW) under a *Diversified Industries* scenario **[Figure 4]**.

Figure 4: Battery storage in GW and GWh



Note: CCIWA analysis of data output from Deloitte's Energy System Pathways model.

Transmission is also a consideration for future energy requirements. The further generation is from use or storage, the more transmission will be required.

As of 2026, WA's total energy network consists of 7,750km of transmission lines. Existing reports suggest a minimum of 7,000km of new transmission will be required across the SWIS and North West Interconnected System (NWIS). [9]

This represents a cost of anywhere between $14-30 billion between 2025-50. While noting that energy networks and demand profiles vary, this scale of funding is comparable to other jurisdictions. For example, the United Kingdom anticipates spending £10 billion (~$20 billion) on transmission infrastructure between 2025-30.[10]

9 WA Government SWIS Demand Assessment 2023-42.

10 Government of the United Kingdom. *UK Infrastructure: A 10 Year Strategy*. June 2025.

CARBON ABATEMENT AND NEGATIVE EMISSIONS

Helping to achieve emissions goals for heavy industry.

CCIWA'S KEY POINTS

Renewable energy generation alone will not get WA to net zero.

Technology to abate carbon emissions is crucial for the 'last mile' of Net Zero by 2050.

For industries where electrification is not technically or financially feasible, negative emissions options can support and keep industry competitive.

There are parts of the economy that will struggle to decarbonise in a cost-efficient way. Similarly, there are emissions in the atmosphere which need removing.

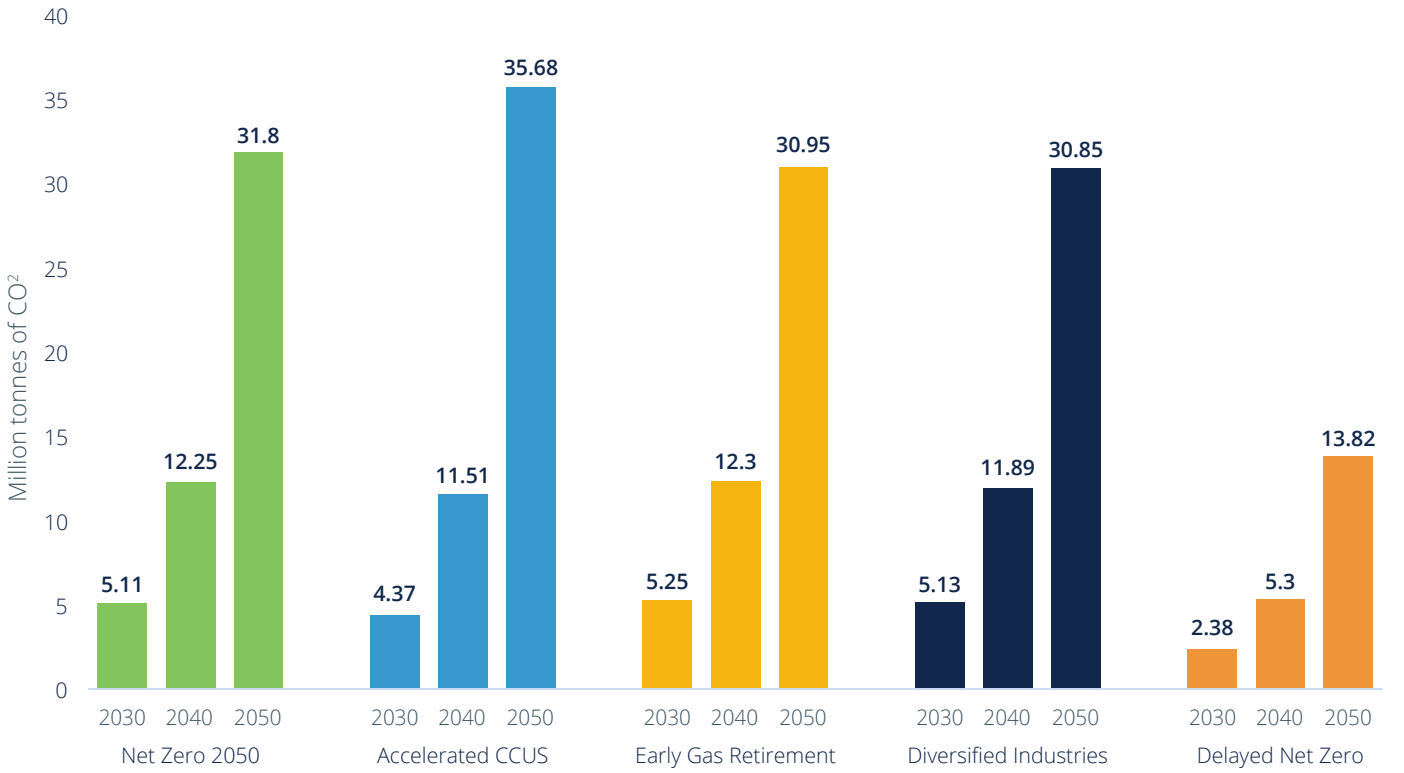
While technologies and processes to manage carbon emissions exist, they are currently used at small scale. **Carbon abatement and negative emissions solutions need more investment and deployment to reach Net Zero by 2050.**

Consistent with industry feedback, the model identified that the 'last mile' of decarbonisation will rely heavily on renewables and on the widespread deployment of carbon capture and

For carbon management, there are three main solutions:

Land use change (LUC)	Land use change is defined as when land becomes an emissions sink rather than an emissions generator.
Carbon Capture, Utilisation and Storage (CCUS)	CCUS is the process of capturing carbon emissions at the source of generation, and preventing those emissions from entering the atmosphere.
Direct Air Capture (DAC)	DAC is a form of carbon capture, removing existing emissions from the atmosphere by filtering it at scale.

Figure 5. CCUS as applied to industrial emissions



Note:
- CCIWA understands that LUC will eventually reach a common threshold, regardless of scenarios. This is due to a combination of factors including available land for change and social licence.
- CCIWA analysis of data output from Deloitte's Energy System Pathways model.

storage, and other negative utilisation, and storage. **[Figure 5]**. This requires significant investment in growing the availability and decreasing the cost of these solutions.

To fully offset emissions, these sectors will require abatement in conjunction with carbon dioxide removal measures.

CCIWA notes that, for natural gas liquefaction in particular, electrification is not a viable pathway due to the very high energy intensity and large export volumes. A further 15% increase in total statewide electricity generation would be required to fully electrify LNG production.

Importantly, carbon abatement can help to develop expertise, while emerging technologies become more economically feasible for deployment (e.g. green hydrogen). CCIWA understands, based on industry advice, that electrolysis-based hydrogen production is now viewed as less likely to be widely deployed before the 2040s, leaving natural gas-derived hydrogen to play a larger interim role to supply growing ammonia and hydrogen demand. Carbon capture can be useful to help lower emissions further.

In terms of geology, WA also has the potential to be a leader in carbon storage for local industry and customers in the Asia Pacific.

A CSIRO and Global CSS Institute study found that WA has the storage capacity to hold WA's annual emissions for 700 years.[11]

Leveraging proximity with major trade partners and our considerable carbon storage capacity, WA is ideally positioned to diversify its economy and support regional decarbonisation.

Industrial chemical processes, power generation, oil and gas, as well as maritime and aviation, are typically considered hard-to-abate sectors of the economy.

11 CSIRO and Global CCS Institute, 'CCUS Hubs Study', Report November 2023.

PUBLIC AND PRIVATE INVESTMENT

For industries to thrive, WA needs the least cost pathway to net zero.

CCIWA'S KEY POINTS

Under the Diversified Industries scenario, reaching net zero would require a $225 billion investment – the equivalent of building more than 100 Fiona Stanley hospitals. However, other research and analysis has suggested that the impacts of the counter-factual, that is, to not transition our energy system, would deliver a greater cost to WA's economy in future years.

The delivered cost of electricity rises in all scenarios as the power sector transitions to lower carbon generation.[12]

Policymakers will need to tackle the challenge of encouraging private sector investment while providing public investment at the right time.

The capital costs associated with WA's energy transition are substantial, **but broad evidence suggests that the modelled costs are in line with other jurisdictions.**[13]

Policymakers must manage the transition to ensure that the least cost option is pursued, otherwise, the end users - WA industry and households – will be significantly harmed.

In this context, it is critical to distinguish between the marginal cost of energy production (which for renewables is often effectively zero), with the average total system cost. It is the latter that determines prices, after accounting for investments in storage, transmission, and other grid-supporting infrastructure.

Deloitte's model found that capital investment, defined as the cost of runnig the energy system and decarbonising, varied depending on scenario. It is important to note that for Delayed Net Zero, the value is only representative of the investment to 2050. Under this scenario, there would still be two decades of investment, to reach net zero by 2070. **[Figure 6]**, or approximately $8-9 billion per year on average. This would be borne by public and private sector investment.

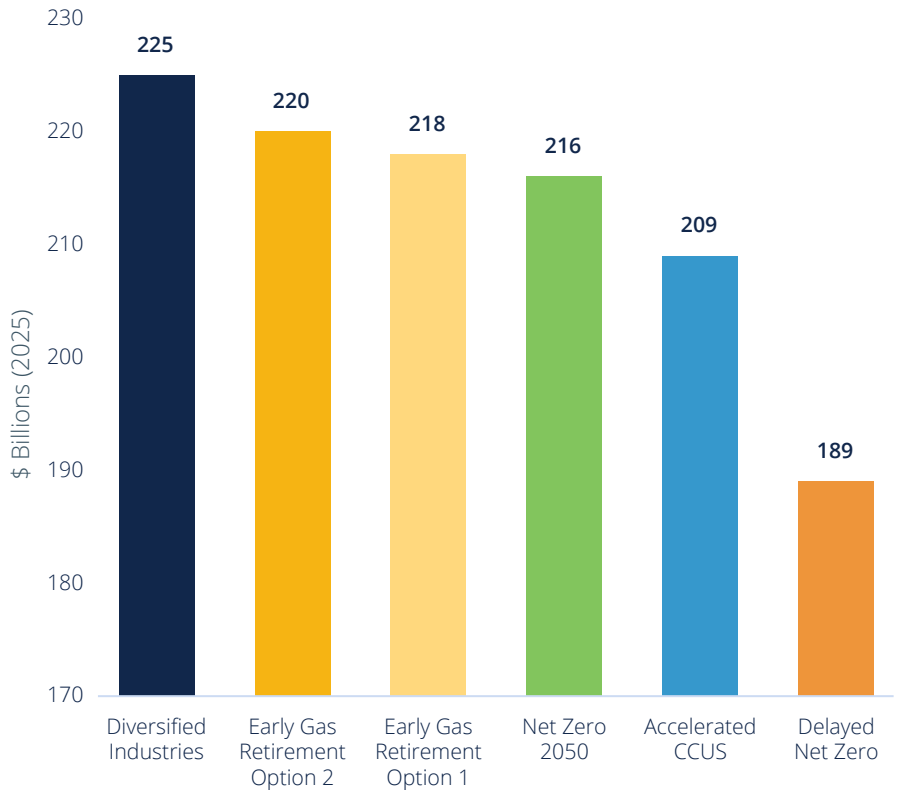
Cost estimates were based on a 7 per cent discount per annum, and CCIWA research found that the overall capital investment estimate aligns with international comparisons, such as United Kingdom. The UK Infrastructure 10 Year Strategy estimates the total cost of their energy transition to be £40b ($80b), or £8b per year between 2025-30, split between £6 billion (about $12b) for generation and £2 billion (about $4b) for transmission. This equates to approximately $200b to 2050, which is consistent with WA's transition.[13]

From an economic perspective, WA's sound fiscal management and strong resources sector mean we can fund the energy transition. However, there is a real risk that WA becomes stuck in a 'transition trough', wherein

12 The 'delivered cost of electricity' is the average levelised cost of electricity (average LCOE) across all generation technologies weighted by the share of total energy generated. This figure includes fuel costs, variable costs, capital expenditure, and operational expenditure.

13 Government of the United Kingdom. UK Infrastructure: A 10 Year Strategy. June 2025

Figure 6: Total capital investment (2025-50) for all scenarios



Note: CCIWA analysis of data output from Deloitte's Energy System Pathways model.

WA experiences an erosion in competitiveness until sufficient energy investment is sufficiently developed.

In addition, risks related to carbon pricing and tariffs from other countries, high labour costs and increasing energy prices will need to be mitigated as they could all contribute to a delayed transition and to industry moving offshore.

A delayed transition applies pressure to the economy in two ways: firstly, by increasing the final cost of reaching net zero, whenever that may be, due to the cost increases of products over time; and secondly risking access to economy-building markets.

Keeping energy costs affordable will ultimately shape WA's future living standards.

As the transition intensifies, WA will face increasing global competition for skilled workers, low-emissions technologies and key supply chain inputs.

Without investing in the transition now, we will continue to see WA's competitiveness dwindle due to the asymmetry of emissions policies across our region and the globe.

The asymmetry of carbon pricing is a key risk for all emissions-intensive industries, such as alumina, LNG, iron ore and other key commodities.

A global carbon price would enable a fairer playing field, but this might not be in place for some time, if at all feasible. Without such an instrument, WA industries will continue to be unfairly penalised when in direct competition with our regional neighbours, such as Indonesia.

A challenge for policymakers in WA and nationally will be to determine the extent that industry should be protected from this critical disadvantage.

We also need to consider the cost of inaction. While identifying the full cost of inaction is outside the scope of this work, Treasury undertook modelling in September 2025 which found that Australia would be up to $2 trillion worse off.[14]

14 Commonwealth Treasury. *Australia's Net Zero Transformation: Treasury Modelling and Analysis.* September 2025.

THE ENERGY TRANSITION CHALLENGE IN ACTION

Alumina, derived from bauxite, is a strategic material used to create aluminium, as well as being found in electric vehicles, electricity networks, solar panels, wind turbines and batteries. Alumina and bauxite are integral to delivering new energy and, ultimately, reducing emissions.

The processing of bauxite to create alumina and aluminium is a significant driver of emissions. In Australia, alumina producers are subject to Australia's Safeguard Mechanism, which forces them to reduce their Scope 1 emissions over time, via declining baselines. However, these producers are competing against other countries that do not impose the same carbon pricing mechanisms.

If policies, such as the Safeguard Mechanism, remain unmanageable for alumina producers and forcing them to close, Australia could lose all the economic benefits of the sector for no net global reduction in emissions.

CHALLENGES IDENTIFIED BY CCIWA

WA faces an array of challenges as part of the energy transition.

Our ability to reach the speed and scale of deployment needed for net zero requires significant physical and financial capital, and overcoming a range of uncertainties, risks and bottlenecks.

There is a real opportunity to capitalise on the challenges we face, which will have a dual benefit of value-adding to the economy whilst simultaneously achieving decarbonisation goals.

Capital intensity and competition for funds

The energy transition requires unprecedented investment across infrastructure, technology and supply chain. WA must compete globally for capital as investors weigh returns and abatement cost across multiple asset classes and jurisdictions.

Climate policy uncertainty and a need for coordinated governance

Uncertainty and asymmetry of climate policy creates risk for long-term investments, often burdening particular groups of stakeholders. Inconsistent and uncoordinated policy signals – particularly around carbon offsets and subsidies – can delay or deter capital allocation in WA's transition-critical sectors.

International competitiveness

WA's exports must remain cost-competitive as asymmetries emerge between the climate policies of WA and its regional trading partners. Without aligned decarbonisation policies, WA industries and exports could become increasingly uncompetitive.

Technological readiness and scalability

WA's transition pathways depend on ongoing technological advances and corresponding cost reductions across a range of abatement technologies. If progress stalls or costs remain high, barriers to investment and deployment will increase.

Supply chain risks

Global supply chains for transition technologies remain volatile, with vulnerabilities in critical minerals, components and logistics. WA must manage exposure to geopolitical risks to secure its own supply chains and guarantee the necessary flow of inputs critical to the transition.

Competing land uses

Agriculture, carbon farming, renewables, mining and conservation are all vying for their respective optimal land use in WA. Navigating trade-offs and land use conflicts – especially in regions with cultural and environmental sensitivities – is increasingly complex.

Labour force disruption and availability

New skills will be required at scale across construction, renewables and clean industry, while some legacy roles will decline. Attracting, training, and retaining a transition-ready workforce is critical amidst national and global competition for talent and for regions facing significant change.

Rapid physical change to industries and networks

Electrification, fuel switching and decentralised energy will require the coordination of physical change at scale. This will occur across ageing infrastructure and dispersed operations whilst also building vast quantities of new generation and transmission infrastructure.

Social licence

The pace and scale of transition will test public support, particularly where communities perceive risks to jobs, land or cultural values. Building and maintaining social license requires early, genuine engagement and benefit-sharing.

Delays in project approvals

Lengthy and complex regulatory processes for environmental and other project approvals are slowing the rollout of major infrastructure projects. Streamlining environmental and planning approvals while maintaining integrity is essential to facilitate the transition.

OPPORTUNITIES FOR WESTERN AUSTRALIA

CCIWA believes that despite these challenges, WA has great opportunity.

WA's abundant renewable and natural resources position the State as a strategic enabler of the energy transition, both locally and regionally.

This is because the energy transition will create several new, value-add industries which leverage WA's strengths. For example, our agricultural sector can contribute to a new biofuel industry, helping to power combustion engines into the future, while our abundant critical minerals are essential to make batteries and for energy transmission, and iron ore is necessary in the manufacture of renewable energy infrastructure.

Our gas and hydrogen exports will be needed by our closest trading neighbours and allies, helping to keep their lights on as they too face similar challenges to WA. Furthermore, our geography also can help the energy transition, by storing carbon and creating economic value through nature-based solutions.

Reinvigorated industries for WA

Critical minerals mining and processing to assist global goals

Helping the Asia-Pacific region decarbonise

Enabling a greener economy

Reinvigorated industries for WA

There are opportunities for WA to capitalise on new market opportunities, particularly in new greener value-added processes and manufacturing, such as green iron, aluminium and new alternate fuels such as hydrogen, biodiesel and biomethane.

By the mid-2030s, Australia (and particularly WA) has the potential to produce the lowest levelised cost electricity in the region.[15] Low-cost renewable electricity is a significant factor in determining green-metal competitiveness and would be a key driver of the competitiveness of energy-intensive exports.

Early movers in industry development face intensive R&D and large capital costs. Government intervention and support reduce the burden of the green premium and could facilitate scaling of the industry.

Capitalising on WA's renewable assets at scale could deliver significant cost advantages to WA manufacturers, giving WA the ability to seize emerging market opportunities in green metals, and low-carbon fuels competitively.

Critical minerals mining and processing to assist global goals

WA continues to hold substantial reserves of critical minerals, which will underpin the transition to a greener economy.

By 2040, expected demand for key energy transition minerals, such as lithium, nickel, cobalt and graphite, will reach nearly $770 billion globally.[16] These minerals underpin the production of batteries, solar panels, wind turbines and other technologies used throughout the energy transition.

This represents a significant opportunity to benefit from the global upswing in demand. There is an opportunity to not only be a major exporter of these raw minerals but, through reliable and affordable power, to refine the critical minerals as well.

Helping the Asia-Pacific region decarbonise

Energy demand in the Asia-Pacific is expected to grow by over 25% between 2023-2050.[17] Many Asian countries face constraints in developing large-scale renewable projects and electrifying their economies, creating a market opportunity for WA to export low-carbon fuels to meet unmet energy demand.

Due to our proximity to major Asian exporters, and existing trade links, WA remains a strategic supplier of energy solutions to the region.

LNG will remain a critical component of energy systems over the coming decades, but there will be increased demand for lower emissions fuel, such as green hydrogen and ammonia, over the longer term.

The development of cleaner fuels in WA will, in turn, be supported by the development of grid-scale renewable developments. Alternative fuels and technologies can be advanced through fair off-take agreements, helping to competitively price them against existing technologies.

Enabling a greener economy

Based on industry feedback, renewable energy and electrification alone will not get WA to net zero, but can help make substantial gains in reaching net zero.

CCUS can help chemicals, mining and other hard-to-abate industries stay competitive in Australia and WA, while continuing to reduce industrial emissions.

By taking a technology-agnostic approach, and investing in research opportunities, WA could not only progressively decarbonise, but also attract international research and investment.

WA has the geological ability to utilise CCUS on a significant and economic scale. This will help protect exports, decarbonise local industry and provide a hub for the Asia-Pacific region.

15 *International Institute for Applied Systems Analysis*.
16 International Energy Agency, '*Global Critical Minerals Outlook 2024*', Report May 2024
17 International Energy Agency, *World Energy Outlook 2024*, Report October 2024. The IEA assumes that energy consumption in China and Japan will decrease slightly in 2050.

CCIWA'S PRINCIPLES AND RECOMMENDATIONS

Further to investment and policy settings made to date, there are several important considerations for the energy transition in order to maintain and deliver a reliable, affordable and decarbonised energy grid for WA.

Ultimately, WA businesses and industry need to maintain commercial competitiveness while progressively decarbonising.

This is underpinned by **three core principles:**

1 Competitiveness is key to WA's future economy

Without the right mix of policy settings, economic attractiveness and technological access, WA will not be able to capitalise on future economic opportunities and maintain the competitiveness of existing industries.

2 A technology agnostic approach to generation, storage and abatement

Given a diverse set of energy generation options are required to meet the transition at least cost, Australia cannot afford to chase specific technologies over others. We should follow international examples, such as China and the United Kingdom, who are pursuing a technology-agnostic energy transition.

3 Messaging matters – alignment in messaging, across all levels of government, with industry

Given that the energy transition is one of the most significant environmental, social and economic challenges of our time, Governments have significant work to do to get the messaging right. This includes bringing the WA community, particularly those in our regions, along for the journey and working with industry to highlight success stories.

FEDERAL RECOMMENDATIONS

The Federal Government should:

Secure a bilateral agreement for environmental assessment and approvals with the WA Government, and task State authorities with implementing the *Environment Protection and Biodiversity Conservation Act* and National Environmental Standards (NES).

Recognise existing State offsets, such as the Pilbara Environment Offsets Fund, under the NES Offsets policy.

Avoid mixed messaging and provide clear, consistent support for the gas sector by fully implementing and accelerating the actions set out in the *Future Gas Strategy*.

Have clear, technology-agnostic messaging in relation to the energy transition and reinforce this with policy settings that provide confidence to investors and industry. A key priority is removing barriers to carbon capture, utilisation and storage (CCUS), including by developing a *National Carbon Capture Strategy or Roadmap* and implementing policies that encourage and support CCUS investment, including targeted funding to accelerate deployment.

Establish a new funding stream for the National Reconstruction Fund offering zero or very low interest loans to assist with the electrification of industry.

Ensure the planned review of the Safeguard Mechanism has a focus on the policy's impact on the global competitiveness of the Australian industry.

Initiate a Regional Carbon and Energy Border Working Group, which includes representation from major emitters, State Governments, New Zealand, East Timor, PNG, Singapore and Indonesia. The aim should seek to harmonise decarbonisation, fuel security objectives and supply chains across the region.

Ensure the right mix of incentives are available to attract apprentices and trainees to support future energy workforces. Skills should be transferable across domains and minimise licensing requirements.

Fast track the *National Bioenergy Feedstock Strategy* and *Cleaner Fuels Program* to bolster diversified fuel security over the longer term.

Develop and fund technology-agnostic policy settings to help Australia reach net zero ambitions. This includes removing existing bans on specific energy generation sources and investing in research for abatement and storage. Ultimately, the Federal Government should be open to emerging technologies which suit local contexts.

Identify further ways to support Australia's two oil refineries to ensure ongoing domestic fuel supplies, beyond 2030.

Extend the Capacity Investment Scheme to gas supply, and direct further funding from the Rewiring the Nation Fund to projects that secure energy supply, and decarbonise energy systems in WA, including the North West Interconnected System (NWIS).

Build on the Sustainable Aviation Fuel Strategy by supporting universities to research low carbon fuels.

Develop broad incentives to support mature and maturing carbon abatement technologies. Support should extend to research into and scaling of biochar, direct air capture and hydrogen technologies. Funding should also help States with the construction of strategic common-use infrastructure to support capture.

STATE RECOMMENDATIONS

The State Government should:

Implement off-take agreements for energy generation, like the recent deals between Synergy and the private sector, to signal to investors that WA is open to private sector investment.

Behind-the-meter options that reduce transmission requirements to support the overall affordability of the energy transition.

Continue to support and enable energy project developments to meet current and future energy demands.

Review its recent environmental approval reforms to ensure they are delivering on their policy intent, including facilitating timely decision-making processes to ensure competitive energy supply. This should be supported by the implementation of clear time-based metrics and key performance indicators, which are tied to improving internal processes of the regulators that approve major projects.

Ensure that Strategic Industrial Areas (SIAs) are turnkey with all relevant approvals in place for construction. This includes designating green industrial hubs within the SIA Strategy network. Appropriate consultation, planning, common-use infrastructure, and funding is needed to send the right signals to industry.

Be complementary to Federal Government initiatives and ensure the right mix of incentives are available to attract apprentices and trainees to support future energy workforces. Skills should be transferable across domains and minimise licensing requirements.

Invest in new gas generation for the South West Interconnected System (SWIS) to improve reliability across the SWIS.

Tackle the challenge of decarbonising heavy industrial areas through targeted support measures. Key to this is creating a regulatory sandbox framework, so industry can apply research and provide feedback on barriers to full-scale deployment.

Lift the ban on new uranium mining in WA and develop a robust regulatory framework that will ensure its safe extraction, transportation, and export.

Pay the upfront costs of new transmission infrastructure and recoup this over time via fixed tariffs.

Explore industry-led solutions for development of energy generation, transmission and storage to ensure timely customer connections.

Invest further in fuel security and resilience, through fast tracking the WA State Advanced Biofuel Strategy to support longer-term resilience and finalising the *Onshore Gas Code of Conduct*.

Develop a comprehensive Statewide Energy Strategy that sets out future mix of generations assets, identifies priority transmission corridors, and where private sector investment is needed. This would provide industry with the clarity and certainty required to make long-term investment decisions in WA.

Release a timeline of delivery for the actions identified in the *CCUS Action Plan*. This would provide industry with the certainty it needs to make investment decisions in CCUS technologies.

STAY INFORMED

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CCIWA acknowledges there are a diversity of views on policy issues within its vast membership, and that as such there may be different views on the issues included within this publication.

CCIWA seeks to understand the views of all its members, and ultimately, in keeping with its Constitution, forms policy positions consistent with the long term interests of the overall economy, for the benefit of communities in WA.

ABN: 96 929 977 985 ACN: 099 891 611

Chamber of Commerce and Industry WA