



Sectoral emissions reduction strategy for Western Australia

Pathways and priority actions for
the state's transition to net zero emissions



December 2023

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Minister's foreword

Climate change is one of the most significant challenges of our time. The Cook Government is committed to taking responsible, effective and enduring action.



The development of the *Sectoral emissions reduction strategy for Western Australia* (SERS) creates the foundations for delivering the State Government's commitment to net zero greenhouse gas emissions by 2050 and recognises the importance of contributing to national and global efforts to tackle climate change and safeguard our community and environment.

The SERS is the culmination of a process which commenced in December 2021 to develop pathways for the state's net zero transition.

This strategy to support sectoral emissions reduction will help us harness the opportunities of the low-carbon transition, ensure the ongoing competitiveness of Western Australia's existing industries and support new industries focused on clean energy exports and green manufacturing.

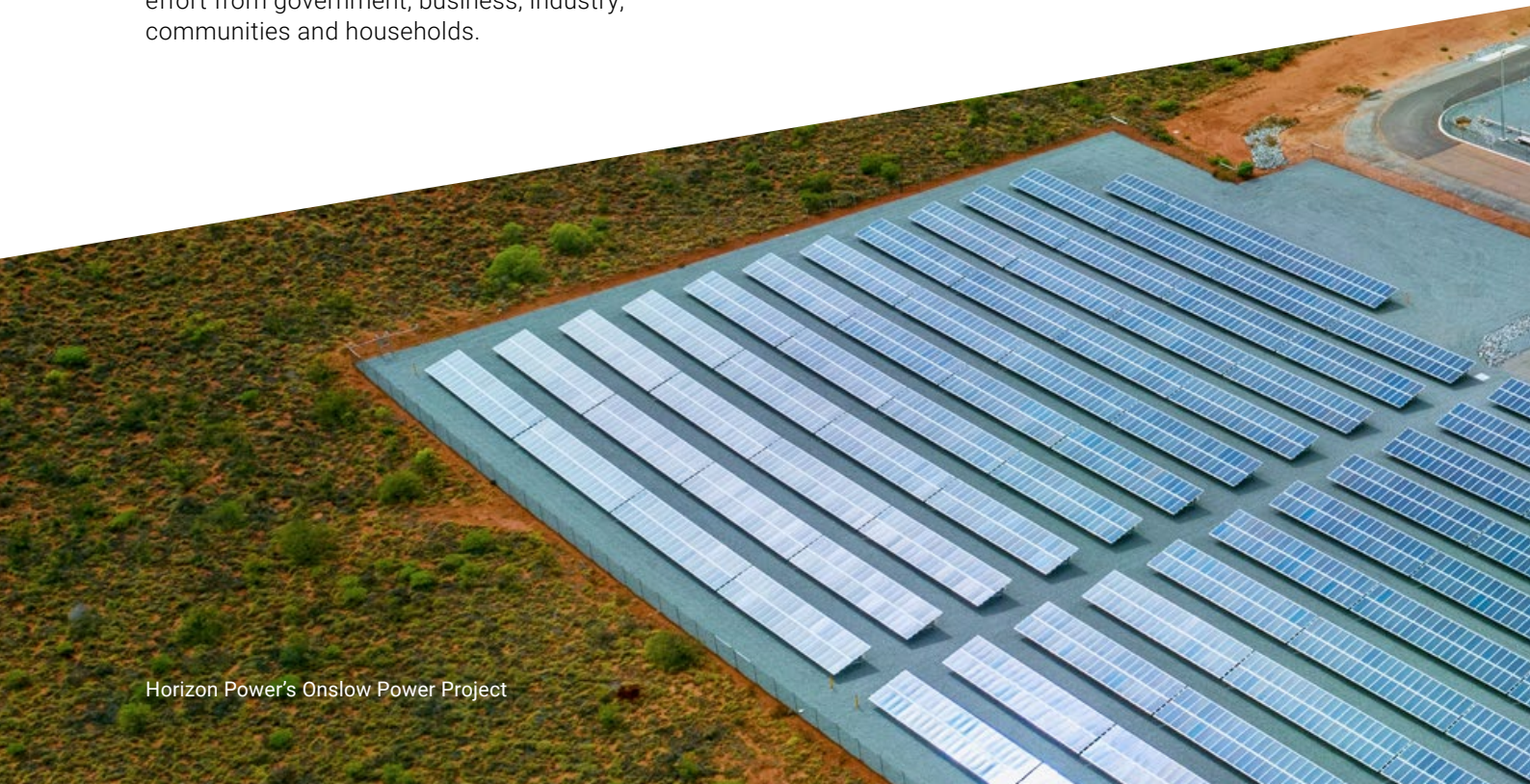
The transition to net zero emissions presents unique and complex challenges and opportunities for Western Australia's economy and the harder-to-abate industries which underpin our state's economic resilience. Achieving our ambition will require considerable and enduring effort from government, business, industry, communities and households.

Fortunately, Western Australian regions, businesses and industries are already taking steps to reduce emissions, with more than 90 per cent of the state's mining and energy companies having set targets for net zero emissions by 2050 or earlier and many pursuing significant investments in decarbonisation. Almost 40 per cent of Western Australian households now have rooftop solar, harnessing our abundant sunshine to power home energy use.

With the growing climate action across the public and private sectors, and the welcome leadership of the Albanese Government, momentum in Australia has never been greater.

The State Government is embracing this momentum and stepping up critical initiatives to accelerate decarbonisation and enhance resilience to climate change.

The transition of our energy system is well underway, and implementation of the South West Interconnected System Demand Assessment is set to unlock additional renewable generation in the state's main electricity grid.



We are taking action to stimulate innovation and scale up critical low-carbon technologies through programs such as the Clean Energy Future Fund and the Carbon Innovation Grants Program.

We have introduced the landmark Climate Change Bill to Parliament to legislate Western Australia's target of net zero emissions and ensure commitment to climate action extends beyond this State Government.

The SERS will accelerate the momentum underway and support the collective actions of households, business and industry.

Initiatives contained within the SERS will drive innovation, provide incentives for clean energy investment, build social licence for key technologies and facilitate infrastructure critical for Western Australia's transition to net zero emissions.

While the SERS sets out priorities for immediate action, new needs and opportunities will emerge over time. The State Government acknowledges that no single strategy or plan can address the many complex issues and policy challenges presented by our changing climate and the imperative of achieving net zero emissions.

The SERS will create an important foundation on which Western Australia's sector pathways will be built.



**Hon. Reece Whitby MLA
Minister for Energy; Environment;
Climate Action**



Executive summary

The State Government has committed to working with all sectors of the economy to transition to net zero emissions by 2050. The delivery of the *Sectoral emissions reduction strategy for Western Australia* builds on significant action on climate change in 2023, including the introduction of climate change legislation and release of Western Australia's first *Climate adaptation strategy*.

The sectoral pathways outlined in this work show key priorities, benchmarks and milestones for Western Australia's transition to net zero emissions while supporting the decarbonisation of our region.

Western Australia has an export-oriented economy and is home to around one-third of heavy industry facilities regulated under the Australian Government's Safeguard Mechanism. Decarbonising Western Australia's resources, manufacturing and mining industries will be fundamental to achieving our net zero goal, and to ensuring our exports remain competitive and our communities continue to prosper.

While the state's harder-to-abate industries and geographic characteristics pose particular challenges for decarbonisation, our regions have some of the most enviable renewable energy resources in the world. Combined with Western Australia's significant manufacturing capability, skilled workforce and access to critical infrastructure, these advantages can catalyse significant investment to decarbonise the economy and develop new, low-carbon industries.

Western Australia's critical minerals are fundamental to the world's clean energy transition, contributing components for electric vehicles (EVs), wind turbines, solar panels, electrolyzers, fuel cells and rechargeable batteries. The state accounts for about half of global lithium production and is a major exporter of nickel, cobalt, manganese and rare earths. Western Australia is also well positioned to become a globally significant exporter of green hydrogen and green ammonia and contribute to the decarbonisation of global steelmaking.

The transition represents a multi-decade investment boom, and a chance to invest in a secure and sustainable energy system and carbon-competitive industries, which will deliver more jobs and growth in a climate-resilient future. Achieving the twin goals of global and local emissions reduction, however, means our decarbonisation pathways will be different to that of other jurisdictions.

Action is already underway to reduce emissions in key sectors of Western Australia's economy. The SERS builds on this momentum, ensuring Western Australia can capitalise on new opportunities, and the transition empowers Aboriginal people and delivers benefits for all community members.

The SERS is supported by whole-of-economy energy systems modelling, conducted in partnership with Climateworks Centre and the CSIRO, to identify least-cost pathways to achieve net zero emissions and identify priority actions for government.



Pathway for electricity

Achieving net zero emissions across the economy requires the electricity sector to decarbonise faster than other sectors while meeting a step change in total demand as other sectors electrify. Firmed renewable energy from solar and wind remains the cheapest source of new electricity generation build.

Substantial augmentation of electricity transmission is necessary to support the transition to net zero emissions. Very large investment is required in both the South West Interconnected System (SWIS) and in the Pilbara to deliver the transmission infrastructure required to support decarbonisation plans of existing businesses and to enable new green industries.

Battery energy storage systems are crucial for short- to medium-term reliability and to support households and businesses to continue to adopt solar photovoltaic systems. Gas will be needed over the short to medium term to provide dispatchable power to complement batteries and unlock higher concentrations of renewable electricity. Long-duration energy storage technologies and green firming technologies will also be needed over the longer term to balance increased amounts of intermittent and distributed generation.



Pathway for industry

The industry sector accounts for about half of Western Australia's emissions. Significant reduction of industry emissions can be achieved through electrification, underpinned by timely investment in renewable energy generation and transmission infrastructure.

New technologies, such as renewable hydrogen, need to be trialled and adopted at scale to ensure industry can continue to decarbonise through to 2050. Carbon capture, utilisation and storage (CCUS) will also be critical to address emissions from liquefied natural gas (LNG) production and support the development of new low-carbon industries.



Pathway for buildings and waste

Solutions to achieve near-zero emissions from buildings, including energy efficiency and electrification, are already mature and commercially competitive or have been demonstrated at scale. Modelling highlights the importance of energy efficiency, which has the added benefit of reducing cost-of-living pressures for households. Selecting products and materials with lower embedded emissions is also critical to decarbonisation of the buildings sector.

Circular economy principles will not only reduce emissions associated with the manufacture of products, but help to minimise waste generation and other environmental impacts.



Pathway for transport

Road transport contributes about three-quarters of this sector's emissions. Adoption of zero-tailpipe emission vehicles is key to reducing emissions. Decarbonisation will be led by the adoption of battery EVs in the passenger market. Complementary measures such as public and active (cycling and walking) transport will also help to reduce emissions through a reduction in vehicle use.

Road freight vehicles, rail and aviation pose additional challenges to transition, with further electric technology improvements and alternative fuel options under development.



Ensuring a just transition

Western Australia's regions are central to the decarbonisation journey. The net zero transition provides an important opportunity to empower Aboriginal people, regionally based individuals, small businesses and communities through community-owned renewable projects, partnerships with industry and job opportunities.

Achieving a just transition will enable all Western Australian households and businesses, including those in the regions, to participate in the new energy landscape and share in the positive environmental benefits and lower energy costs.



Pathway for agriculture and land

The majority of agriculture emissions come from non-energy sources, in particular methane from livestock.

Agricultural emissions are acknowledged to be hard to abate, underscoring the need for additional technological solutions to substantially reduce key sources of methane emissions and address residual emissions in 2050.

Maintaining and enhancing land-based sequestration will be crucial to both the state and agriculture achieving net zero emissions. Land use emission 'removals' from cultivation of forests and other activities to sequester carbon will need to be sustained to offset emissions from other sources.

The SERS builds on momentum already underway, ensuring Western Australia can capitalise on new opportunities.



Western Australia's role in the global net zero transition

The Government of Western Australia announced the statewide target of net zero emissions by 2050 in August 2019, along with a commitment to work with all sectors of the economy to achieve this goal.

The [Western Australian Climate Policy](#), released in 2020, pledged to develop the SERS to evaluate opportunities for cost-effective abatement across the state's key economic sectors and develop strategies to guide emissions reduction.

The scale of investment required in sustainable energy systems and carbon-competitive industries is enormous. The development of the SERS recognises the important role for the State Government in setting the terms of, and incentivising, private investment in the net zero transition.

Western Australia's economic profile presents distinctive challenges for the state's transition to net zero

Western Australia's economy is export-oriented, with about half of Australia's exports of goods, including minerals, petroleum, agri-food and specialised manufactured goods, originating from this state.

Western Australia has the largest share of heavy industry of any Australian jurisdiction. About half the state's emissions are contributed by facilities regulated under the Australian Government's Safeguard Mechanism. These industries are the backbone of our regions and underpin our state's economic resilience and the nation's prosperity.

The Pilbara region – the hub of Western Australia's iron ore mining, LNG and ammonia production – is the most significant of Australia's industrial regions in terms of emissions. The Pilbara contributes 19.2 per cent of Gross State Product (GSP), 3.4 per cent of Australia's Gross Domestic Product (GDP) and one-third of national exports.

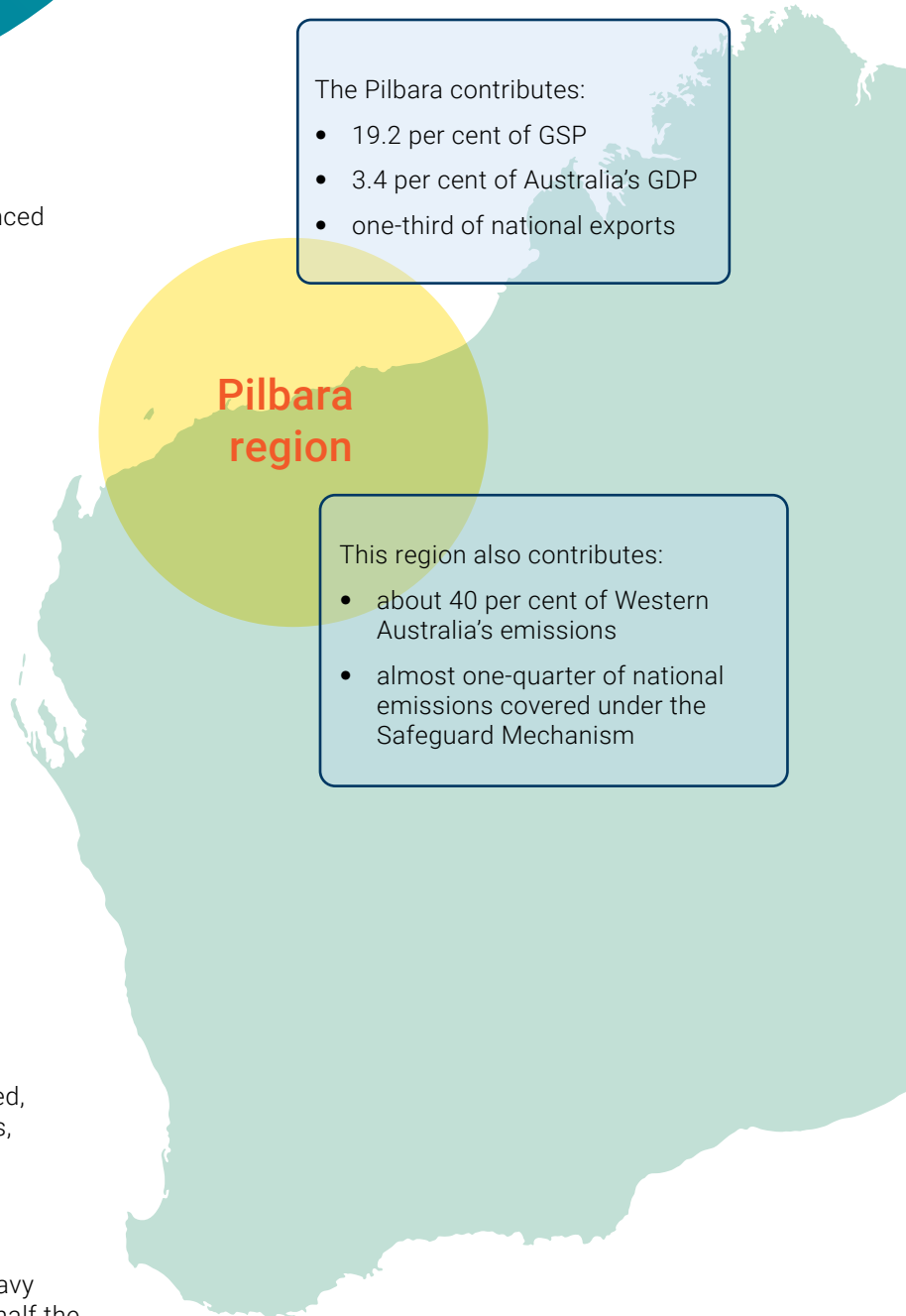


Figure 1: Western Australian Pilbara region

This region also contributes about 40 per cent of Western Australia's emissions and almost one-quarter of national emissions covered under the Safeguard Mechanism.

These statistics underscore both the challenge and the imperative of reducing emissions from our industrial regions. Decarbonising these critical industries will be fundamental to achieving state and national commitments for the net zero transition, and ensuring exports remain competitive and our regions and communities continue to prosper.

Our regions and industries are well placed to decarbonise

Western Australia's industrial regions have some of the most enviable renewable energy resources in the world, along with proximity to existing industrial centres and access to critical infrastructure. These natural advantages can catalyse significant investment to decarbonise existing industries and develop new, low-carbon industries.

The scale, pace and importance of addressing emissions from these hard-to-abate sectors is reflected in the significant commitments made by mining and energy companies to achieve net zero emissions by 2050 or earlier.

While Western Australia's heavy industry sectors face technological and commercial challenges, many of the state's mining and energy companies are well placed to execute the low-carbon transition, with large balance sheets underpinning capacity for investment in key infrastructure and low-carbon technologies. Western Australian industry also has extensive experience driving innovation and large-scale transformation across its supply chains and investments.

Western Australia can leverage these advantages to:

- transform our energy-intensive industries
- diversify our industrial base
- capitalise on global demand for clean energy exports and low-carbon commodities
- create resilience in our regions.

Western Australian resources are supporting decarbonisation of our region and the world

Western Australia's critical minerals are fundamental to the world's clean energy transition, contributing components for EVs, wind turbines, solar panels, electrolyzers, fuel cells and rechargeable batteries. The International Energy Agency has forecast that EVs and energy storage systems alone could drive a 30-fold increase in demand for some critical minerals over the next 20 years.¹

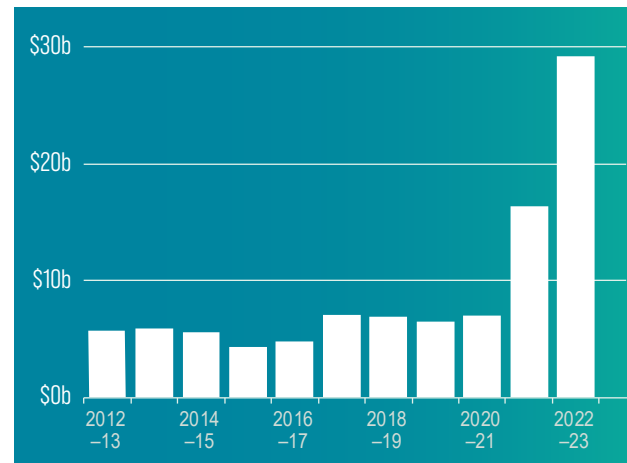


Figure 2: Battery and critical mineral sales from Western Australia

The state accounts for about half of global lithium production and is a major exporter of nickel, cobalt, manganese and rare earths. The establishment of a critical minerals processing industry in Western Australia is delivering both economic benefits and supporting global demand. Our value-adding industries, including the manufacturing of battery-active materials, are helping de-risk supply chains and enabling decarbonisation of our region.

Western Australia is well positioned to become a globally significant exporter of green hydrogen and green ammonia. The state also has comparative advantages for production of green iron, possessing the iron ore reserves, natural gas and potential renewable hydrogen networks to contribute to the decarbonisation of global steelmaking.

¹ International Energy Agency, 2021, *The Role of Critical Minerals in Clean Energy Transitions*, www.iea.org

The Climate Council estimates that an Australian green steel industry exporting to China could reduce global emissions by about 2 per cent – almost twice as much as Australia eliminating its own emissions – while an established green metals industry exporting to Asia could cut global emissions by 8 per cent.²

While some pathways to green steel will significantly reduce global emissions, local processing may put upward pressure on emissions within Western Australia. This underscores the complex local and global dimensions of industry transformation, which must be understood and considered in the development of transition policies and emissions pathways.

Transitioning Western Australia’s economy presents enormous opportunities, and requires urgent action

Transitioning our state’s energy-intensive economy presents substantial economic and social opportunities and will help diversify and strengthen the resilience of Western Australia’s economy.

The transition represents a multi-decade investment boom, and a chance to invest in a secure and sustainable energy system and carbon-competitive industries, which will deliver more jobs and growth in a climate-resilient future. Building the skilled workforce required to underpin the technology development and new industries will be crucial.

Realising these opportunities requires an unprecedented transformation of our energy systems and industrial infrastructure. This cannot be achieved by organisations acting alone.

Clear and committed government policies, along with effective planning and coordination, are required to support investor confidence, and ensure Western Australia can continue to attract the investment and talent required for the net zero transition.

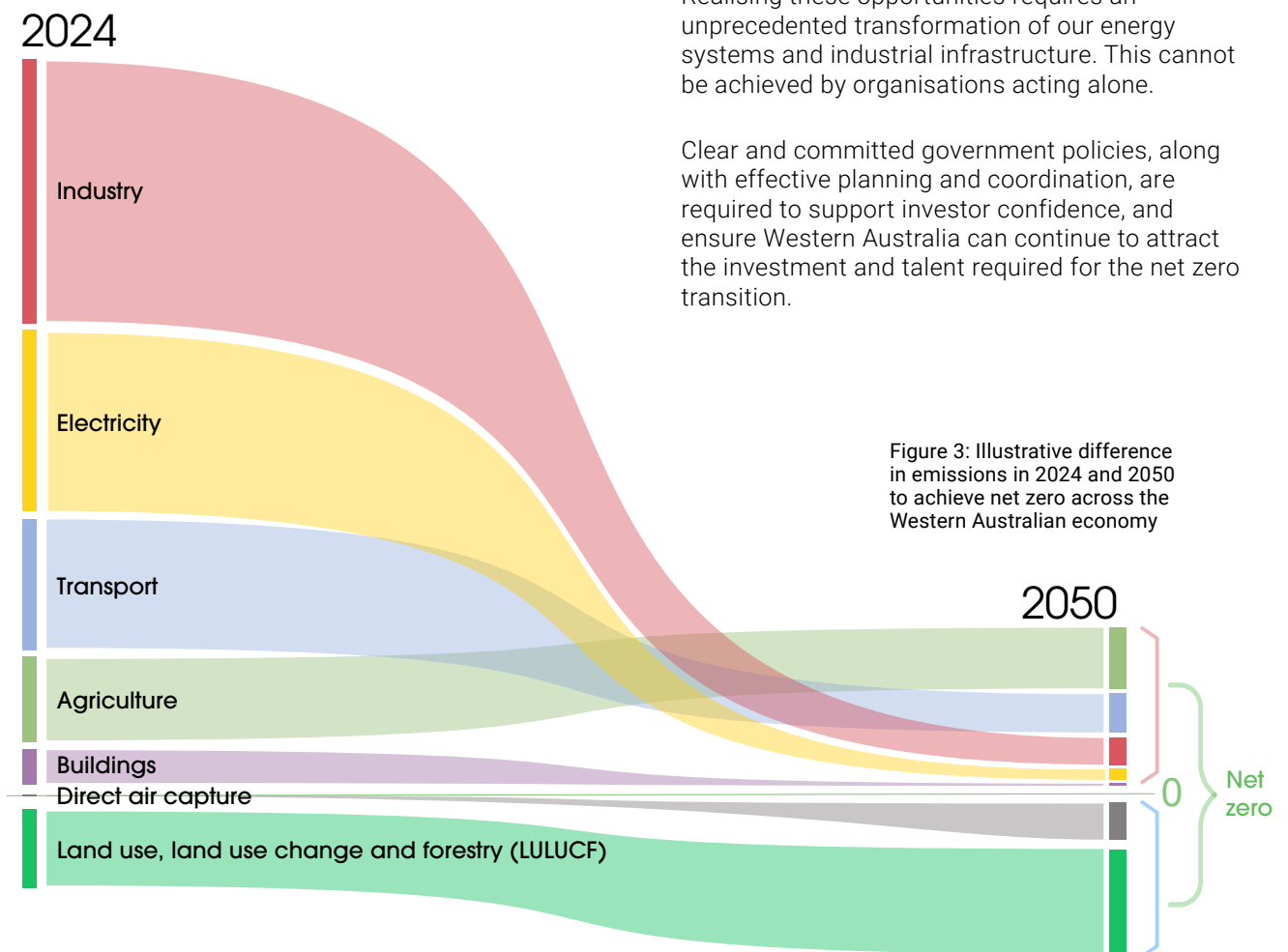


Figure 3: Illustrative difference in emissions in 2024 and 2050 to achieve net zero across the Western Australian economy

² Climate Council, 2023, Climate Council of Australia submission to Australian Parliament on ‘Inquiry into Australia’s transition to a green energy superpower’.

Shaping Western Australia's low-carbon future

Action is underway to reduce emissions

Significant action is underway to reduce emissions in key sectors of Western Australia's economy. The State Government has set a target to cut emissions from its operations to 80 per cent below 2020 levels and retire all State-owned coal-fired electricity generation by 2030. This commitment was backed by investment of \$3.8 billion in energy storage, wind energy generation and transmission network upgrades on the state's main electricity grid, the SWIS.

The SWIS Demand Assessment has identified the need for significant additional transmission infrastructure in the state's main grid over the next 20 years to enable the connection of low-emissions electricity generation and support industry decarbonisation. Early network planning is underway, along with initial steps to establish renewable generation hubs in regions with the best wind and solar resources. The State Government has recently announced a major upgrade of the network in the north region of the SWIS and the establishment of PoweringWA to coordinate the delivery of new electricity infrastructure at the pace needed for decarbonisation.

Through the Pilbara Industry Roundtable, the State Government and key industries have agreed on the importance of common use electricity infrastructure in the Pilbara to enable industry's ambitious decarbonisation goals. Concessional financing from the Clean Energy Finance Corporation has been secured as part of a \$3 billion [Rewiring the Nation](#) deal with the Australian Government to facilitate major grid upgrades and unlock future renewable energy projects in Western Australia, particularly for the North West Interconnected System (NWIS) and broader Pilbara region.

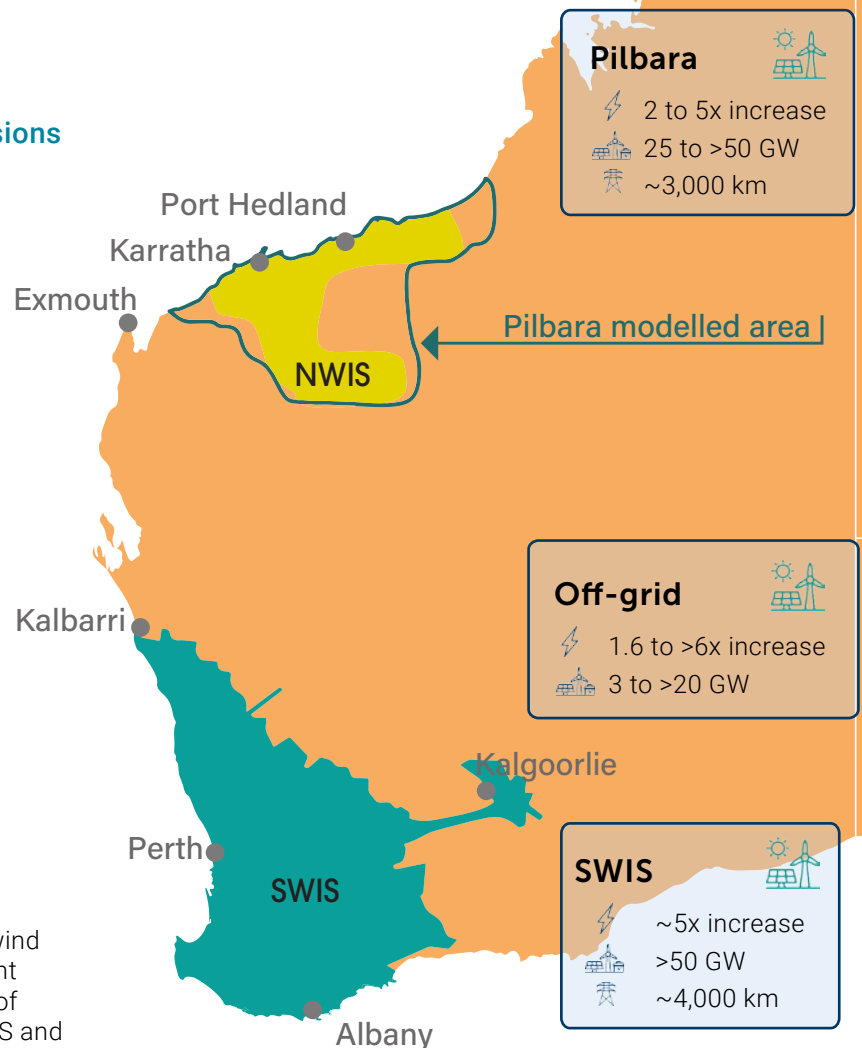


Figure 4: Renewable energy and transmission required to support the 2050 net zero transition (SERS electricity modelling)

The State Government will:



Legislate
net zero
emissions by
2050.



Cut
State Government
emissions by 80 per cent
of 2020 levels by 2030.



Retire
State-owned
coal-fired
generation by 2030.

The State Government has adopted a nation-leading approach to environmental assessments. Since 2020, net zero-aligned greenhouse gas management plans have been integrated into approval conditions for proposals under Part IV of Western Australia's *Environmental Protection Act 1986*.

The State Government has also introduced Western Australia's Climate Change Bill 2023 to Parliament to legislate the state's net zero target, require interim target-setting and tracking, and ensure government accountability on climate action.

Overcoming barriers is critical for an orderly transition

While most large businesses in Western Australia have set ambitious targets to reduce emissions, the pace of action can be hampered by policy, structural and regulatory barriers.

The State Government can enable and significantly accelerate action by:

- planning for, and investing in, transmission infrastructure
- ensuring robust and streamlined environmental assessment processes
- planning and coordination of land use issues
- evaluating and supporting clean energy workforce requirements
- ensuring secure and diverse supply chains
- de-risking new technologies.

Governments also have a key role to play in developing social licence for large-scale renewable energy and transmission infrastructure, and critical technologies such as CCUS. PoweringWA will undertake consultation with regional communities and Aboriginal people to ensure appropriate consideration is given to environmental, cultural and social issues in the delivery of electricity infrastructure.

A just transition will empower Aboriginal people and benefit regional communities

A significant proportion of prospective clean energy projects are taking place on land where Aboriginal people hold rights and interests. The net zero transition presents significant opportunities for Aboriginal people through equity stakes in large-scale renewable projects and community-owned clean energy projects which improve access to clean, affordable energy.

Aboriginal-led carbon farming projects can deliver a broad range of social, cultural and economic benefits to Aboriginal communities, while supporting environmental outcomes and the transition to net zero emissions.

Empowerment and engagement of Aboriginal people is critical to the success of the net zero transition and will ensure the benefits of the transition are shared, ecological values and cultural heritage are protected, and renewable energy solutions can be deployed at the pace and scale required.

More broadly, the transition will require substantial transformation of regional industries, workers and communities. Regional communities need to continue to be informed, engaged and supported to attract and take advantage of new clean energy industries while also supporting workers and businesses in existing industries.

Governments have a key role to play in developing social licence for large-scale renewable energy and transmission infrastructure.

Sectoral contributions to Western Australia's emissions

Western Australia's net emissions are about 4 per cent higher than 2005 levels, because of strong growth in mining and exports which has driven increases in stationary energy and fugitive emissions from fossil fuel extraction.³ Almost half the state's electricity emissions are from outside the main electricity grid, the majority of which are from self-supply for large extractive industries. Emissions trends are linked to economic growth, with the size of Western Australia's economy almost doubling since 2005 and the mining sector increasing more than 2.5 times.⁴

Western Australia's transport emissions have steadily increased since 2005 in line with population and vehicle fleet growth, and freight activity. These increases have been significantly counterbalanced by increased sequestration in the land sector and reduced agriculture emissions in recent years.

About half of Western Australia's emissions come from facilities covered by the Australian Government's Safeguard Mechanism, in particular facilities associated with production of LNG, iron ore, fertiliser and alumina. The Safeguard Mechanism applies to industrial facilities emitting more than 100,000 tonnes of carbon dioxide equivalent (CO₂-e) per year.

From July 2023, the Safeguard Mechanism has imposed declining baselines on covered facilities. This is expected to significantly reduce net emissions from these sources to 2030 and beyond.

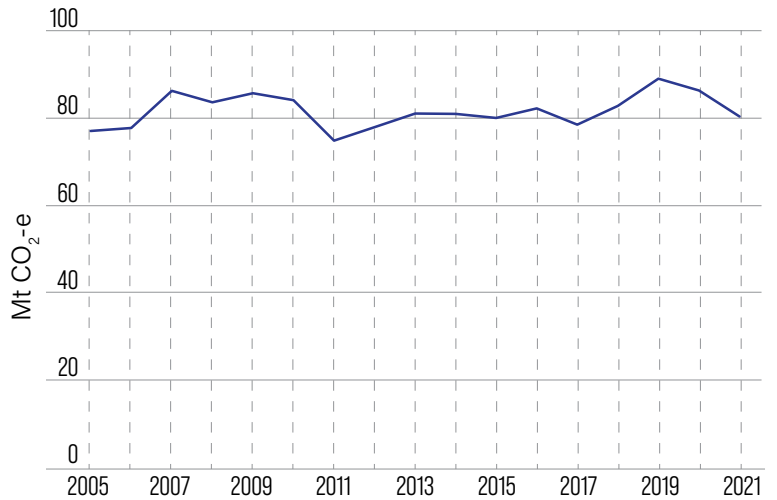


Figure 5: Western Australian emissions 2005 to 2021, megatonnes carbon dioxide equivalent (Mt CO₂-e)

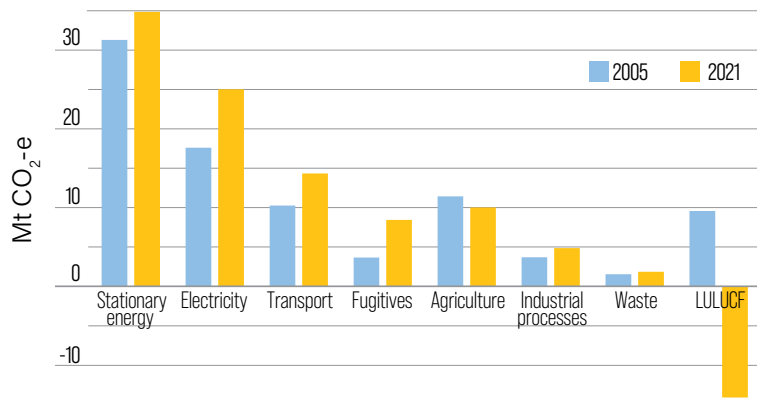


Figure 6: Sectoral emissions – 2005 and 2021

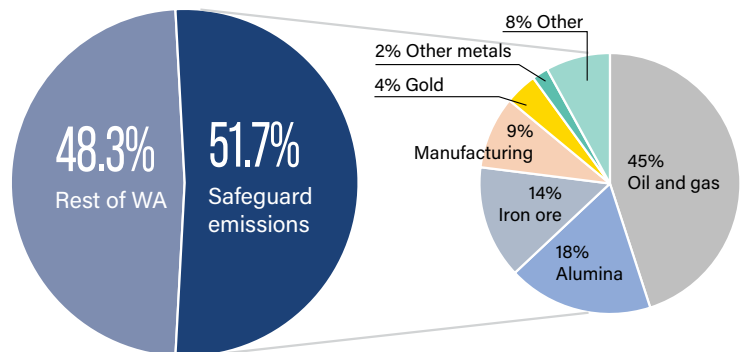


Figure 7: Contribution of Safeguard facilities to Western Australia emissions 2021⁵

³ Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW 2023). This data is the most recent published information on Western Australia's greenhouse gas emissions.

⁴ Australian Bureau of Statistics catalogue 5220.0

⁵ 'Other' sector is primarily composed of rail freight transport, captive power facilities, and emissions associated with gas supply.

The emissions intensity of Western Australia's economy, measured as tonnes of carbon dioxide equivalent per \$1000 GSP, has declined significantly over recent decades. The state's economic emissions intensity is now approaching that of New South Wales. Additional action is required to accelerate the decoupling of emissions and economic growth and establish a pathway to net zero.

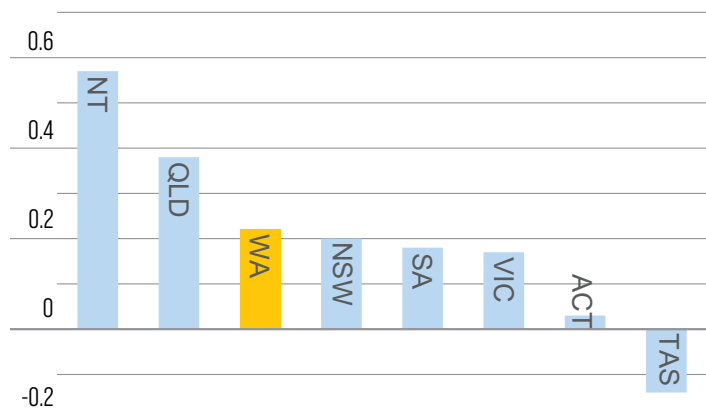


Figure 8: Economic emissions intensity of Australian jurisdictions 2021

Laying the foundations for the net zero transition

Western Australia's sectoral pathways will reflect the unique characteristics and geographic distribution of the state's key emissions sources.

The strong capability of our resources sector creates the ideal platform to deliver the net zero transition. However, establishing a net zero pathway while also supporting the decarbonisation of our region will present unique challenges.



Figure 9: Modelled Western Australian emissions in 2024 and indicative net zero in 2050 Mt CO₂-e

The State Government conducted whole-of-economy energy systems modelling in partnership with Climateworks Centre and the CSIRO to provide an evidence base for policy development as part of the SERS. Modelling considered several different scenarios, along with local and global factors, to identify least-cost pathways to achieve net zero emissions, no-regrets options and priority actions for government. Economy-wide modelling was supported by extensive consultation and complemented by sectoral modelling to evaluate regional implications and ensure robust outcomes.

Western Australia's analysis has been informed by key elements of the [Australian Industry Energy Transitions Initiative](#) to ensure assumptions, such as technology costs and availability, are robust and consistent with those validated by key industry stakeholders.

Western Australia's sectors will decarbonise at different rates

Modelling and policy analysis conducted for the SERS identified critical milestones, technologies and challenges for each sector pathway, and priority areas for action.

Consistent with national and international studies, Western Australia's modelling confirms the pace of decarbonisation will vary across sectors. Reducing emissions will be easier for some industries and sectors, while others will be slower to decarbonise and require significant new infrastructure and innovative technologies.

Residual emissions are expected in some harder-to-abate sectors of the economy in 2050, which will be offset by bio-sequestration or other negative-emissions solutions such as CCUS, or direct air capture.

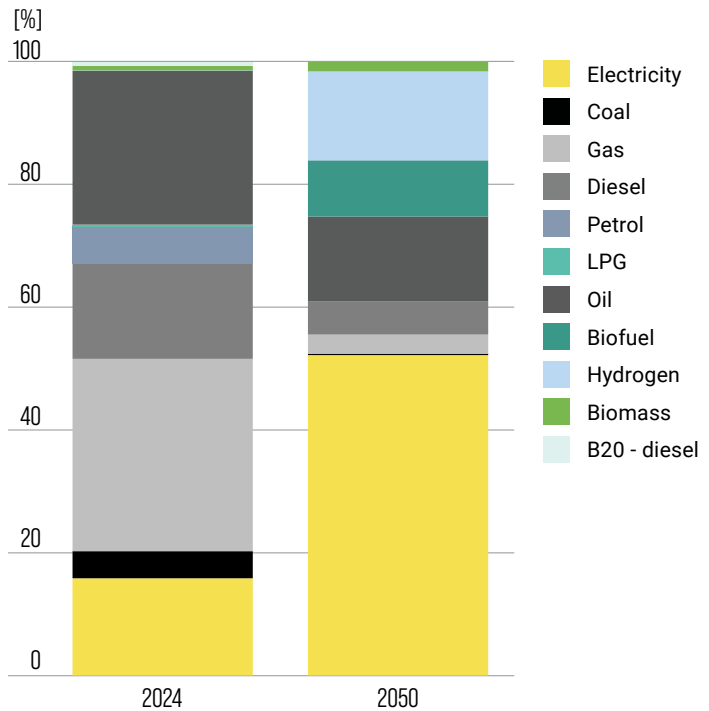


Figure 10: Indicative change in fuel mix in Western Australia from 2024 to 2050

Low-emissions electricity is key to the net zero transition

Achieving net zero emissions across the economy requires the electricity sector to decarbonise faster than other sectors while simultaneously meeting a step change in total demand as other sectors electrify.

Firmed renewable energy from solar and wind remains the cheapest source of new electricity generation build and is the most cost-effective option for reducing emissions. Increasing the share of lower-cost renewable energy will put downward pressure on electricity costs, relieving cost-of-living pressures affecting Western Australian households.

The fuel mix across the Western Australian economy will shift substantially towards electricity as industry and transport electrify. SERS modelling suggests the share of electricity in Western Australia's fuel mix could increase from 15 per cent today to more than 50 per cent by 2050.

The transition will require action across four key pillars of decarbonisation

Modelling underscores the need for action in:

- energy efficiency to improve energy productivity and reduce energy waste
- decarbonising electricity to zero or near-zero emissions
- electrification and a shift away from fossil fuels to zero- or near-zero-emissions alternatives
- non-energy (e.g. fugitive methane) emissions reductions and sequestration.





Pathway for electricity

Substantial deployment of renewable energy generation and energy storage will be needed to facilitate multiple sectors in the economy to decarbonise.

SERS modelling suggests that electricity demand could increase more than fivefold for current and new applications in the SWIS and Pilbara by 2050. This includes electrification of transport, mining, natural gas liquefaction and chemical production, and development of future industries such as hydrogen and green ammonia.

Western Australia’s renewable energy resources provide an unrivalled opportunity to transition the state’s economy and existing industries, as well as to support the decarbonisation of other economies in our region.

Transitioning to net zero will require a step change in renewable energy generation

Replacing thermal generation with zero-emissions electricity will also require more renewable generation and storage because of the variable nature of wind and solar resources. About 60 gigawatts (GW) of new generation (including storage) could be required in the SWIS by 2050, and 50 GW in the Pilbara.

While modelling assumes some hydrogen production and export, more ambitious assumptions for hydrogen development would result in requirements for renewable energy that are substantially higher again.

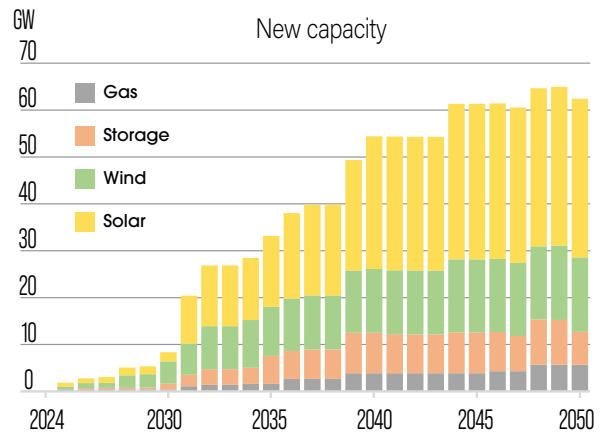
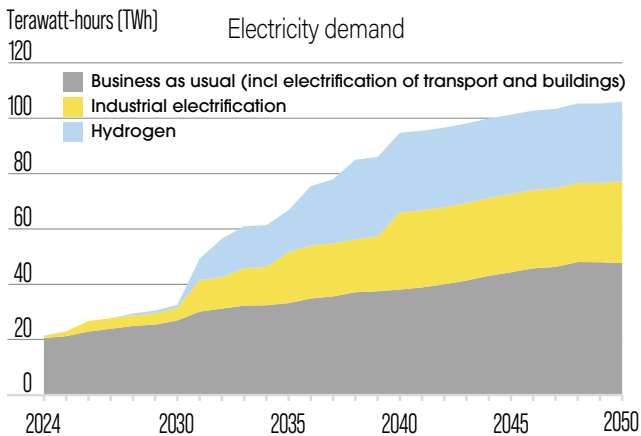


Figure 11: Projected electricity demand and electricity generation capacity in the SWIS (SERS/SWIS Demand Assessment electricity modelling)

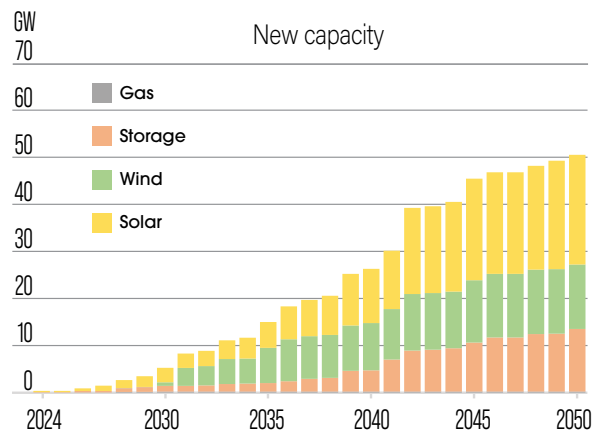
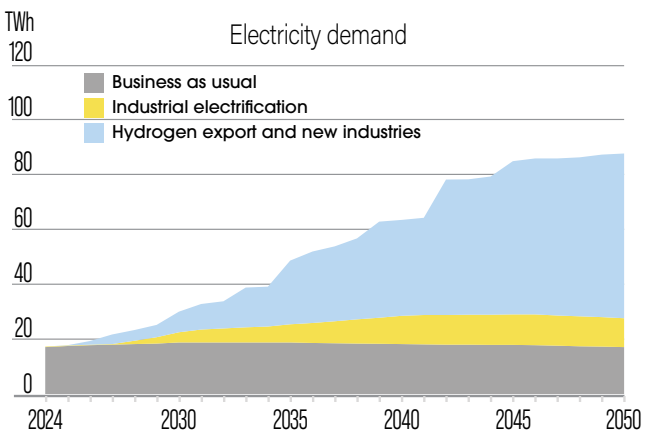


Figure 12: Projected electricity demand and electricity generation capacity in the Pilbara (SERS electricity modelling)

By 2050, 96 per cent of energy consumed is projected to come from renewable generation, compared with 34 per cent currently in the SWIS and 2 per cent in the Pilbara.

The scale and pace of the net zero transition will present both significant workforce challenges and opportunities in Western Australia to deliver highly skilled work in renewables, electricity networks and energy performance across utilities. Government will need to evaluate skill requirements and remove regulatory barriers to developing new qualifications and training.

Transmission infrastructure is critical for the transition

Substantial augmentation of electricity transmission is necessary to deliver the lowest-cost pathway to net zero emissions. Very large investment is required in both the SWIS and in the Pilbara to deliver the transmission infrastructure required to support existing businesses' decarbonisation plans and to enable new green industries.



Figure 13: Proportion of renewable energy in the SWIS and the Pilbara

Modelling indicates 4,000 km of transmission could be required in the SWIS over the next 20 years and more than 3,000 km in the Pilbara to 2050. Creating social licence for transmission infrastructure will be a key determinant of success. PoweringWA will have a key role in engaging with the community to enhance understanding of the importance of transmission in the SWIS to achieve Western Australia's decarbonisation pathway.



Highlights

SWIS Demand Assessment

The State Government has committed \$126 million of funding for Western Power to start the first stage of network investments identified in the SWIS Demand Assessment.

Green Approvals

Western Australia has established a \$32 million dedicated Green Energy Approvals team to streamline approvals for proponents and investors in renewable energy, critical minerals and hydrogen projects.

Transmission investment

The State Government has secured an allocation of up to \$3 billion in concessional financing from the Rewiring the Nation program for transmission infrastructure in the Pilbara and the SWIS. The investment will support about 1,800 construction jobs, unlock crucial renewable energy projects and empower regional communities.

Energy storage

More than 50 gigawatt hours (GWh) of energy storage may be needed in the SWIS by 2042. In the Pilbara, up to 70 GWh of energy storage could be needed by 2050.

The State Government is spending more than \$2 billion on big battery systems in Kwinana and Collie. The trial and demonstration of long-duration storage is being supported through the Clean Energy Future Fund, which has provided \$2 million to Power Research and Development's Pumped-up Walpole project, building 1.5 megawatts of pumped hydroelectric storage in Walpole.

National Skills Agreement

The Cook and Albanese Governments have signed a five-year National Skills Agreement to embed national cooperation and strategic investment in Western Australia's vocational education and training sector and address critical skills needs in the state. The package will deliver \$1.2 billion in flexible funding to deliver skills for critical and emerging industries including clean energy and net zero transformation.

Dispatchable renewable capacity will be an essential part of a low-carbon electricity future

Western Australia has excellent renewable solar and wind resources which can be accessed through expansion of transmission networks. However, the state also needs capacity that can be accessed when these intermittent sources of electricity are not available. This sort of electricity is referred to as dispatchable power.

As high-emitting sources of electricity such as coal are retired, new sources of dispatchable power will be needed. In Western Australia, this will primarily take the form of batteries, with additional back-up from gas to ensure reliable supply, at least until alternative dispatchable low-carbon technologies become cost-effective. In the SWIS, large-scale batteries are already being deployed, with Synergy spending more than \$2 billion to build big batteries in Kwinana and Collie and private sector battery investment from Neoen at Collie and Alinta at Wagerup.



New initiatives

- Establish dedicated resources within the State Government's Green Energy Approvals Initiative team, investing a further \$6.5 million, to facilitate timely, efficient assessment of priority electricity transmission infrastructure projects in the SWIS and the Pilbara.
- Progress the implementation of the SWIS Demand Assessment and establish PoweringWA to oversee and coordinate investment in electricity network, generation and storage infrastructure, including the development of renewable generation hubs as needed. PoweringWA will coordinate the delivery of new energy infrastructure and help identify, mitigate and manage impacts for affected communities.
- Reform rules for the Wholesale Electricity Market (which covers the SWIS) to incentivise adequate investment in firming renewable energy following the planned retirement of fossil fuel generation.
- Support Horizon Power to deliver critical land acquisition and early planning activities to enable the least-cost generation solutions and decarbonisation of Horizon Power's towns.
- Trial long-duration storage technologies suitable for Western Australian regions' microgrids and climate conditions.

Storage is important not only for firming of large-scale renewables but also to allow ongoing integration of smaller distributed energy resources by households and businesses. Generation from rooftop solar has increased nearly 12-fold in Western Australia over the past decade. Battery energy storage systems are crucial for short- to medium-term reliability and to support households and businesses to continue to adopt solar photovoltaic systems.

In the longer term, long-duration energy storage technologies may be needed to balance increased amounts of intermittent and distributed generation.



Consultation highlights: key enablers for electricity

- Streamlined approvals for renewable energy and transmission infrastructure projects
 - A skilled workforce to support rapid deployment of renewable energy projects
 - Land access for renewable energy infrastructure
 - Continued planning to understand and facilitate delivery of renewable energy infrastructure and access requirements
 - Investment certainty for renewable energy and storage proponents
- Provide an additional \$708 million to transform the electricity network to enable connection of large-scale renewable energy including:
 - » \$575 million (\$655 million in total) to Western Power to fund the Northern Regional Energy Program Stage 1, the first major transmission infrastructure upgrade following the SWIS Demand Assessment. This will enable existing projects to deliver more renewable energy to the grid and enable several new renewable generation projects to connect to the SWIS by 2027
 - » \$133 million for planning, early works and the purchase of long-lead items to implement the findings of the SWIS Demand Assessment.
 - Develop electricity sector workforce projections for Western Australia to allow stakeholders – including government agencies, training providers, and the electricity industry – to understand the employment implications of alternative electricity scenarios.



Pathway for industry

The major contributions to industry emissions are gas extraction, manufacturing (including alumina), mining and chemicals (particularly fertiliser production). While heavy industry accounts for the largest share of emissions, small-to-medium enterprises also make a material contribution but lack equivalent capability to track emissions in their operations or supply chains and understand abatement options.

Modelling undertaken for the SERS shows that in a least-cost pathway to net zero emissions for Western Australia, industry emissions would be cut by about 85 per cent by 2050. This outcome is broadly consistent with the findings of the Australian Industry Energy Transitions Initiative.

Electrification is a key pathway to decarbonise industry

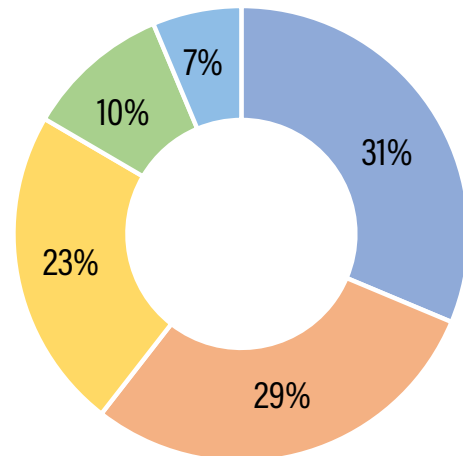
Significant reduction of industry emissions can be achieved through electrification, underpinned by timely investment in renewable energy generation and transmission infrastructure. Energy infrastructure will have a significant spatial footprint, emphasising the importance of land access in the net zero transition. Preliminary modelling indicates that a substantial amount of land will be required in the Pilbara to host the renewable energy infrastructure needed. This presents Traditional Owners with significant opportunities to pursue their own priorities through well-crafted land use agreements.

Decarbonising harder-to-abate industries requires new technologies

SERS modelling also points to the need to commercialise key technologies, such as mechanical vapour recompression and electric or hydrogen calcination for alumina processing. New technologies need to be trialled and adopted at scale to ensure industry can continue to materially decarbonise through to 2050.

While many mining operations can reduce emissions through on-site renewable electricity and connection to electricity networks, reducing emissions through replacement of diesel-based haulage (trains and haulpacks) will take longer.

The industry sector accounts for about 50 per cent of Western Australia's emissions.⁶



■ Gas extraction ■ Manufacturing ■ Mining ■ Chemicals ■ Other

Figure 14: Breakdown of Western Australian industry emissions (current)

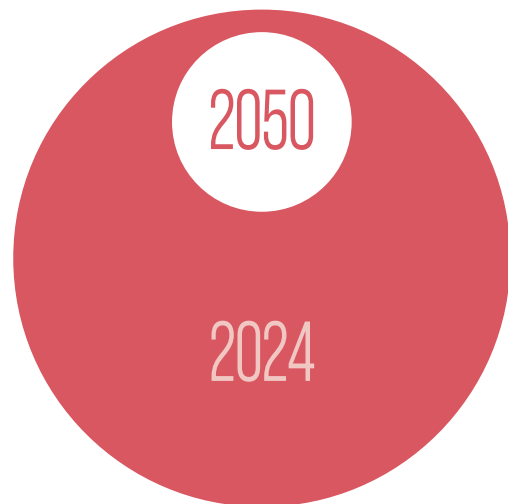


Figure 15: Modelled industry emissions in net zero-aligned pathway: reduction from 36.0 Mt CO₂-e in 2024 to 4.7 Mt CO₂-e in 2050

⁶ Industry accounts for more than 50 per cent of Western Australia's greenhouse gas emissions when electricity generation is included. Scope 1 and 2 emissions associated with electricity generation for industry use are included in the electricity sector for the SERS modelling

SERS analysis emphasises the role of hydrogen (underpinned by large-scale renewable energy generation) in establishing Western Australia's green export industries, including green ammonia and green iron and steel.



Nomadic Energy

Carbon capture, utilisation and storage has an important role to play

CCUS will be critical to address emissions from LNG production and to support the development of new low-carbon industries. A recent study commissioned by the Western Australian LNG Jobs Taskforce sees potential for broad deployment of CCUS from the early 2030s with significant cuts to industry emissions.

Modelling and engagement with industry has emphasised the importance of collaboration, and the value of industrial clusters and renewable energy hubs to reduce overall decarbonisation costs.



Highlights

Transitioning the Pilbara

The State Government has worked with major resources companies through the Pilbara Industry Roundtable to evaluate future electricity demand, and the land and regulatory requirements to facilitate common use infrastructure and increased levels of renewable energy in the Pilbara.

Reducing emissions from LNG

Horizon Power is working with Woodside to support its decarbonisation plans for the Pluto LNG facility, which includes connecting the facility and a new 50-megawatt solar farm in the Maitland Strategic Industrial Estate to the NWIS. The Pluto LNG facility would be the first standalone system to connect to the NWIS under the new regulatory regime (Pilbara Network Access Code), delivering increased reliability and reduced carbon emissions for the facility.

Green iron

Western Australia can help decarbonise global steelmaking and create new markets for Western Australian iron ores. The State Government has investigated pathways to significantly reduce emissions from iron and steel production along with the significant infrastructure and investment required to realise this opportunity.

Decarbonising alumina

A \$1.7 million trial is underway through the Clean Energy Future Fund to pilot replacement of gas with electricity for calcination of alumina to decarbonise the refining process, giving Western Australia a commercial advantage to grow a green aluminium industry with our abundant renewable resources.

CCUS

A recent study by the Global CCS Institute and the CSIRO commissioned by the Western Australian LNG Jobs Taskforce underscores Western Australia's significant potential for CCUS. The study emphasises the need for CCUS to reduce reservoir emissions from natural gas extraction and emissions from other industrial processes, such as ammonia production.

Establishing CCUS hubs will provide economies of scale and improve viability for smaller operators.

The State Government is introducing legislation in 2023 to allow for the transport and storage of greenhouse gases to support industrial and LNG projects to decarbonise.

Consultation highlights: key enablers for industry



- Timely, streamlined environmental approvals
- Access to renewable electricity and grid connection
- Land use planning/zoning to support industrial hubs and renewable infrastructure
- Social licence for key technologies
- Common use infrastructure and industry collaboration
- Targeted support to address technology risk and stimulate innovation
- Knowledge and tools for small-to-medium enterprises to adopt existing lower-emission technologies



New initiatives

- Deliver a program of work to expand and decarbonise electricity systems in the Pilbara through common use infrastructure. Activities include:
 - » establishment of renewable generation hubs in the Pilbara in consultation with affected communities including Traditional Owner groups
 - » modelling of demand and supply scenarios to support decarbonisation of key industry sectors
 - » evolution of electricity regulatory frameworks to facilitate efficient decarbonisation of the region
 - » development of guidance to clarify existing land access and tenure pathways and provide bespoke advice to Pilbara proponents.
- Invest an additional \$11.2 million to 2026–27 to expand and extend the Clean Energy Future Fund to scale up trials and demonstration of new technologies necessary for Western Australia's net zero transition.
- Provide \$4.3 million to develop and deliver a Carbon Capture Utilisation and Storage Action Plan to enhance policy certainty, attract investment, enable the accelerated deployment of proven technology and infrastructure, and support development of new and emerging CCUS technology.
- Deliver a detailed engineering design study for a common user low-emissions green iron pilot facility in Western Australia, to test and increase the long-term viability of Western Australian iron ores in response to evolving global market demand.
- Work with key industry stakeholders to investigate support required by Western Australian small-to-medium enterprises to reduce emissions.
- Implement the New Energies Industries Funding Stream within the Investment Attraction Fund to accelerate innovation and scale up commercial potential and manufacturing capacity in industries necessary for the transition.



Pathway for transport

The transport sector contributes 18 per cent (14.3 Mt) of Western Australia’s emissions.

Modelling shows that in a least-cost pathway to net zero emissions for Western Australia, transport emissions would be cut by about 70 per cent by 2050.

Electrification is fundamental to the transition of the transport sector

Road transport contributes about 75 per cent of the sector’s emissions and adoption of zero-tailpipe emission vehicles will be key to reducing emissions. Decarbonisation will be led by the passenger market with the adoption of battery EVs. Emissions, however, will take time to reduce because of the slow pace of vehicle turnover.

Heavy vehicles, rail and aviation will be slower to transition

Road freight vehicles and rail pose additional challenges to transition because of typically longer distances travelled, the need for recharging/refuelling times to be minimised and the weight of larger batteries. Nonetheless, electrification and other solutions, such as hydrogen fuel-cell technology, are progressing. Biofuels also have the potential to play a role in heavy transport. Modelling indicates emissions from heavy vehicles could increase in coming years before starting to decline because of increased activity and slow adoption of low-emissions technology.

Some transport sectors such as shipping and aviation currently have limited abatement options and are expected to have residual emissions in 2050. Synthetic fuels and biofuels are being considered for these sectors, and there is potential for ammonia to be used in shipping.

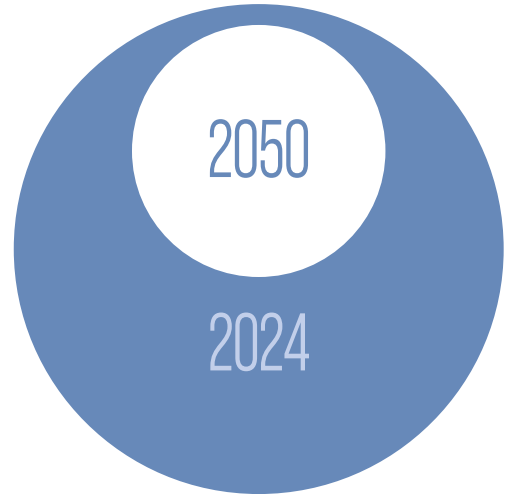
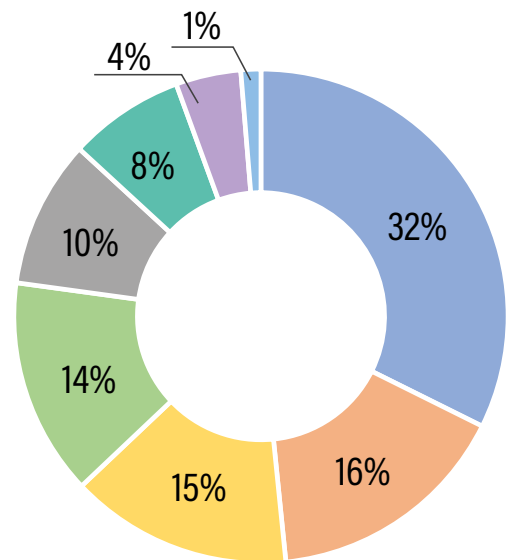


Figure 16: Modelled transport emissions in a net zero-aligned pathway: reduction from 15.8 Mt CO₂-e in 2024 to 4.2 Mt CO₂-e in 2050



- Passenger
- Light commercial vehicle
- Rail
- Articulate vehicles
- Rigid trucks
- Other transport
- Air domestic
- Bus

Figure 17: Breakdown of Western Australian transport emissions (current)



Adoption of battery EVs must accelerate rapidly

Modelling highlights the importance of a rapid transition to battery EVs to achieve a net zero pathway.

Western Australia's transition to low- and zero-tailpipe emission vehicles is continuing to accelerate, with sales of battery electric passenger vehicles now at 6.5 per cent. However, a rapid uptake of EVs across vehicle segments in line with a net zero pathway will be challenging. The State Government is supporting the transition through infrastructure investments and incentives as well as planning for the integration of EVs into Western Australia's power systems. Investment in public and active (cycling and walking) transport to reduce overall vehicle use will complement support for EV uptake.

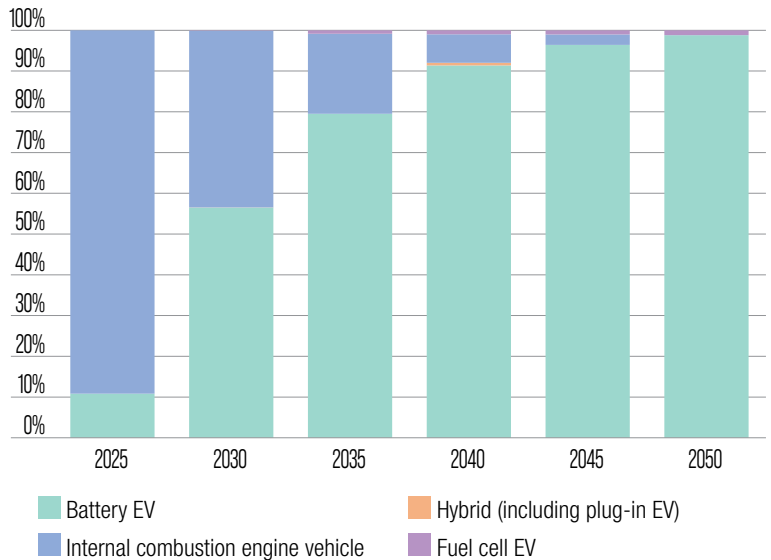


Figure 18: Modelled road light vehicle sales 2025 to 2050 consistent with a net zero pathway



Highlights

Electric vehicle strategy

The [State Electric Vehicle Strategy for Western Australia](#) is supported by government investment of more than \$200 million, including the provision of rebates to Western Australians buying an eligible EV, funding for the installation of EV chargers, and delivery of 130 new locally built electric buses.

METRONET

Efficient and accessible public transport is a crucial part of the decarbonisation pathway for transport. METRONET is the single largest investment in public transport Perth has seen, with about 72 km of new passenger rail and 23 new train stations.

Active transport

The State Government is enhancing the opportunity for micro-mobility by improving infrastructure for bicycles, e-bikes and e-scooters. More than \$340 million is being invested in pedestrian and cycling infrastructure over the next four years throughout the state.

EV Network

The \$23 million WA EV Network – Australia's longest connected EV fast-charging network – will be fully operational in early 2024.

Charge Up grants

The State Government is providing \$15 million in grants to co-fund small- and medium-sized businesses, not-for-profits and local government authorities to install EV chargers at workplaces and public destinations.

Lumsden Port upgrade

The State Government is investing \$129 million together with \$565 million from the Australian Government to develop Pilbara Ports' new multi-user facility and logistics hub at Lumsden Point (Port Hedland). This upgrade will facilitate the export of battery metals such as lithium and copper concentrates, facilitate the import of renewable energy infrastructure including wind turbines and blades and support the growth of direct shipping services to the Pilbara. The port will also reduce the need for road freight transfer to and from Perth, decreasing associated emissions.

Consultation highlights: key enablers for transport



- Accessible and efficient EV charging infrastructure
- Affordable EVs across vehicle segments
- Planning and support for small operators to facilitate uptake of low-emission trucks
- Investment to encourage mode shift to active and public transport
- Adequate fuel-efficiency standards



New initiatives

- Develop a statewide strategy for future electric road transport charging infrastructure required to support the transition to net zero.
- Develop a road freight decarbonisation strategy for south-west Western Australia in consultation with the road freight sector.
- Fund installation of additional EV chargers at new METRONET train stations to boost the rollout of EV charging stations underway at existing train station parking bays.
- Increase the State Government fleet EV target to at least 50 per cent of all new purchases in eligible categories from 1 July 2025 to demonstrate government leadership and support the supply of EVs to the second-hand vehicle market.
- Identify opportunities to leverage business investment in the production of advanced biofuels (renewable diesel) and low-emission fuels for the state's agriculture, mining and transport industries.
- Continue to advocate for adoption of fuel-efficiency standards for both passenger and heavy vehicles to improve the emissions performance of the petrol/diesel fleet and increase availability of low- and zero-emission models in Australia.





Pathway for agriculture and land

Western Australian agriculture is a growing industry made up of a mosaic of production systems, with more than 8,200 small and medium enterprises. Markets and consumers are increasingly demanding low-carbon and carbon-neutral products.

Methane from livestock is the primary source of agriculture emissions

The majority of agriculture emissions come from non-energy sources, in particular methane from livestock. Each industry, however, has its own unique emissions profile and options to reduce emissions. Western Australia's land sector is a significant carbon sink and plays an important role in balancing emissions from other hard-to-abate sectors of the economy. Maintaining and enhancing land-based sequestration will be crucial to both the state and agriculture achieving net zero emissions.

The agriculture sector faces challenges to decarbonise

SERS whole-of-economy modelling shows under a least-cost net zero scenario, agriculture emissions will only be reduced by about 20 per cent by 2050, underscoring the sector's hard-to-abate emissions. Land use emission removals are modelled to

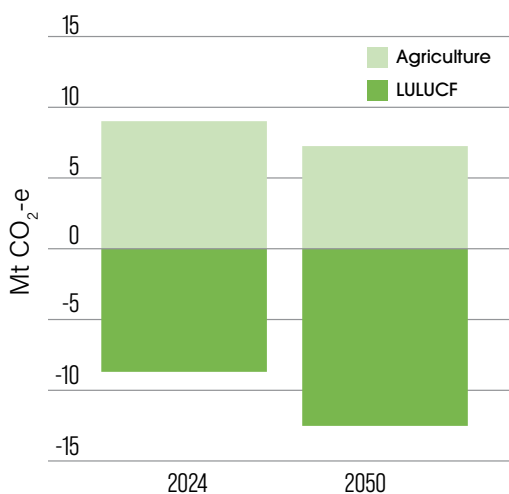


Figure 20: Modelled agriculture and land use emissions in net zero-aligned pathway: Agriculture CO₂-e reduction from 9.0 Mt CO₂-e in 2024 to 7.3 Mt CO₂-e in 2050, LULUCF CO₂-e reduction from -8.7 Mt CO₂-e in 2024 to -12.5 Mt CO₂-e in 2050

Agriculture contributes 12.5 per cent (10 Mt) of Western Australia's emissions.

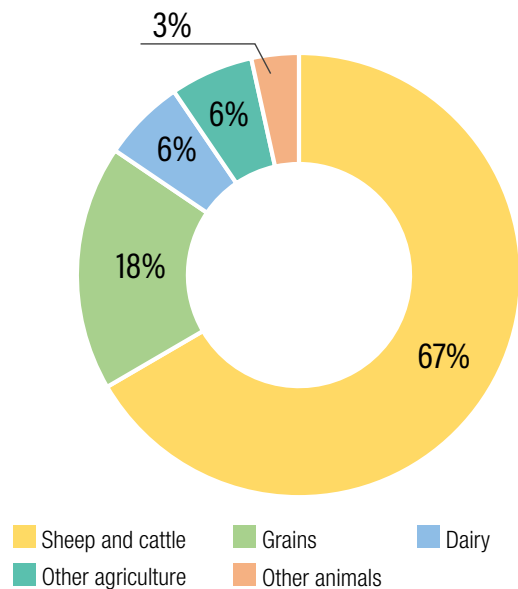


Figure 19: Breakdown of Western Australian agriculture emissions (current)

increase as a result of cultivation of forests and vegetation for the purposes of carbon sequestration, softwood plantation and biodiversity.

Emissions modelling suggests that production and input efficiencies and mitigation technologies will progressively be adopted across the state's agricultural industries. About 80 per cent of farms in the grain sector already use information communication technology to improve production efficiency.⁷ Increased agricultural production to meet global and domestic demand, however, is expected to increase emissions from the sector in coming years before emissions start to decline.

SERS modelling and analysis emphasises the need for technological solutions to substantially reduce key sources of methane emissions and address residual emissions in 2050.

Further research and development of abatement solutions is required for many agricultural industries

Solutions for reducing methane emissions from livestock may include feed supplements, genetic improvements and waste management. Further research, development and commercial demonstration is required to deliver cost-effective solutions that can be adopted at scale.

⁷ ClimateWorks Australia, 2020. Decarbonisation Futures: Solutions, actions and benchmarks for a net zero emissions Australia.

Solutions are also required to reduce non-energy emissions from the significant and growing grains industries, through fertiliser and soil management and access to low-emission inputs such as green urea. Support for farms in the management of waste and energy in the dairy, chicken and pork industries will be needed to reduce methane and nitrous oxide emissions.

Existing options to reduce net emissions from agriculture also include adoption of on-farm practices to store carbon in vegetation and soils to develop net zero farms and produce as well as enhancing biodiversity and sustainability.

Western Australian grain exports

Western Australia exports 80 per cent of its grain and is exposed to emerging market drivers for carbon-neutral and low-carbon grain. The State Government is already working with industry to accelerate innovation and practice change to achieve low-carbon market pathways for the \$8 billion Western Australian grain supply chain.

Carbon-neutral farms

The Katanning Research Station is a practical demonstration site that supports the application of tested carbon-neutral options for Western Australian broadacre farmers. The goal is to achieve on-farm carbon neutrality for the station by 2030.



Highlights

Carbon farming

The \$15 million Western Australian Carbon Farming and Land Restoration Program promotes the agriculture sector's potential to sequester carbon in the landscape, generate Western Australian-sourced carbon credits and grow the state's carbon farming industry. Almost \$4 million has been allocated to projects since 2021, selected for their ability to deliver priority environmental, economic and social co-benefits, and contribute to the long-term sustainability of the agriculture industry.

Consultation highlights: key enablers for agriculture



- Decarbonisation information and tools that are fit-for-purpose for small and medium enterprises
- Reliable data on land use sequestration and offsetting potential
- Improved knowledge and skills in emissions accounting and decarbonisation methods to meet international and domestic demand for low-emissions produce
- Research, development and demonstration of decarbonisation methods for hard-to-abate sectors such as sheep, cattle and cropping



New initiatives

- Work with the Australian Government and the CSIRO to improve data collection and accuracy of carbon sequestration measurement and enhance understanding of Western Australia's land-based sequestration potential.
- Consider tools and supports for producers to undertake verified carbon accounting processes and move to carbon-neutral production through developing and implementing a profitable and productive carbon-neutral plan.
- Support the state's food and beverage manufacturers to accelerate adoption of sustainable and carbon-sensitive practices and accreditation.
- Work with industry to improve the verification of methane emissions reduction methods from Western Australian grazing and feed systems, allowing producers to reduce their emissions and participate in carbon-neutral and low-carbon markets for red meat, milk and wool, both domestically and internationally.
- Investigate requirements to improve emissions measurement and information on mitigation practices to reduce nitrous oxide and carbon dioxide emissions in the state's cropping sector.
- Identify target industries for life cycle analyses based on market priorities and work with industry funders and others to seek to undertake this analysis over the next four years.
- Identify innovative approaches (e.g. robotics, off-grid heating/cooling, waste management) to reduce emissions and improve efficiencies in intensive livestock and horticulture enterprises.
- Consider opportunities to use local grains as feed for intensive animal industries, reducing emissions associated with imported soybean meal from South America.



Pathway for buildings and waste

Nationally, the built environment accounts for about 25 per cent of emissions. As large consumers of electricity, future emissions from buildings will depend on energy-efficiency measures, fuel switching from gas to electricity, and decarbonisation of the electricity grid.

Solutions to decarbonise the buildings sector are already cost-effective

Most of the solutions required to achieve near-zero emissions, including deep energy efficiency and electrification for heating and water services, are mature and commercially competitive or have been demonstrated at scale. Buildings also have the ability to produce and store their own energy through rooftop solar and batteries.

Energy-efficiency measures have the added benefit of reducing cost-of-living pressures for households. Energy-efficiency opportunities are becoming more sophisticated, including building optimisation technologies such as smart lighting and energy management systems.

SERS modelling shows under a least-cost net zero scenario, emissions will be close to zero in the buildings sector by 2050. Electrification plays a key role in reducing emissions. Electricity consumption may reach more than 80 per cent of final energy demand in buildings by 2050.

Modelling also highlights the importance of energy efficiency, which could result in avoided energy use in 2050 equivalent to 30 per cent of total energy use for the sector. Buildings are a long-lived asset, underscoring the importance of energy-efficient design for new buildings and a significant role for retrofitting abatement technologies in existing buildings. Selecting products and materials that have lower associated emissions is also critical.

The buildings sector is one of the most cost-effective sectors to decarbonise.

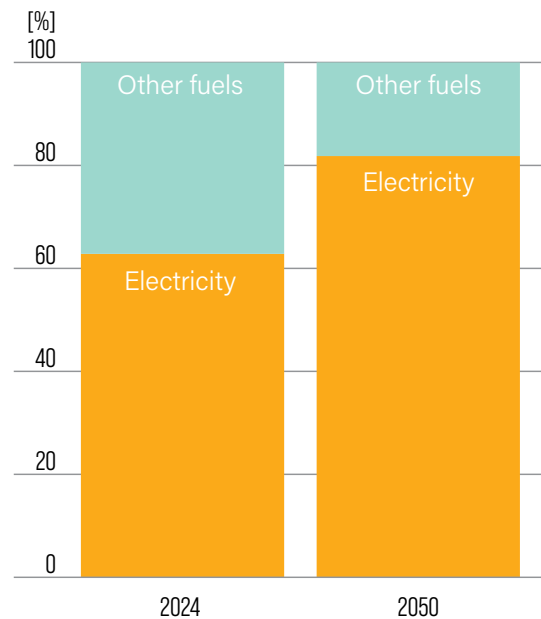


Figure 21: Modelled fuel mix in the buildings sector in a net zero-aligned pathway

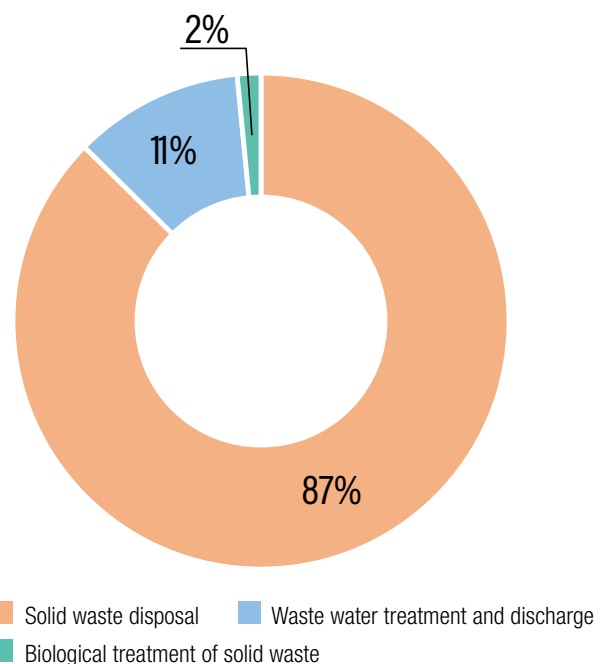


Figure 22: Breakdown of Western Australian waste emissions (current)

Circular economy principles are central to meeting the net zero goal

Circular economy principles, reducing the need for new raw materials to be extracted and processed, apply to the buildings sector as well as more broadly across the economy. Keeping products, components and materials in use for as long as possible will not only reduce emissions associated with the manufacture of those products but will help to minimise waste generation and other environmental impacts associated with the linear 'take, make, dispose' model.

The waste sector accounts for about 2 per cent of Western Australia's emissions. Almost 90 per cent of these emissions result from disposal of solid waste to landfill. Reform in the waste sector has been underway in Western Australia for more than a decade. Programs such as food organics and garden organics (FOGO) collection and processing have had a direct impact, helping to reduce greenhouse gas emissions.

Earlier this year, the Western Australian Waste Authority embarked on a review of the state's *Waste Avoidance and Resource Recovery Strategy 2030* (the waste strategy). As part of this review, the Waste Authority is seeking to align the waste strategy with other priorities, particularly climate change and emissions reductions. The review of the waste strategy is expected to be completed in 2024.



Highlights

A blueprint for sustainable buildings

DevelopmentWA's East Village at Knutsford residential housing estate will deliver Australia's first blockchain-ready homes, featuring 36 energy-efficient homes powered by a micro-grid supply network derived from 100 per cent renewable sources. The homes will be designed to achieve a minimum 7-star energy efficiency rating and will feature energy-efficient technologies such as heat pump hot water systems. Energy bills could be down at least 50 per cent compared with a standard-build home of this type. The homes will also feature reduced embodied emissions through use of recycled masonry materials, where appropriate, and frame construction.

Government leadership

The Department of Communities already meets 7-star NatHERS requirements for social housing construction, helping to reduce energy consumption and bills. Five hundred social housing dwellings managed by the Department of Communities will have solar photovoltaic systems installed by July 2024.

Schools Clean Energy Technology Fund

The State Government is investing \$44.6 million in energy efficiency and clean energy solutions for Western Australian schools to reduce emissions in line with a low-carbon future.

In addition, all new primary schools in Western Australia are required to meet an all-electric design standard. The secondary school planning guidelines also minimise fossil fuel use in new buildings.

Waste avoidance and resource recovery

The [Waste Avoidance and Resource Recovery Strategy 2030](#) has been instrumental in improving waste management in Western Australia and helping to minimise greenhouse gas emissions.



Consultation highlights: key enablers for buildings and waste

- Electrification and implementation of energy-efficiency measures
- Adoption of building standards
- Demonstration and communication of sustainable building practices and tools
- Avoidance of organic waste generation
- Systems to improve the circular economy with extended product stewardship schemes



SERS modelling shows under a least-cost net zero scenario, emissions will be close to zero in the buildings sector by 2050.



New initiatives

- Implement an emissions reporting system to measure emissions and energy use from government buildings and operations and enable high-emissions facilities to be prioritised for improvement.
- Develop a strategy for a sustainable and climate-resilient health system, which will include initiatives to reduce emissions from healthcare infrastructure and buildings as part of the Department of Health's commitment to net zero.
- Implement new Sustainable Design Guidelines to encourage all-electric design for non-residential State Government-owned new builds and upgrades. Encourage certification of new government buildings⁸ to a Green Star 4-star 'Best Practice' rating.
- Work with the Australian Government on development of a national framework for disclosure of residential energy-efficiency information.
- Progress reforms to include provisions for Building Upgrade Finance in the *Local Government Act 1995*. This will allow local governments to facilitate loans to third parties for specific building improvements such as solar panels and other green energy fixtures, helping to reduce emissions associated with buildings within their district.
- Explore options to partner with the Australian Government to improve the energy performance of the existing social housing stock.
- Review the *Waste Avoidance and Resource Recovery Strategy 2030* with a focus on climate change and emissions reduction opportunities.



⁸ The definition of new government buildings that should be certified is provided in the Department of Finance's *Environmentally Sustainable Design Guideline for Non-Residential Government Buildings TG040*.



Ensuring a just transition for Western Australia

The net zero transition will provide substantial opportunities for regional areas

Regional areas are well placed to take advantage of the many economic opportunities related to reducing emissions, deploying renewable energy and sequestering carbon.

The expansion of renewable energy infrastructure offers a chance to create a wide range of new industries and jobs that are suited to regional areas. The diversification of the mining sector, beyond exploration and extraction and into processing of minerals needed for the transition, also offers export revenue and job creation opportunities, even as the international demand for some of the state's commodities declines over coming decades.

While the transition presents large opportunities, the principle of 'just transition' recognises that some communities will be disproportionately impacted by the transition and working together at a regional level can improve overall outcomes for affected communities.

All segments of our society must be supported to share in the benefits of the transition

Significant transformation will be required in regions with emissions-intensive sectors where heavy industry is a key economic driver.

Achieving a just transition involves enabling all Western Australian households and businesses, including those in the regions, to participate in the new energy landscape and share in the positive environmental benefits and lower energy costs.

While a significant proportion of Australian households currently benefit from rooftop solar installations bringing clean reliable power, people living in social housing, and Aboriginal people in regional and remote areas, lack equivalent opportunities.

Western Australia's regions are critical to the decarbonisation journey. The net zero transition offers substantial potential to enhance economic opportunities as well as improve energy access and reduce costs for communities.

The Western Australian *Aboriginal Empowerment Strategy* recognises that native title, cultural heritage, land management, natural resources and the regulation of land use – including for the delivery of renewable energy – all have important implications for Aboriginal people. Aboriginal people must be empowered to freely determine their economic, social and cultural development in relation to the clean energy transformation, in line with principles set out by the United Nations Declaration on the Rights of Indigenous People.



Highlights

Collie transition

The State Government has invested \$662 million in the Collie Transition Package to support future jobs in the coal mining region. The package includes a \$200 million Industrial Transition Fund to attract major projects and new industries to the town.

Powering regional and remote communities

Horizon Power operates 38 power systems delivering energy to 46,662 residential, business and pre-payment customer accounts. Its networks supply some of the most isolated and remote communities in the world including 138 remote Aboriginal communities and three town-based reserves.

Community batteries

Horizon Power has commissioned three community batteries – two in Broome and one in Derby – to improve customer access to solar and thereby reduce energy costs and carbon emissions. The community batteries provide customers with solar-smoothing capabilities, meaning the excess energy generated by rooftop solar can be absorbed by the batteries with simultaneous energy flow-back into the network. The solar-smoothing service makes it easier for customers to access solar energy and avoid the expensive up-front costs of purchasing and installing their own smoothing batteries.

Aboriginal people will have a significant stake in the net zero transition

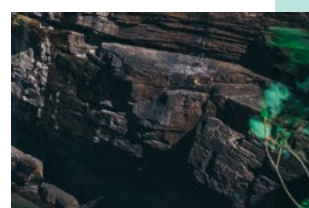
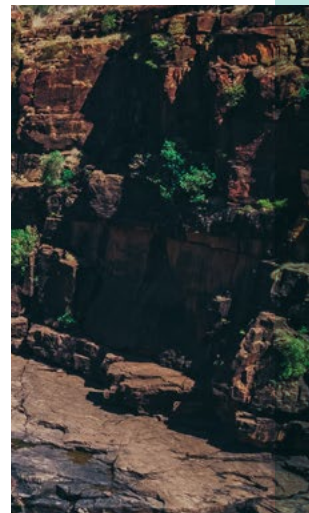
Eighty-two per cent of the state's area is covered by registered determinations of native title. This means Aboriginal people have a very significant stake in the net zero transition, including through opportunities related to nature-based solutions, large-scale renewable energy projects and transmission infrastructure on land where they have rights and interests.

The net zero transition provides an important opportunity to empower Aboriginal people, regionally based individuals, small businesses and communities through community-owned renewable projects, partnerships with industry and job opportunities. The State Government is committed to working with Western Australians in regional and remote areas to shape energy solutions that support their aspirations.



New initiatives

- Install community batteries in the towns of Kununurra, Esperance, Exmouth, Carnarvon and Denham to support network security and facilitate increased adoption of rooftop solar by households and businesses, reducing customer electricity bills.
 - Provide \$3 million to enable Traditional Owner groups to procure information and services required to establish an informed position on Pilbara Energy Transformation initiatives and projects.
 - Augment the Green Energy Approvals Initiative to include criteria that promote Aboriginal empowerment (including equity partnership).
 - Consider ways to support Aboriginal leadership in clean energy projects across Western Australia.
- Develop a coordination framework to support regional communities and industries to capitalise on decarbonisation opportunities.
 - Deliver a \$19.9 million program, co-funded with the Australian Government, to deliver clean energy solutions for regional and remote households including:
 - » the Kimberley Communities Solar Program delivered in partnership with Aboriginal communities in Beagle Bay, Djarindjin/Lombadina, Ardyaloon, Bidyadanga and Warmun to support decentralised renewable energy solutions in remote Aboriginal communities, saving households about \$450 each in annual energy costs
 - » the expanded Sunshine Saver Program to support renters and low-income households in regional areas to access the benefits of low-cost solar energy.



Tracking Western Australia's progress

Actions outlined in this document will support emissions reduction pathways for key sectors and create an important foundation on which Western Australia's net zero transition will be built.

Responsibility and timeframes for the implementation of actions included in the SERS are outlined in the [Appendix](#).

Implementation of the SERS and oversight of Western Australia's transition to net zero emissions will be coordinated through the Ministerial Taskforce on Climate Action, chaired by the Minister for Climate Action.

The State Government recognises that ongoing action will be required to transition the state's economy to net zero emissions, manage impacts and ensure the benefits of the transition are shared across the community.

The Climate Change Bill 2023, introduced to Parliament in November this year, will legislate the target of net zero emissions by 2050 and require the setting of interim targets at regular intervals to create a clear pathway for decarbonising the economy consistent with this long-term goal. The legislation also requires preparation and regular review of a statewide emissions reduction strategy to support achievement of targets, as well as annual reporting to Parliament to track progress.

Reporting under the climate change legislation will start in 2025.

Western Australia's greenhouse gas emissions are published annually by the Australian Government Department of Climate Change, Energy, the Environment and Water as part of Australia's National Greenhouse Accounts.

The Australian Government is responsible for preparation of the National Greenhouse Accounts and all aspects of emissions reporting to the United Nations Framework Convention on Climate Change to track progress against national targets under the Paris Agreement.





Appendix

	Initiative	Lead agency	Completed by
Electricity sector			
1	Establish dedicated resources within the State Government's Green Energy Approvals Initiative team, investing a further \$6.5 million, to facilitate timely, efficient assessment of priority electricity transmission infrastructure projects in the SWIS and the Pilbara.	Department of Water and Environmental Regulation	2024
2	Progress the implementation of the SWIS Demand Assessment and establish PoweringWA to oversee and coordinate investment in electricity network, generation and storage infrastructure, including the development of renewable generation hubs as needed. PoweringWA will coordinate the delivery of new energy infrastructure and help identify, mitigate and manage impacts for affected communities.	Energy Policy WA	2024–28
3	Provide an additional \$708 million to transform the electricity network to enable connection of large-scale renewable energy including: 3a \$575 million (\$655 million in total) to Western Power to fund the Northern Regional Energy Program Stage 1, the first major transmission infrastructure upgrade following the SWIS Demand Assessment. This will enable existing projects to deliver more renewable energy to the grid and enable several new renewable generation projects to connect to the SWIS by 2027 3b \$133 million for planning, early works and the purchase of long-lead items to implement the findings of the SWIS Demand Assessment.	Western Power	2027
4	Reform rules for the Wholesale Electricity Market (which covers the SWIS) to incentivise adequate investment in firmed renewable energy following the planned retirement of fossil fuel generation.	Energy Policy WA	2024
5	Support Horizon Power to deliver critical land acquisition and early planning activities to enable the least-cost generation solutions and decarbonisation of Horizon Power's towns.	Horizon Power	2026–28
6	Trial long-duration storage technologies suitable for Western Australian regions' microgrids and climate conditions.	Horizon Power	2026–28
7	Develop electricity sector workforce projections for Western Australia to allow stakeholders – including government agencies, training providers, and the electricity industry – to understand the employment implications of alternative electricity scenarios.	Department of Training and Workforce Development	2024

	Initiative	Lead agency	Completed by
	Industry sector		
8	Deliver a program of work to expand and decarbonise electricity systems in the Pilbara through common use infrastructure. Activities include:		
	8a establishment of renewable generation hubs in the Pilbara in consultation with affected communities including Traditional Owner groups	Energy Policy WA	2028
	8b modelling of demand and supply scenarios to support decarbonisation of key industry sectors	Energy Policy WA	Annual
	8c evolution of electricity regulatory frameworks to facilitate efficient decarbonisation of the region	Energy Policy WA	2028
	8d development of guidance to clarify existing land access and tenure pathways and provide bespoke advice to Pilbara proponents.	Department of Planning, Lands and Heritage	2025
9	Invest an additional \$11.2 million to 2026–27 to expand and extend the Clean Energy Future Fund to scale up trials and demonstration of new technologies necessary for Western Australia’s net zero transition.	Department of Water and Environmental Regulation	2031
10	Provide \$4.3 million to develop and deliver a Carbon Capture Utilisation and Storage Action Plan to enhance policy certainty, attract investment, enable the accelerated deployment of proven technology and infrastructure and support development of new and emerging CCUS technology.	Department of Jobs, Tourism, Science and Innovation	2028
11	Deliver a detailed engineering design study for a common user low-emissions green iron pilot facility in Western Australia, to test and increase the long-term viability of Western Australian iron ores in response to evolving global market demand.	Minerals Research Institute of Western Australia	2024
12	Work with key industry stakeholders to investigate support required by Western Australian small-to-medium enterprises to reduce emissions.	Department of Jobs, Tourism, Science and Innovation	2024
13	Implement the New Energies Industries Funding Stream within the Investment Attraction Fund to accelerate innovation and scale up commercial potential and manufacturing capacity in industries necessary for the transition.	Department of Jobs, Tourism, Science and Innovation	2026

	Initiative	Lead agency	Completed by
Transport sector			
14	Develop a statewide strategy for future electric road transport charging infrastructure required to support the transition to net zero.	Department of Water and Environmental Regulation	2025
15	Develop a road freight decarbonisation strategy for south-west Western Australia in consultation with the road freight sector.	Department of Transport	2026
16	Fund installation of additional EV chargers at new METRONET train stations to boost the rollout of EV charging stations underway at existing train station parking bays.	Public Transport Authority	2025
17	Increase the State Government fleet EV target to at least 50 per cent of all new purchases in eligible categories from 1 July 2025 to demonstrate government leadership and support the supply of EVs to the second-hand vehicle market.	Department of Finance	2025
18	Identify opportunities to leverage business investment in the production of advanced biofuels (renewable diesel) and low-emission fuels for the state's agriculture, mining and transport industries.	Department of Primary Industries and Regional Development	2027
19	Continue to advocate for adoption of fuel-efficiency standards for both passenger and heavy vehicles to improve the emissions performance of the petrol/diesel fleet and increase availability of low- and zero-emission models in Australia.	Department of Transport	2024

	Initiative	Lead agency	Completed by
Agriculture and land use			
20	Work with industry to improve the verification of methane emissions reduction methods from Western Australian grazing and feed systems, allowing producers to reduce their emissions and participate in carbon-neutral and low-carbon markets for red meat, milk and wool, both domestically and internationally.	Department of Primary Industries and Regional Development	2027
21	Investigate requirements to improve emissions measurement and information on mitigation practices to reduce nitrous oxide and carbon dioxide emissions in the state's cropping sector.	Department of Primary Industries and Regional Development	2027
22	Identify target industries for lifecycle analyses based on market priorities and work with industry funders and others to seek to undertake this analysis over the next four years.	Department of Primary Industries and Regional Development	2027
23	Identify innovative approaches (e.g. robotics, off-grid heating/cooling, waste management) to reduce emissions and improve efficiencies in intensive livestock and horticulture enterprises.	Department of Primary Industries and Regional Development	2027
24	Consider opportunities to use local grains as feed for intensive animal industries, reducing emissions associated with imported soybean meal from South America.	Department of Primary Industries and Regional Development	2027
25	Work with the Australian Government and the CSIRO to improve data collection and accuracy of carbon sequestration measurement and enhance understanding of Western Australia's land-based sequestration potential.	Department of Primary Industries and Regional Development	2027
26	Consider tools and supports for producers to undertake verified carbon accounting processes and move to carbon-neutral production through developing and implementing a profitable and productive carbon-neutral plan.	Department of Primary Industries and Regional Development	2027
27	Support the state's food and beverage manufacturers to accelerate adoption of sustainable and carbon-sensitive practices and accreditation.	Department of Primary Industries and Regional Development	2027

	Initiative	Lead agency	Completed by
Buildings and waste			
28	Implement an emissions reporting system to measure emissions and energy use from government buildings and operations and enable high-emissions facilities to be prioritised for improvement.	Department of Water and Environmental Regulation	2026
29	Develop a strategy for a sustainable and climate-resilient health system, which will include initiatives to reduce emissions from healthcare infrastructure and buildings as part of the Department of Health's commitment to net zero.	Department of Health	2024
30	Implement new Sustainable Design Guidelines to encourage all-electric design for non-residential State Government-owned new builds and upgrades. Encourage certification of new government buildings ⁹ to a Green Star 4-star 'Best Practice' rating.	Department of Finance	Ongoing
31	Work with the Australian Government on development of a national framework for disclosure of residential energy-efficiency information.	Energy Policy WA	2024
32	Progress reforms to include provisions for Building Upgrade Finance in the <i>Local Government Act 1995</i> . This will allow local governments to facilitate loans to third parties for specific building improvements such as solar panels and other green energy fixtures, helping to reduce emissions associated with buildings within their district.	Department of Local Government, Sport and Cultural Industries	2024
33	Explore options to partner with the Australian Government to improve the energy performance of the existing social housing stock.	Energy Policy WA	2027
34	Review the <i>Waste Avoidance and Resource Recovery Strategy 2030</i> with a focus on climate change and emissions reduction opportunities.	Department of Water and Environmental Regulation	2024

⁹ The definition of new government buildings that should be certified is provided in the Department of Finance's Environmentally Sustainable Design Guideline for Non-Residential Government Buildings TG040.

	Initiative	Lead agency	Completed by
Just transition			
35	Install community batteries in the towns of Kununurra, Esperance, Exmouth, Carnarvon and Denham to support network security and facilitate increased adoption of rooftop solar by households and businesses, reducing customer electricity bills.	Horizon Power	2027–28
36	<p>Deliver a \$19.9 million program, co-funded with the Australian Government, to deliver clean energy solutions for regional and remote households including:</p> <p>36a the Kimberley Communities Solar Program delivered in partnership with Aboriginal communities in Beagle Bay, Djarindjin/Lombadina, Ardyaloon, Bidyadanga and Warmun to support decentralised renewable energy solutions in remote Aboriginal communities, saving households about \$450 each in annual energy costs</p> <p>36b the expanded Sunshine Saver Program to support renters and low-income households in regional areas to access the benefits of low-cost solar energy.</p>	Horizon Power	2025
37	Provide \$3 million to enable Traditional Owner groups to procure information and services required to establish an informed position on Pilbara Energy Transformation initiatives and projects.	Energy Policy WA	2028
38	Augment the Green Energy Approvals Initiative to include criteria that promote Aboriginal empowerment (including equity partnership).	Department of Energy, Mines, Industry Regulation and Safety	2024
39	Consider ways to support Aboriginal leadership in clean energy projects across Western Australia.	Department of Primary Industries and Regional Development	2027
40	Develop a coordination framework to support regional communities and industries to capitalise on decarbonisation opportunities.	Department of Primary Industries and Regional Development	2027

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