



GOVERNMENT OF
WESTERN AUSTRALIA

Western Australian Industry Environmental, Social and Governance Information Pack

OCTOBER 2022





Premier Foreword

Today, more than ever, customers, suppliers, investors and communities around the world are demanding that businesses strengthen their Environmental, Social and Governance (ESG) commitments and deliver positive outcomes for the community and environment.

This trend is only set to increase, spurring a rapid rise in sustainable investment. This is illustrated by over \$1.6 trillion worth of ESG bonds being issued globally in 2021 – more than twice the previous year's issuance.

Western Australia's industries and businesses are leading the way to position our state at the forefront of a cleaner, diverse, inclusive and responsible global economy.

In November 2021, the Western Australian Government published its first ever ESG Information Pack, Supporting Continuous Improvement in ESG Outcomes for Western Australia. This information pack highlights our key policy commitments, partnerships with industry and the community, and actions currently in progress that are addressing the crucial environmental and social challenges facing Western Australia today and into the future.

The Western Australian Industry ESG Information Pack builds on this work, recognising the critical role of industry in helping Western Australia deliver ESG outcomes.

The Western Australian Government is committed to the state achieving the Paris Agreement objective of net zero emissions by 2050. We acknowledge Australia's 2022 Nationally Determined Contribution and recognise the importance of contributing to the country's pursuit of the objectives within the United Nations Sustainable Development Goals.

ESG principles are undoubtedly changing the way we operate for the better. We are committed to seizing the opportunity to leave our state a better place for generations to come.

Hon Mark McGowan MLA

Premier; Treasurer; Minister for Public Sector Management; Federal-State Relations



Deputy Premier Foreword

Improving social, environmental and governance outcomes is an ongoing priority of the Western Australian Government.

Crucially, Western Australia has the right ingredients to deliver better ESG outcomes. We have the people, technology, resources and determination needed to thrive. This is demonstrated across the economy, from our health and medical life sciences sector and primary industries, where innovative technologies are being applied to support a range of social and environmental outcomes, to our resources and energy sectors, where the majority of companies have set targets for net zero carbon emissions.

An important part of securing our position as a leading ethical supplier of choice is raising awareness about the incredible work our local industries are delivering.

The Western Australian Industry ESG Information Pack will help to inform our investors and global industry partners about industry-led ESG initiatives taking place across the state's identified priority sectors, as highlighted in Diversify WA.

ESG ambitions are highlighted through the use of targeted case studies that showcase some of the incredible and diverse ESG outcomes industries are delivering across the state.

Our industries are embracing opportunities to strengthen their ESG commitments and deliver positive outcomes for the community and environment. Supporting these strong foundations, the Western Australian Government continually seeks to provide the right policy and regulatory settings to unlock and encourage more sustainable business.

While committed to continuous development and improvement to enhance our ESG outcomes, I am proud to be able to showcase the incredible achievements that our local industries have already made to deliver benefits both locally and globally.

Hon Roger Cook MLA
Deputy Premier; Minister for State
Development, Jobs and Trade;
Tourism; Commerce; Science

About this information pack

In November 2021, the Western Australian Premier, the Hon Mark McGowan MLA, released the inaugural Western Australian Government ESG information pack, **Supporting Continuous Improvement in ESG Outcomes for Western Australia**. That information pack was developed primarily to inform investors in Western Australian Government debt securities of key policy commitments and actions in Western Australia that support the delivery of positive ESG outcomes. It presents a broad range of current and in-progress Government-led ESG ambitions, and benchmarks these to the United Nations Sustainable Development Goals (SDGs) to both demonstrate their linkages and establish a baseline to assess progress on ESG outcomes. To keep investors informed about the progress of these outcomes, an update was released in May 2022.

The purpose of this document, the **Western Australian Industry ESG Information Pack**, is to build on the narrative established in the first information pack.

The **Western Australian Industry ESG Information Pack** has been prepared to inform investment decisions in Western Australia's key industries. It provides a

snapshot of Western Australia's industries' contribution to ESG outcomes and similarly aligns these with the United Nations' SDGs.

The industries included in this document have been guided by Western Australia's economic development framework, [Diversify WA](#). While this framework does not encompass all industries that are operational in the state, it includes industries that significantly contribute to Western Australia's export economy.

In particular, **Diversify WA** identifies 8 external-facing sectors, and this document aligns industry-led ESG activities and outcomes to these sectors. In 2020-21, the value of exports from these priority sectors totalled \$223 billion, which accounted for approximately 98% of Western Australia's total goods and services exports.

The **Western Australian Industry ESG Information Pack** also details the state's ESG outcomes in selected cross-sector activities that improve value and productivity across multiple sectors of Western Australia's external-facing economy. These cross-sector activities include science, innovation and technology and advanced manufacturing.

Diversify WA activities

Investment and trade activities

External focused economy



Energy



Tourism,
events and
creative
industries



International
education



Defence
industries



Mining and
METS



Space
industries



Health and
medical life
sciences



Primary
industries

Cross-sector activities

Supply chain development

Advanced manufacturing

Science, innovation and technology

Environmental, social and governance frameworks

About Western Australia

Western Australia is an export-oriented economy with supply chains that are deeply integrated into the global economy. Around half of Australia's exports of goods originate from the state. In 2020-21, Western Australia's Gross State Product was valued at \$362 billion, which represented 17.5% of Australia's Gross Domestic Product.

As part of the Commonwealth of Australia, Western Australia is a secure and stable jurisdiction supported by a strong system of government and rule of law. This facilitates a fair, transparent and effective governance environment that cultivates confidence in government policies and decision-making.

The strength of Western Australia's governance is reflected by Western Australia being ranked the most attractive jurisdiction in the world for investment in the Fraser Institute's 2021 Annual Survey of Mining Companies. World-renowned for its rich biodiversity and sustainable and ethical primary industries, Western Australia is internationally recognised for its environmental impact assessment approach.

Western Australia has a long-standing global reputation for delivering outstanding quality in everything we do and produce. This is a reputation built by our unique strengths and capabilities, such as our highly-skilled workforce, abundant resources and our exceptional research and education institutions. It is also enhanced through the state's good governance, regulation and whole-of-economy commitment to achieving outstanding ESG outcomes.

Western Australia has a range of cutting-edge industries and competitive advantages that help unlock commercial value. With a continually growing and diversifying economy that is supported by the Western Australian Government through the **Diversify WA** framework, robust supply chains, a reliable trading record and a collaborative approach to investment, Western Australia is an ideal partner for business across the globe.

Acknowledgement of Country

The Government of Western Australia acknowledges the Traditional Custodians throughout Western Australia and their continuing connection to the land, waters and community. We pay our respects to all members of Aboriginal and Torres Strait Islander communities and their cultures, and to Elders past, present, and emerging.

A note about language

In this document, the term Aboriginal people is used in preference to "Indigenous" or "Aboriginal and Torres Strait Islander" people, in recognition that Aboriginal peoples are the original inhabitants of Western Australia.

Cultural warning

Aboriginal people should be aware that this document may contain images of deceased persons.



Sustainable Development Goals



Source: WA State Budget 2022-23



Southern Forests, Pemberton

ESG in Western Australia

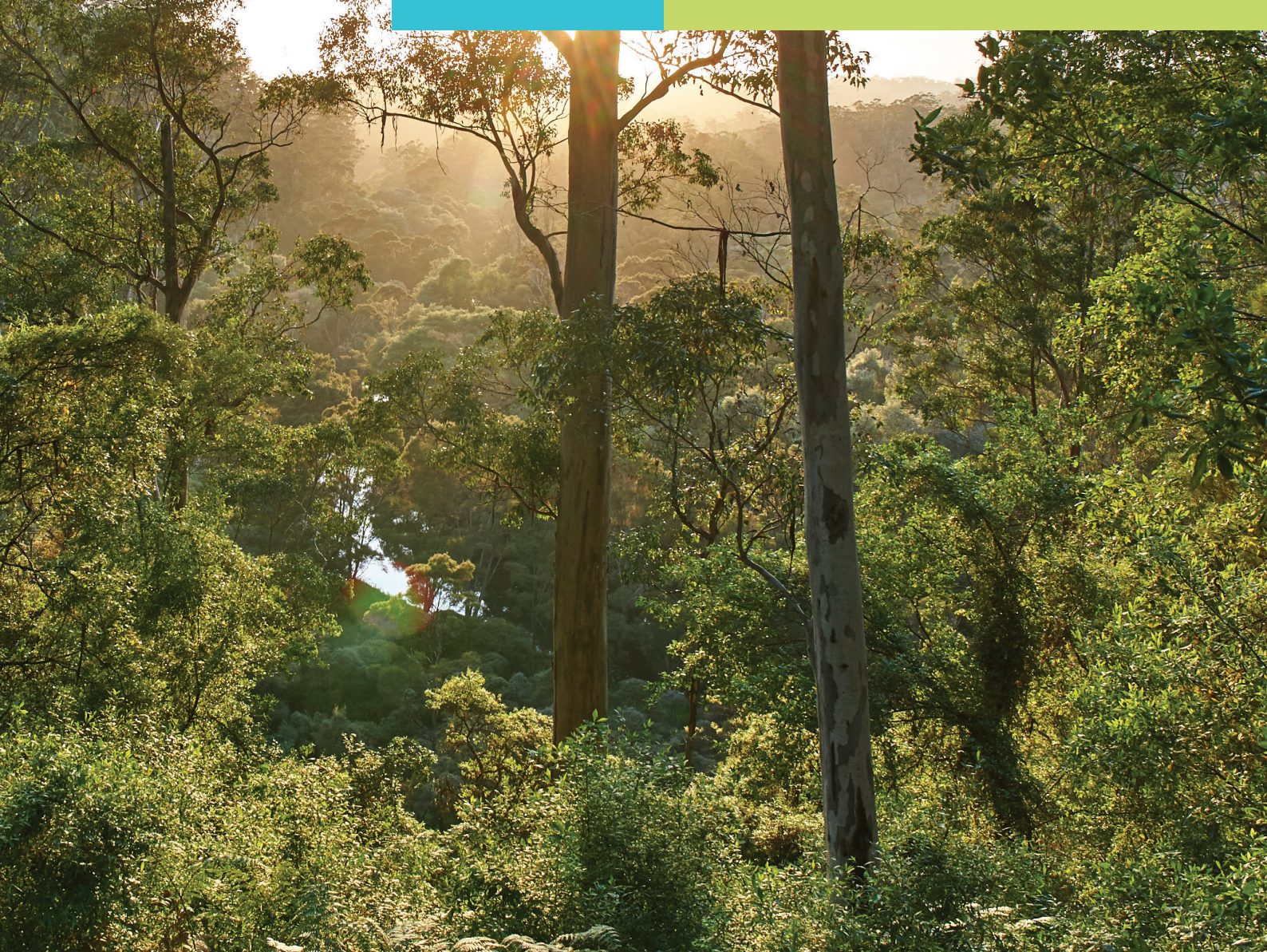
Delivery of ESG outcomes is a shared priority for the Western Australian Government, industry and community. While a range of significant achievements have been delivered to date, this is an ongoing commitment supported through both public and private investment and innovation.

Environment

Home to more than half of Australia's biodiversity hotspots, Western Australia is

internationally renowned for its biodiversity. Recognising the intrinsic value of our environmental assets, Western Australia strives to balance sustainable development with conservation and enhancement for future generations.

Western Australia does have a relatively high carbon footprint when measured on a per capita basis (35t CO₂, National Greenhouse Accounts 2019). This has gradually increased over the past two decades, largely resulting from the rapid expansion of Western Australia's mining and METS sectors, which service the global economy.



With access to abundant natural and mineral resources, the state's energy and mining and METS sectors are harnessing Western Australia's comparative advantages to drive world-leading initiatives that advance environmental outcomes for Western Australia and our international partners alike, including by reducing carbon footprints.

Western Australia has ample solar and wind resources, some of the largest reserves in the world for battery minerals and our emerging renewable hydrogen industry will play an important role in tomorrow's energy mix. As the world moves to a lower carbon future, Western Australia will play a key role in value chains of new energy technologies, through our exports, expertise and renewables potential.

The [Western Australian Climate Change Policy](#), released in November 2020, details how this will be progressed, with our vision to: "harness Western Australia's innovation and wealth of natural and mineral resources to achieve net zero emissions and ensure a prosperous and resilient future for all Western Australians." Achievement of this vision is being supported through partnership between government and industry to develop sectoral emissions reduction strategies, which will provide robust pathways and actions to facilitate the state's transition toward net zero by 2050. Paired with significant investment in renewables and energy storage to reduce emissions, Western Australia is on a strong trajectory to meeting this ambition.



Social

Western Australian industries are striving to advance social ambitions relating to health, education, diversity and safety. Western Australia's health and medical life sciences sector delivers innovation designed to optimise health and wellbeing outcomes. The state's world-class education institutions provide quality learning experiences to a diverse range of students, and Western Australia's tourism, events and creative industries showcase our rich cultural heritage and help generate economic and social inclusion opportunities.

Targeted initiatives are being implemented by industry to give back to local Western Australian communities. In particular, industries' initiatives to advance social and economic ambitions in regional communities are supported and underpinned by a sustained commitment from the Western Australian Government to develop the potential of our regions, including through the [Royalties for Regions](#) investment program.

The Western Australian Government's commitment to building the capacity and protecting the rights and interests of Traditional Owners through legislation, policies and processes is complemented by industries' ambition to deliver positive social and economic outcomes for Aboriginal people. Western Australia has introduced a modern framework for the recognition, protection, conservation and preservation of Aboriginal cultural heritage through the Aboriginal Cultural Heritage Act 2021, which also recognises the fundamental importance of this cultural heritage to Aboriginal people and all Australians.

Governance

People working in Western Australia are supported by strong labour relations and occupational health and safety frameworks. Underpinned by robust legislation and regulations, these frameworks ensure high-quality industry practices. Through initiatives such as [Western Australia's Plan for Gender Equality](#), government and industry are also working together to lead generational change and create a better, fairer and more equitable community in Western Australia.

Industry operations are safeguarded and optimised across all sectors of the Western Australian economy through strong corporate governance and shareholder protections. This includes policies and practices relating to transparent and fulsome disclosure, remuneration, whistle-blower protection, and diversity and inclusion.

These safeguards are enhanced by the Western Australian Government's ability to deliver a secure, stable and diverse investment environment that builds on our state's sound financial management and economic strengths. Our low sovereign risk and political stability, combined with Western Australia's comprehensive, transparent and well-practiced regulatory framework assures the interests of our local community and international partners are protected.

Supported by efficient, coordinated and strong public institutions such as the Environmental Protection Authority, the Auditor General and the Office of the Information Commissioner, the Western Australian Government is able to deliver public services and regulatory control in a manner that engenders public trust.



Energy



Western Australia's transition to clean energy spans many industries and is supported by a strong foundation of strategic frameworks to enable growth and improve access to reliable energy. Foremost is the [Western Australian Climate Change Policy](#), which underscores the Western Australian Government's commitment to adapting to climate change and working with all sectors of the economy to achieve net zero greenhouse gas emissions by 2050.

A key component of the state's energy generation system will be a sensible, managed transition toward greater use of renewables, with a commitment to retiring remaining state owned coal fire generation assets by 2030. An estimated \$3.8 billion will be invested in new green power infrastructure that is expected to result in a 40% reduction in emissions on the state's main grid, the South West Interconnected System.

The Western Australian Government has also established a number of mechanisms to attract investment and build research capability in new energy, including through the [Clean Energy Future Fund](#), [New Industries Fund](#), [Investment Attraction Fund](#) and support for the Future Energy Exports Cooperative Research Centre.

This state-level investment is complemented by support from the Australian Government through initiatives such as the Technology Investment Roadmap, which supports national development and commercialisation of low emissions technologies, including energy storage. This roadmap is expected to drive over \$84 billion of total investment in low emissions technologies by 2030.

According to the Clean Energy Council's 2022 Clean Energy Australia Report, between 2017 and 2021, there was over \$1.3 billion invested in large-scale renewable energy projects in Western Australia and in 2021, 31.5% of our state's electricity generation came from renewables.

These enabling frameworks are leveraged by Western Australia's energy sector to deliver a range of environmental outcomes, from conservation to fast-tracking the achievement of net zero. Across the sector, businesses of all sizes are establishing ambitious emission reduction targets, delivering innovative renewable energy projects, scaling-up critical minerals and battery storage capability, implementing low-carbon technologies, and exploring opportunities to capture, sequester and utilise carbon.

Sitting behind the sector's environmental outcomes are robust and transparent regulatory frameworks with legislation, policies and processes in place for consumer protection, market operations, environmental protection, industrial relations, cultural heritage and Native Title.

Through these measures, Western Australia's energy sector is continually striving to ensure the delivery of innovative and sustainable solutions that meet the needs of both local and global energy users.



Batteries and critical minerals

Western Australia is primed to play a central role in decarbonising the world's economies, as a reliable, ethical and sustainable supplier of battery and critical minerals and clean energy. With an abundance of battery and critical minerals, including significant mineral deposits, Western Australia has established itself as a leading supplier of lithium, nickel, cobalt, manganese and rare earths. These minerals are essential to a range of clean energy technologies, including rechargeable batteries, electric vehicles (EV) and wind turbines.

Since the middle of the last decade, Western Australia has welcomed over \$9 billion of investment across the sector, including the establishment of globally-significant mineral processing facilities.

To support industry development, the Western Australian Government has established a [Future Battery and Critical Minerals Industries Strategy](#), and is delivering a range of investment activities, such as a big battery feasibility study for the state's Collie region and support to develop a Western Australian-based global precursor cathode manufacturing facility.

There are also strong partnerships between government, industry and the research community to support the energy transition and grow the battery industry through mechanisms such as the Future Battery Industries Cooperative Research Centre, a \$120 million independent national centre located in Western Australia.

Battery and critical minerals highlights

- » Western Australia produces 57% of the world's lithium supply, an essential metal supporting electrification and net zero emissions.
- » Western Australia's Curtin University, which is ranked second in the world for mineral and mining engineering, has partnered with industry on a \$240 million research collaboration that aims to de-risk the uptake of new technologies and support the commercialisation of critical mineral projects. A cornerstone of the research partnership will be the construction of pilot and demonstration-scale testing facilities in Western Australia, helping to further grow the state's research infrastructure and expertise towards global decarbonisation.
- » Major mining company BHP has secured a nickel supply agreement with Tesla Inc. to supply nickel from its Nickel West asset in Western Australia, and the parties have also agreed to collaborate on battery supply chain sustainability.
- » Iluka Resources Limited is an international critical minerals company with an extensive portfolio including mineral sands and rare earth operations in Western Australia. In 2019, Iluka designed and commissioned new specialised equipment for mine site rehabilitation, the "Flora Restorer." The Flora Restorer assists with restoration and revegetation by improving the establishment of native plants amid trying climate conditions at Iluka's Eneabba operations.





Credit: Water Corporation WA



Utility providers are leading the way

Western Australian utility providers are striving for more reliable and clean energy by leading the development and adoption of innovative energy solutions, such as the integration of renewables, orchestration of distributed energy resources, future energy storage, green hydrogen and standalone power systems (SPS), both at scale and as part of microgrids.

- » Horizon Power, Western Australia's regional and remote energy provider, conducted world-leading microgrid trials in Onslow. The trials demonstrated the technical viability to successfully run a power system on 100% clean, green solar and battery power. The emergent technology enables safe and stable integration of centralised, utility-owned energy resources, such as power stations, solar farms, and batteries, with distributed customer-owned energy resources, such as rooftop solar, batteries, and EV solutions. Further, Horizon Power is delivering Australia's first renewable hydrogen demonstration plant in a remote power system in Denham, expected to be operational before the end of 2022. The demonstration plant will utilise solar and renewable hydrogen generation and

storage to provide renewable energy equivalent to that used by up to 100 homes. This end-to-end undertaking will test the technical capability and viability of green hydrogen as a power source in microgrids, while also helping to advance hydrogen development across Australia.

- » Western Power maintains and operates an electricity network connecting 2.3 million Western Australians in the south west. The organisation is rolling out SPS units across its network, reducing the need to replace long runs of power infrastructure. There are almost 100 SPS units already installed, and modelling forecasts substantial growth in the number of installed SPS units over the coming decades.
- » Synergy, an electricity generator and retailer of electricity and gas, is installing a battery with 100 megawatts (MW) of capacity, capable of powering the equivalent of 160,000 homes for two hours.
- » Synergy and the Water Corporation are investigating the technical and economic feasibility of pumped hydroelectricity energy storage at utility scale in Western Australia.



Renewable hydrogen

Western Australia has an extraordinary opportunity to become a global renewable hydrogen leader and assist international partners to meet their future energy and emissions reduction goals. To support the development of the state's renewable hydrogen industry, the Western Australian Government has released the [Renewable Hydrogen Strategy and Roadmap](#) that identifies the strategic focus areas and key initiatives to enable our state to become a major producer and exporter of renewable hydrogen.

The Western Australian Government and industry are partnering to identify ways to produce, export and use renewable hydrogen, including through the establishment of hydrogen hubs in the state's Pilbara and Mid-West regions.

Hydrogen highlights

- » The Asian Renewable Energy Hub located in Western Australia's Pilbara region will generate 26,000 MW of renewable energy and produce 1.6 million tonnes of green hydrogen or 9 million tonnes of green ammonia each year. Although some of the generation capacity is expected to be dedicated to large energy users in the Pilbara region, the bulk of the energy will be used for the large-scale production of green hydrogen products.
- » Yara, a crop nutrition company, has joined forces with ENGIE, a major player in the global energy transition, to build a renewable hydrogen plant to produce renewable ammonia in the Pilbara Region. The plant will be one of the world's first industrial scale renewable hydrogen production operations. The pilot project is scheduled for completion in 2024.



Western Green Energy Hub

The Western Green Energy Hub (WGEH) is one of the world's largest green energy projects. Very large-scale hybrid wind and solar will produce around 50 gigawatts (GW) of renewable energy, with development phased across 15,000 square kilometres. The anticipated investment is approximately \$70 billion, with the aim to produce at least 3.5 million tonnes of green hydrogen per year.

The project is led by a consortium comprising InterContinental Energy, CWP Global and the Mirning People, traditional custodians of the land on which the project will take place. The Mirning have direct carried equity and a permanent board seat. WGEH is a nation building project, providing transformational economic, social and environmental outcomes for many decades.

LNG Highlights

- » In 2019, 13% of global LNG exports came from Western Australia.
- » The FEnEx CRC established a subsidiary company, Luth Eolas Pty Ltd, to commercialise KETH. KETH will be the only cryogenic gas and energy testing facility in the southern hemisphere and will enable hydrogen and LNG production, demonstration, training, testing certification and research.



Natural gas

Western Australia's large offshore gas reserves provide opportunities for the export of liquefied natural gas (LNG) that assist the development of gas-intensive downstream industries. Leaders in the state's LNG industry are implementing strong emissions reduction targets and, through the LNG Jobs Taskforce, industry and government are able to collaborate on opportunities to develop the sector, including in the areas of decarbonisation and enhancing local business participation in LNG supply chains.

The Taskforce has supported key initiatives, including the establishment of the Future Energy Exports Cooperative Research Centre (FEnEx CRC), which provides cutting-edge, industry-led research, education and training to support LNG and hydrogen production. With the support of the Taskforce, the FEnEx CRC is leading a project to establish a world-class LNG and hydrogen research and demonstration facility in Western Australia, the Kwinana Energy Transformation Hub (KETH).

Another priority for the Taskforce is advancing environmental outcomes for Western Australia, including through studies into carbon capture, utilisation and storage. It is also exploring world-leading decommissioning opportunities, as significant numbers of Western Australian based oil and gas assets are now approaching end of life and moving into the cessation of production. The Taskforce is working with the Centre of Decommissioning Australia (CODA), an independent centre supporting the establishment and growth of Australia's domestic decommissioning capabilities, to build capacity and capability to deliver this decommissioning activity locally. As part of this work, opportunities to use global best practice and to maximise recycling of removed equipment and materials are being explored.



Woodside Energy Group Limited (Woodside Energy)

Abating greenhouse gas emissions at Pluto LNG

Woodside Energy, the largest energy company listed on the Australian Securities Exchange (ASX), is implementing a greenhouse gas abatement program at its Pluto LNG facilities. The Pluto Greenhouse Gas Abatement Program includes an interim target to abate 30% of emissions by 2030 and long-term targets to abate 100% by 2050. The targets are based on the expansion of Pluto LNG and account for emissions associated with a two-train facility. The extensive program includes measures to reduce, mitigate and offset greenhouse gas emissions. As part of its offset measures, Woodside Energy has invested more than \$100 million across Australia through native tree planting over the past 10 years, and continues to undertake carbon projects in regional Western Australia. Woodside Energy is working with environmental enterprises on its Native Reforestation Project in Western Australia.

Investing in hydrogen and ammonia production

Woodside Energy is progressing H2Perth, a world-scale hydrogen and ammonia production facility in southern metropolitan Perth, Western Australia. The initial proposal is targeting approximately 110,000 tonnes per annum of hydrogen production.



Solar and wind

Western Australia boasts world-class solar and wind resources, allowing the state to harness its significant clean energy advantages and continue to transform the energy landscape. There are 11 large-scale renewable solar and wind energy projects connected to Western Australia's main electricity network, the South West Interconnected System.

The Western Australian Government has established a Local Industry Participation in Wind Farm Supply Action Group that

includes representatives from industry and government. The Group provides advice and recommendations on the establishment and development of a wind turbine manufacturing industry in Western Australia. This initiative is underpinned by cross-sector collaboration and is a showcase of partnership to achieve a wind turbine manufacturing industry in Western Australia that will contribute to more affordable clean energy and future-proofed jobs.



Collgar Wind Farm

The Collgar Wind Farm, a project wholly owned by the Retail Employees Superannuation Trust, is built over a land envelope of 18,000 hectares in Merredin, Western Australia and has 111 Vestas V90 wind turbines with a total power production capacity of 222 MW, generating between 630-750 GWh per year. In 2021, it was recognised by the Global Real Estate Sustainability Benchmark as a global sustainability Sector Leader in Renewable Power and maintained its 5-star rating for ESG management and performance.

Solar and wind highlights

- » Since 2019, the large-scale renewable capacity connected to the South West Interconnected System has increased by 1,600%, and rooftop solar photovoltaic (PV) generation connections have increased 51%.
- » The Yandin Wind Farm, a RATCH-Australia and Alinta Energy investment, produced more energy than any other wind farm in Western Australia in the 12 months to 30 June 2022. Using 51 4.2 ME turbines, it can power the equivalent of approximately 200,000 households across Western Australia each year.
- » BHP has recently signed a Power Purchase Agreement (PPA) with Enel Green power, a leading multi-national renewable energy company within the Enel Group. The PPA underpins the construction of a new windfarm comprising 18 wind turbines that are expected to produce 315 GWh per year. The windfarm will generate the equivalent of 100% of the current power requirements for major nickel processing operations from 2024.
- » Leading global mining group, Rio Tinto, is installing a 34 MW PV solar farm at its Gudai-Darri operations. The solar plant is expected to supply all of Gudai-Darri's electricity demand during peak solar power generation times and approximately 65% of the average electricity demand.
- » Woodside Energy is evaluating a solar PV power facility, approximately 15 km south-west of Karratha in Western Australia. The facility will generate electricity from a large-scale solar PV farm, complemented by a battery energy storage system and other associated infrastructure. Initially, the proposed facility could supply 100 MW of solar energy to Pluto LNG and other customers located near Karratha, with potential expansion to a maximum capacity of 500 MW.



Tourism, events & creative industries



Western Australia is a desirable and vibrant destination with strong connection to and recognition of Aboriginal cultures and traditions, vast natural attractions and an exciting range of arts and cultural events providing unique experiences to locals and visitors alike.

Home to 5 tourist regions, world-class venues like Optus Stadium, WA Museum Boola Bardip and Perth Arena, and host to a number of major

arts festivals and sporting events, Western Australia is a true tourism, events and creative industries destination of choice.

Offering more than attractions and experiences, Western Australia's tourism, events and creative industries achieve targeted ESG outcomes by maintaining and celebrating culture and heritage, empowering diverse communities and strengthening connections to nature and our unique biodiversity.



Aboriginal tourism

Aboriginal tourism is centred on promoting Western Australia's rich, diverse and authentic Aboriginal cultural experiences, while also supporting Aboriginal people to secure sustainable economic, social and job outcomes.

The Western Australian Government is committed to supporting this important industry through key partnerships and strategies such as the [Jina: WA Aboriginal Tourism Action Plan 2021 - 2025](#), which was developed in partnership with the Western Australian Indigenous Tourism Operators Council and is backed by the \$20 million Aboriginal Tourism Fund. The 4-year plan strives to position Western Australia as the premier Aboriginal tourism destination, facilitate the development of Aboriginal cultural experiences, and build capacity for Aboriginal people to enter the tourism sector.



Advancing social and economic ambitions

Contributing to cultural and environmental management

The Wunambal Gaambara people are the native title holders of 2.5 million hectares of land and saltwater in the North Kimberley region of Western Australia. Under the Wunambal Gaambara people's traditional Wanjina Wunggurr law and customs, visitors sought permission to visit the local Country. In the modern context, permission and welcome are granted through a visitors pass program, the Unguu Visitor Pass (UVP).

The UVP is operated by the Wunambal Gaambara Aboriginal Corporation (WGAC), who is responsible for managing the Native Title rights and interests of the Wunambal Gaambara people. Independent travellers and commercial tour operators visiting by either car, aircraft, boat or bushwalking are required to ensure that they purchase the appropriate pass through the UVP program. The WGAC has also developed the Unguu Visitor Management Plan that enables the Wunambal Gaambara people to know who is on their local Country, manage their land and cultural places and build effective participation and leadership in the tourism industry. Together, the plan and the funds raised from the UVP support the Wunambal Gaambara people to implement their integrated Healthy Country Plan to grow sustainable capacity to keep and share their local Country's natural and cultural assets intact for future generations.

Generating income and employment opportunities

Camping with Custodians is an Australian-first program that gives visitors the opportunity to meet and mix with Aboriginal custodians on Aboriginal lands. The Western Australian Government develops high quality campgrounds that are open to the public and operated by the community. The program provides locals with the chance to showcase their culture and proceeds from camp visits support generation of income, employment, training opportunities and jobs for local people. In supporting Aboriginal communities to work on Country, Camping with Custodians aims to provide visitors to Western Australia with an authentic Aboriginal experience – a goal that underpins the Jina: Western Australian Aboriginal Tourism Action Plan.

Sustainable tourism

Western Australia supports tourism that drives social and environmental outcomes. Through sustainable tourism practices, the sector recognises the importance of our natural environment, encourages conservation and demonstrates respect for local communities and cultures. Further, the closely related agritourism industry offers educational tourism experiences, including through 'farm-to-plate' adventures that help raise awareness for more sustainable lifestyles by promoting local produce and imparting knowledge to visitors to better understand where their food comes from and how it is produced.



Whale sharks at Ningaloo Reef

Every year, whale sharks congregate along the largest fringing reef in Australia, the Ningaloo Reef. Interactions with the world's biggest fish are managed sustainably through a combination of industry endeavours and strong governance foundations. The Western Australian Government's involvement in this area includes legislation and stringent licencing arrangements that help to manage and minimise any potential risks to the whale sharks and their environment.

Live Ningaloo

One of a limited number of licenced commercial operators in the Ningaloo Marine Park, Live Ningaloo is a sustainable tourism and EcoStar accredited business operating whale shark and humpback whale swim tours. Live Ningaloo's sustainability efforts to protect the pristine marine environment encompass education initiatives, maximising the use of renewable energy, adopting alternatives to chemical cleaning and maintaining key industry partnerships. In recognition of its sustainability efforts, Live Ningaloo won Gold in the 2021 Australian Tourism Awards Ecotourism category.

Events and creative industries

Western Australia's events and creative industries play a central role in telling Western Australian stories, promoting harmony and reconciliation and celebrating diversity. Western Australia's events and creative industries also promote sustainability and inclusion, particularly in regional communities, by providing opportunities to establish business enterprises, grow jobs and showcase local art and culture.

The Western Australian Government supports industry in this area with strategic investments, through initiatives such as the \$20 million Regional Arts and Cultural Investment Program. As a place of exceptionally diverse Aboriginal cultures and identities, Western Australia is proudly home to world-renowned Aboriginal artists whose works are exhibited in international galleries.



Wirnan Intergenerational Well-Being Project

The Wirnan Intergenerational Well-Being Project is designed to share traditional culture between and within generations. Wirnan is a collaborative partnership project delivered by an alliance of art centres dispersed across the Kimberley region. This includes Waringarri Aboriginal Arts (Kununurra), Mangkaja Arts Resource Agency (Fitzroy Crossing), Warlayirti Artists (Balgo), Warmun Art Centre (Warmun), Mowanjum Arts and Culture (Derby) and Kira Kiro Artists (Kalumburu). Each art centre develops a program that is tailored to meet the needs of their communities with most art centres working closely with local schools to engage students in programs. There have been more than 150 different activities delivered, engaging hundreds of adults, young people and children through a framework of arts and cultural practice to generate well-being.



DADAA Limited – Sculptures by the Sea

DADAA Limited (DADAA) is a leading arts and health organisation that creates access to cultural activities for people with disability or a mental illness across Western Australia. DADAA's important work includes tactile and audio described services. Each year, visitors with disability and their carers are invited by DADAA to participate in a free tactile tour of Sculptures by the Sea, an annual art exhibition staged on Cottesloe Beach. The tours focus on sculptures nominated as being safe to touch and located in accessible areas. Verbal descriptions of sculptures are also offered to participants who are blind or vision-impaired. The tactile tours introduce new ways of experiencing and enjoying contemporary sculpture through informed discussion and touch.



International education



Western Australia is a top education destination, full of opportunity for international students to take advantage of quality institutions and programs. Western Australia is also a diverse place to live, with people originating from more than 190 countries now calling Western Australia their home. Access to support and generous work rights also enables students to connect with the broader community with ease.

In 2019, prior to the COVID-19 pandemic, more than 50,000 international students resided in the state from 153 countries. International education and its flow-on benefits generated \$2.1 billion for the state and supported around 12,000 full-time jobs. There were also flow on effects for the tourism industry and it is estimated each international student attracted 1.5 visiting friends and relatives from overseas.

Western Australia is home to top-ranked education institutions with more than 125 high-quality education providers, industry-leading lecturers and researchers, and a wealth of employment opportunities. Recognising the value of Western Australia's international education sector, the Western Australian Government has supported the sector to grow, adapt and continue to deliver high-quality education experiences through a range of initiatives. This includes development of the [Western Australian International Education Recovery and Renewal Plan](#), which articulated sector-specific strategies and initiatives to

reposition, recover and achieve long-term sustainability beyond the pandemic. Programs to support and attract international students to Western Australia from across the world have also been announced, such as the [\\$195 million Reconnect WA Package](#) and the [Western Australia Safe Transition Industry Support Package](#), which has offered a suite of support measures for international students totalling \$16 million announced as part of the 2021-22 State Budget and an additional \$41.2 million boost in the 2022-23 State Budget.

From promoting a sense of global citizenship to fostering an appreciation of cultural diversity, Western Australia's international education sector means more than a quality education. Building on these social ambitions is the sector's important role in increasing the number of adults who have relevant skills, including technical and vocational skills, for future employment or entrepreneurial endeavours.

For international students studying onshore in Western Australia, the sector's extensive range of engagement and support programs prioritise and safeguard student wellbeing. Pastoral care initiatives are an important part of the student experience and ensure that international students remain supported throughout their study journey in Western Australia. International students studying in Western Australia have the option to continue to work in the state following completion of



their studies. There are ample post study opportunities that await international students in the diverse industries that operate out of Western Australia. Not only does the international education system provide a lever for future employment and greater ongoing opportunities, but support is accessible in times of need.

Building on a supportive environment is an array of scholarships available to international students. The Western Australian Government supports international students through scholarships including the Premier's University Scholarships, the Premier's Western Australian Certificate of Education Bursary and the Gerald Frank Brown Memorial Scholarship. Western Australia's international education sector also supports international students through a range of programs and scholarships. Combined, these scholarships provide students with support for cost of living expenses, while building on Western Australia's relationships with global partners and educating the world's next generation of leaders.

Western Australia's education institutions also play a vital role in environmental education. As repositories of knowledge, the state's universities are often called upon for their environmental expertise. The Western Australian Government has harnessed the research expertise of staff and students from Edith Cowan University and other Perth institutions for more than 20 years to help shape and target the response to declining groundwater levels at Perth's largest source of groundwater that supports surrounding wetlands, the Gnangara Mound. Further, Western Australia's 5 universities have systems and policies in place that hold the organisations accountable with a plan to mitigate and adapt to climate change.



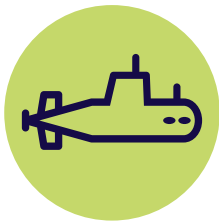
StudyPerth

StudyPerth, Western Australia's peak international education industry body, is a platform for good governance and plays a leadership role within the sector, including formulating key policies and strategies in partnership with government and providing a forum to share information and knowledge. From a social perspective, StudyPerth provides international students with a range of support programs, including access to free career, mental health, wellbeing and legal support. These programs are delivered through a multicultural service to provide support that meets diverse needs.



Satit Bilingual School of Rangsit

A consortium comprised of Western Australian universities and vocational education and training providers signed a Memorandum of Understanding (MoU) with Satit Bilingual School of Rangsit University in Thailand in February 2021 for the delivery of pathway programs to Thai students. Under the consortium arrangement, Satit Bilingual School students undertake the Diploma of Business – University Pathway at Western Australia's Phoenix Academy, before transitioning to Curtin University, Edith Cowan University or Murdoch University. The first of its kind in Thailand, this innovative MoU has been sector-led with the support of the Western Australian Government and Australian Government.



Defence industries



Western Australia supports a defence presence that represents over 9% of the Australian Defence Organisation and includes over 5,500 permanent Australian Defence Force (ADF) personnel. Spanning more than 250 related businesses, Western Australia's defence industries contributed approximately \$3 billion to Western Australia's Gross State Product in 2020-21. The state also has approximately 30,000 veterans who have served in the ADF.

Significantly contributing to Australia's defence requirements including through support for the ADF, Western Australia's defence industries are competitive, resilient and have a long history of success, with modern manufacturing capabilities and support from superb tertiary institutions.

The Western Australian Government has developed the [Western Australia Defence and Defence Industries Strategic Plan](#) to maximise the state's participation in, and contribution to, national and international defence industries. The plan is implemented by the Western Australian Government's Defence West, and sets out six key strategies to 2030 to: support a strong and enduring defence presence; grow the state's defence industries' capability and contribution; develop strategic infrastructure; build research and innovation partnerships; advance education, training and skills; and support veterans and families.

Western Australia is home to Australia's largest naval base (HMAS Stirling), key Royal Australia Air Force and Australian Army bases, and the Australian Marine Complex (AMC). As a world-class centre of excellence for manufacturing, fabrication, assembly, maintenance and technology development, the AMC services a range of sectors such as defence, oil and gas, and resources. It is within this setting that Western Australia's defence industries are supported to grow and drive social and environmental change. For instance, Western Australia's defence industries are pursuing ways to become more sustainable, including investigating opportunities for future naval ships powered by zero carbon fuels such as hydrogen and ammonia.

The [Defence Science Centre \(DSC\)](#) further advances Western Australia's defence industries' ESG ambitions. Part of Defence West, the DSC is Western Australia's contribution to the Australian Defence Science and Universities Network, which is an extensive network that creates connections across universities, industries and defence to develop the state's science and research capabilities. Through initiatives like the DSC, Western Australia's defence industries are enhancing scientific research, upgrading technological capabilities and encouraging innovation.



With the support of the Western Australian Government, Western Australia's defence industries also promote the inclusion of historically under-represented members in the community, with key illustrations of this being:

- » the Women in Defence Scholarship that offers qualifications to women of all ages and backgrounds seeking careers in defence industries
- » the Western Australia Jobs and Skills Centres, which offer support to Aboriginal people, youth, people with disability, mature aged workers and culturally and linguistically diverse people to pursue career opportunities, including specifically within the defence industry.

Western Australian veterans and their families have access to ongoing well-being and welfare support through a range of services offered by industry, such as the Returned Services League of Western Australia. Further, Western Australia shows its appreciation to veterans through a range of commemorative ceremonies that provide a platform to reflect on important historical events and support the overall well-being of veterans and ADF personnel by championing mental-health and social inclusion.

Western Australia has the capability and capacity to contribute towards upcoming national and international defence programs, and the ability to continue to deliver ESG outcomes.



Austal Limited

Austal Limited, a global shipbuilder and defence prime contractor located in Western Australia, has launched its VOLTA series of electric powered high-speed ferries that combine innovation and sustainability to create a cost-effective electric powered vehicle capable of zero emissions. With this technology, there is a future in sustainable defence ships using alternative low carbon emission fuels.



Blue Ocean Monitoring

Blue Ocean Monitoring is a world-leading maritime remote and autonomous systems expertise business located in Western Australia. Blue Ocean Monitoring is developing and implementing novel autonomous underwater vehicle solutions for defence industries. These remote autonomous technologies also have the potential to shape the future of maritime data collection, reduce environmental impacts and costs, increase efficiencies and minimise risk in maritime operations.



Mining and METS



Western Australia is internationally recognised as having one of the most advanced and successful mining industries. In 2020-21, Western Australia's mining industry accounted for \$169.6 billion in Gross State Product and mining and mineral exploration industries employed an average of 155,000 people during 2021.

Western Australia's mining industry is serviced and complemented by a world-class mining equipment, technology and services (METS) sector that supplies cutting-edge technology, software, equipment, engineering and construction services. Twenty-two of the top 100 global METS companies are headquartered in Western Australia, and a further 55 have operations here.

As outlined in [Western Australia's Mineral and Petroleum Resources Development Strategy](#), the Western Australian Government is committed to ensuring a best-practice regulatory framework is in place, which underpins the ability of the mining and METS sector to demonstrate its strong ESG credentials. This framework is enhanced by national measures, including legislation that is guiding industry leaders to prevent, mitigate and remedy modern slavery risks in global supply chains and outsourced labour arrangements.

Western Australia's mining and METS sector is driven to give back to the economy and Western Australian communities. ESG achievements are advanced through a combination of contributions to remote and regional areas, environmental stewardship and by more targeted philanthropy including through organisations such as the Minderoo Foundation.

Western Australia's mining and METS sector is already embracing the opportunities presented by the shift in community and investor expectations on ESG performance, particularly with respect to the increased focus on sustainability and reducing carbon emissions.

The majority of large mining and energy companies in Western Australia, which contribute about half of the State's emissions, have set targets for net zero emissions by 2050. Environmental ambitions are complemented by strong project approval processes that take into account the target of net zero emissions by 2050, sustainable water management and waste recycling. This includes the Western Australian Government's [Environment Online](#) platform, which aims to bring together all aspects of water and environmental assessments, approvals and compliance.

The mining sector has also invested in autonomous technology to access its numerous benefits, including removing people from some of the more hazardous jobs while improving the ability to more efficiently find, extract and process resources, with less waste and impact on the environment.

The maturity of autonomous haulage in the state's iron ore sector is world leading, with more than 400 autonomous trucks in operation. The trucks, which are monitored from remote operations centres in Perth, remove workers from the mine site, which has resulted in reduced accidents, while improving machine and tyre life, and reducing fuel consumption.



The Dandjoo Darbalung Program

In 2021, The Dandjoo Darbalung Program won the Community Partnership Resources Sector Award for its support of students from Aboriginal communities in remote areas of Western Australia. Supported by St Catherine's College, IGO Limited, AngloGold Ashanti Limited, Sandfire Resources Limited and Barminto Limited, the program provides holistic support for Aboriginal students with their tertiary studies, while also encouraging and nurturing their cultural identity. It is the largest Aboriginal residential program in Australia, and has a retention rate of more than 80% compared to a national average of less than 50%, and a pass rate equal to non-Aboriginal students, well above the national average.



Gee Gie Pty Ltd (Gee Gie)

Local Aboriginal company Gee Gie has been contracted to work on the first stage of a new project under the Abandoned Mines Program. Gee Gie will work with the Western Australian Government to identify, document and prioritise remediation work of abandoned mine features near Cue, Marble Bar and Yalgoo. Gee Gie will also consult with the local shires and Aboriginal communities on the nature of the project and work to build positive relationships within the local communities. The Abandoned Mines Program uses funds generated through the Mining Rehabilitation Fund, a pooled fund contributed to by Western Australian mining operators, to rehabilitate historic abandoned mines in the state.



Zero emissions mining

The mining and METS sector is a significant contributor to Western Australia's greenhouse gas emissions and decarbonisation of the industry is an immediate priority. The sector has focused strongly on the electrification of mining operations and renewable energy to help reach decarbonisation goals.

Electrification of mining operations

Western Australian mining and METS companies are participating in collaborative efforts to electrify mining operations at both the national and global levels through initiatives such as the Electric Mine Consortium, the Charge On Innovation Challenge and the International Council on Mining & Metals' Innovation for Cleaner, Safer Vehicles Initiative.

Major iron ore miners BHP, Rio Tinto, Fortescue Metals Group and Roy Hill have announced decisions to purchase electric trains for their Pilbara operations. BHP and Rio Tinto estimate that transitioning their entire fleet of rail locomotives would substantially reduce their carbon emissions in the Pilbara

by an estimated 20 to 30%. Trialling of the trains is set to commence from 2023.

BHP and Rio Tinto have partnered with leading manufacturers of construction and mining equipment, including Caterpillar (BHP and Rio Tinto) and Komatsu (Rio Tinto) to develop and deploy zero-emission mining trucks.

Further, Fortescue Future Industries is developing the technology and energy supply to decarbonise Fortescue Metals Group by 2030, including developing an in-house haul truck to test battery electric and hydrogen fuel cell technology.

Renewable energy

The mining industry is leading the way in the adoption of renewable energy. Global gold producer Gold Fields Limited was the first mine in Australia to install wind turbines as part of a new microgrid system at its Agnew gold mine. The system also includes solar, gas and battery storage to provide the mine with an average of 50-60% renewable energy.



Minderoo Foundation

Established by Andrew and Nicola Forrest in 2001, Minderoo Foundation is a modern philanthropic organisation seeking to break down barriers, and drive positive, lasting change. Minderoo Foundation is proudly Australian, with more than \$2.7 billion committed to a range of global initiatives, spanning from ocean research and ending modern slavery, to collaboration against cancer and community projects. Minderoo Foundation's mission is to arrest unfairness and create opportunities to better the world.



Community support

Western Australia's mining and METS sector is committed to advancing social ambitions through contributions to our economy and community. Even throughout the COVID-19 pandemic, the mining and METS sector demonstrated ongoing commitment through a range of support measures, including highlights such as:

- » A commitment of over \$220m from the Minderoo Foundation with additional support from Fortescue Metals Group Limited to procure and distribute vital medical supplies to the local Western Australian community, personal protective equipment (PPE) for the Commonwealth Government and increase more than four-fold Australia's COVID-19 PCR testing capacity in the critical time prior to vaccines being available.
- » Rio Tinto's \$41 million contribution to community initiatives across Western Australia in 2021, which included significant in-kind logistics support to the community COVID response and vaccination campaign. Rio Tinto has also committed to invest \$15 million in The Royal Flying Doctor Service as part of a six year partnership extension to support health for regional, rural and remote communities in Western Australia.
- » BHP established a \$50 million Vital Resources Fund to keep critical regional services functioning during COVID-19 and strengthen community recovery. This followed BHP's earlier commitment to reduce payment terms for small, local and Indigenous businesses and employ a further 1,500 people to support its Australian operations during the height of the pandemic.



Space industries



Western Australia has played a vital role in the global space industry for 60 years. The state's highly skilled and diverse workforce supports over 100 companies operating in space-related sectors in Western Australia. Being located in the southern hemisphere, Western Australia is ideal for space situational awareness and networks requiring global coverage of space assets. The state is also well positioned geographically for ground stations and satellite ranging telescopes.

In 2018, the Australian space sector was worth around \$3.9 billion and supported approximately 10,000 jobs. The Australian Government's goal is to grow the sector to \$12 billion with an additional 20,000 jobs by 2030.

Western Australia is home to 2 key space research centres, Curtin University's Space Science and Technology Centre and the University of Western Australia's International Space Centre. To support the advancement and growth of the state's space industries, the Western Australian Government has signed a Memorandum of Understanding with the Australian Space Agency, which assists with the establishment of the:

- » Australian Space Data Analysis Facility at the Pawsey Supercomputing Research Centre in Western Australia, which supports analysis of satellite data for other sectors including mining, agriculture, emergency services and maritime surveillance.
- » Australian Space Automation, Artificial Intelligence and Robotics Control Complex which will be a world-leading facility for businesses and researchers to develop, test and operate robotics, automation and artificial intelligence in space for satellites, space stations and on the Moon or Mars.

Western Australian companies and research institutions are delivering significant activity and maintaining capabilities in all of the National Civil Space Strategy priority areas, which are targeted activities that build on Australia's areas of strength and address national space-related challenges. In particular, Western Australian industry is leading the way in ground-based satellite and deep space communications, data processing and analysis, space situational awareness, Earth observation, satellite development, robotics and world-leading remote operations.

Through innovation, research and technology, Western Australia's space industries are able to help build more resilient and sustainable practices that achieve environmental outcomes. Remote operation capabilities developed by the state's space industries have been applied in other sectors to provide cross-sector benefits in agriculture, minerals exploration and offshore oil and gas operations. For instance, drone technology is assisting Western Australia's primary industries to adopt precision farming and digital agriculture. Further, mining and METS industry leaders are forging the way to upgrade infrastructure through the use of robotics. These remote operation capabilities are helping other sectors to increase efficiencies while promoting safer and more sustainable practices.



Woodside Energy Group Limited (Woodside Energy) / National Aeronautics and Space Administration (NASA)

Woodside Energy, the largest energy company listed on the ASX, is working in close collaboration with NASA to trial remotely operated vehicles and machinery. Currently, Woodside Energy is working with a NASA Robonaut to test initial ideas from across its business to explore opportunities for robotics to work successfully and safely, side-by-side with people, to make its operations safer and more efficient. This case study demonstrates partnership to achieve technological development and showcases industry efforts to create safer working environments and future jobs.



Fugro SpAARC

Fugro, world-leading geo-data specialists, were selected by the Australian Space Agency to design, build and operate the Australian Space Automation, Artificial Intelligence and Robotics Control Complex (SpAARC) in Western Australia. SpAARC aims to provide flexible and cost-effective solutions to meet the operational needs of current and future missions, both terrestrial and in space. Through SpAARC, remote and autonomous marine vessels, submersible robots and space robotic assets can be operated from Perth. Replacing more traditional, larger manned vessels, remote and autonomous marine vessels have been used to inspect gas trunklines in the North West of Western Australia. Over a one-month project, Fugro was able to significantly reduce diesel consumption which resulted in a 97% reduction in CO₂ emissions.



Australian Remote Operations for Space and Earth (AROSE)

AROSE is a not-for-profit, industry-led consortium headquartered in Perth and supported by the Western Australian Government. AROSE maintains a vision for Australia to be the leading global providers of remote operations on Earth and in space. Among other things, AROSE is exploring opportunities with satellite communication companies to deploy remote communications and support data capture from in situ sensors in remote communities in Western Australia. In addition, AROSE is collaborating with resources companies and satellite companies to explore opportunities for the wider deployment of earth observation technology and to minimise their footprint.



The Square Kilometre Array (SKA) Project

The SKA is a global mega-science project to build the world's largest and most capable radio telescopes. As part of the project, Western Australia will host the SKA-low telescope that will spread across 65 km and consist of 131,072 antennas. The Western Australian Government is partnering with industry to support the SKA Project, including by funding the joint venture between Curtin University and The University of Western Australia, the International Centre for Radio Astronomy Research (ICRAR).

Contributing to social and environmental outcomes

The SKA and ICRAR are advancing social and economic outcomes, including for Aboriginal people. To date, numerous contracts have been awarded to Traditional Owners to assist with the establishment of the site. The SKA

Observatory will continue to build on this into the future by involving Traditional Owners over the 50-year project. Other support will include contract opportunities for Aboriginal people and businesses, supporting Aboriginal internships and promoting Indigenous astronomy. Further, the SKA will create future-proofed jobs, contribute to research and innovation, and help to promote science, technology, engineering and mathematics.

From an environmental perspective, ICRAR is supportive of energy-efficient designs and renewable energy options for the SKA and precursor telescopes. In addition, ICRAR is currently translating SKA technology and know-how to communication systems, space debris monitoring and environmental monitoring.



Health and medical life sciences



Western Australia's health and medical life sciences sector has experienced significant growth in recent years, creating and exporting world-leading innovations that improve health outcomes for the state, nationally and globally. AusBiotech's Australian Biotechnology Sector Snapshot 2022 reports that Western Australia's life sciences sector includes 244 organisations.

The Western Australian Government supports industry through multiple endeavours, such as the [Health and Medical Life Sciences Industry Strategy](#), which builds on current initiatives to strengthen and position the sector as a world-leading, sustainable and value-adding industry. The Western Australian Government also funds a range of innovative research proposals designed to benefit the health of Western Australians.

Western Australia has strong health and medical research capabilities underpinned by 5 world-class universities and leading medical research institutes such as the Telethon Kids Institute, Harry Perkins Institute of Medical Research, Lions Eye Institute, Australian National Phenome Centre and Perron Institute for Neurological and Translational Science. All of these institutions play a role in contributing to medical research and advancing health outcomes and well-being for all communities.

The Queen Elizabeth Medical Centre (QEI), is Western Australia's largest hub of life science organisations and one of the largest medical centres in the southern hemisphere. With more than 40 organisations based at QEI, the cluster fosters co-location benefits including a start-up ecosystem supported by clinical and research infrastructure, as well as talent and capability sharing opportunities.

Through the state's research capability, innovation and key partnerships, Western Australia's health and medical life sciences sector is able to contribute to social achievements, including by developing medicines and treatments for all.

Further, Western Australia's health and medical life sciences sector is exploring innovative options to deliver quality and accessible health care services. With the support of the Western Australian Government through the [WA Health Digital Strategy](#), opportunities for clinicians to practice and prepare for complex procedures using augmented and virtual reality technologies are being investigated.

Western Australia is on track to become an internationally recognised leader in health and medical life sciences with its world-class research base, robust ethical and regulatory environments, entrepreneurial talent and commercialisation track record.



VeinTech Pty Ltd (VeinTech)

VeinTech is on a mission to improve the cannulation experience. Cannulation is often the first procedural step in a patient's clinical care journey, but can create issues if clinicians fail to find the right vein, including pain, anxiety, health complications and delays to critical treatments. VeinTech is currently in product development to solve this issue and reduce the resulting impact on patients and health care providers around the world.

After winning the Perth Biodesign program in 2019, Nikhilesh Bappoo, Nicholas Buckley & Dr Katherine Arenson have been pushing forward with their award-winning design concept. With their bench prototype completed and alpha prototype in development, VeinTech are positioned to reduce the high rate of first pass cannulation failure occurring globally through their portable hand-held vein imaging device, the VeinWave.



VitalTrace Pty Ltd (VitalTrace)

VitalTrace, a Perth-based start-up, is developing a novel biosensor device to improve the childbirth process for mothers, clinicians and babies. Real-time and reliable data about babies' oxygenation and wellbeing during childbirth can play a critical role in improving birth outcomes. VitalTrace is leading a project to develop an accurate wireless biosensor that circumvents the need for traditional blood sampling diagnostics to obtain reliable information about oxygenation. VitalTrace's technology is being developed as a device to be manufactured in Australia at scale for the global market.



Contributing to health outcomes

Western Australia's health and medical life sciences sector contributes to improved health outcomes for all. Through ongoing research and innovation, the sector is able to continue to advance this social ambition and build on its outstanding achievements to date, which include:

- » Nobel Laureates Professor Barry Marshall and Dr Robin Warren discovering the role of the *Helicobacter Pylori* bacterium in causing stomach ulcers. Professor Marshall founded medical device company Tri-Med to market ulcer diagnostics globally.
- » Professor Fiona Wood's invention of spray-on skin for burns victims, which was subsequently commercialised by regenerative medicine company, Avita Medical.
- » Professor Fiona Stanley AC and Carol Bower, two eminent Western Australian researchers, who made a landmark discovery about the vital role of maternal dietary folate in early pregnancy in reducing the risk of neural tube defects (NTD) such as spina bifida. They followed their research up with decades of campaigning and advocacy, leading to national mandatory fortification of wheat flour for bread making in 2009. Following the change, there was a significant 14.4% national decline in NTD.



Primary industries



Western Australia's vast size, extensive coastline, varied landscapes and diverse climate zones allow industry to produce a diverse range of high-quality agricultural, fisheries and food products. Our primary industries contribute approximately \$10 billion to Western Australia's economy every year. The sector supports over 30,000 jobs in farming, fisheries and forests, with another 18,800 related jobs in food and beverage manufacturing.

From transformational farming systems to sustainable and ethical fisheries management, Western Australia's primary industries are world leading. Western Australia is one of the most pest-free and disease-free agricultural production regions in the world, and 98% of Western Australia's fish stock were assessed in 2019-20 as 'not at risk' or vulnerable through exploitation.

Supporting Western Australia's primary industries is a strong regulatory framework that provides for high standards in sustainable production, labour relations, water management, animal welfare and biosecurity. In addition, a range of Western Australian Government initiatives lend further support that contribute to industry's ESG outcomes, including:

- » the \$15 million [Agricultural Climate Resilience Fund](#), which will support projects that develop resilience to changes in climate

- » the \$15 million [Carbon Farming and Land Restoration Program](#), which offers support to the sector to realise its potential to sequester carbon in the landscape
- » [Western Australia Soil Health Strategy](#), which guides the future for managing, protecting and improving the state's vast soil and land resources over the next 10 years.

The state's primary industries are also supported at a national level through programs such as the Australian Government's \$100 million Future Drought Fund, which will see farm business resilience and regional drought resilience programs rolled out across Western Australia.

Regenerative agriculture is seeing Western Australia's primary industries adopt more sustainable management practices and efficient use of natural resources. Through practices such as carbon farming, primary industries are looking at ways to increase the amount of carbon stored in soil and vegetation and reduce greenhouse gas emissions produced from livestock. In addition, the number of Human Induced Regeneration carbon farming projects on pastoral estates continues to grow, with 91 projects registered by April 2022.

Western Australian farmers are also looking into renewable energy options to improve



self-sufficiency. There are a number of projects underway that support the transition away from diesel-powered energy generation to solar power and battery storage, saving farmers thousands of dollars a year as well as creating more sustainable practices.

Western Australia's primary industries also support the delivery of social outcomes. Organisations like the Noongar Land Enterprise Group, located in Western Australia, is the first of its kind in Australia and works in partnership with Traditional Owners to drive industry and land-based enterprises and promote agriculture and business opportunities for the benefit of Aboriginal communities. This supports the economic participation of Aboriginal people, which preserves cultures, brings prosperity, higher standards of living and pride, as well as enabling families to remain together on-Country.

From life on land to life below water, Western Australia's primary industries continually strive for enhanced ESG outcomes.



Dutjahn Sandalwood Oils Pty Ltd

Dutjahn Sandalwood Oils Pty Ltd (Dutjahn), is a Western Australian sandalwood oil distillation company backed by Dutjahn Custodians, Kutkabbuba Aboriginal Corporation and the founders of WA Sandalwood Plantations. Dutjahn sustainably harvests sandalwood, and distils and exports oil for use in the global perfume market. Through its operations, Dutjahn supports local livelihoods and promotes equity and inclusions for Aboriginal Australians, including through its governance and ownership structure, which is 50 % owned by Aboriginal Australians. In 2019, Dutjahn won the United Nation's Equator Prize in recognition of the company's initiatives for community, climate action and Aboriginal people.



Aboriginal Pastoral Academy

The Aboriginal Pastoral Academy provides young Aboriginal people with practical experience, as well as foundational employability and life skills required to be job-ready in the pastoral industry. The Academy was developed in response to industry requests to provide a supported career path for young Aboriginal people and a skilled, entry-level cohort to add to the pastoral industry workforce. A new partnership between Nyamba Buru Yawuru's Warrmijala Murrgurlayi (Rise up to Work) Sustainable Employment Program, the Kimberley Pilbara Cattlemen's Association, industry and the Western Australian Government, is expected to take the academy to the next level in years to come.



Carbon neutral practices

Harvest Road – Leeuwin Coast

In 2020, Harvest Road's Leeuwin Coast shellfish became Australia's first-ever carbon neutral aquaculture products. Leeuwin Coast shellfish are accredited Carbon Neutral by Climate Active, a partnership between the Australian Government and industry that encourages voluntary climate action. Carbon Neutral certification is only given to entities that meet the Climate Active Carbon Neutral Standards to cancel out the emissions generated by their activities.

Cullen Wines

In addition to being 100% carbon positive, where its soil sequesters more carbon than its business emits, and water self-sufficient, Cullen Wines is also solar powered up to 40% through its own panels and the remainder through Synergy Natural Power, which is generated via solar and wind renewable sources.



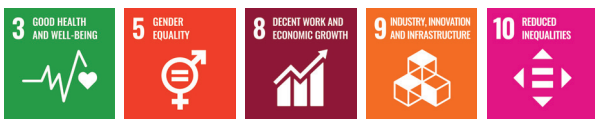
Western Australia's grains industry and the Wheatbelt region

Western Australia's grain industry has a track record of being innovative and responsive to market conditions. Through new and improved genetics, agronomic techniques and key partnerships, industry is responding to changes in climate and exploring ways to be more sustainable:

- » CBH Group (CBH), a co-operative owned and controlled by Western Australian grain growing businesses, has exported over 10 million tonnes of Western Australian sustainable-accredited canola to the European biofuels market through the International Sustainability and Carbon Certification (ISCC) EU certification. CBH has expanded its ISCC sustainability certification to barley, wheat, lupins and oats.
- » A \$22 million Western Australian research project is exploring ways to re-engineer soils to improve water holding capacity. This project is part funded by the Grains Research and Development Corporation and the Western Australian Government.
- » INPEX CORPORATION, ANZ and Qantas Airways Limited have entered into a Memorandum of Understanding to investigate a Wheatbelt project involving the development of a large-scale, native reforestation process to support land care solutions and integrated carbon farming. The project also includes an investigation into a renewable biofuel business integrated with sustainably harvested native biomass and agricultural waste residues for the purpose of producing a low carbon intensity biofuel, such as sustainable aviation fuel.



Cross-sector activities



Western Australia delivers a range of cross-sector activities that improve value and productivity across multiple sectors of the economy while also supporting a range of ESG outcomes.

Science, innovation and technology

Through research and development, industry is building its science and technology capability to improve productivity, resilience, competitiveness and adaptability. The Western Australian Government invests in science, innovation and technology through a range of initiatives and partnerships, including:

- » The [Science, Technology, Engineering and Maths \(STEM\) Skills Strategy](#), which aims to support the development of local STEM capability to support the jobs of the future and address ongoing social and environmental challenges.
- » The [New Industries Fund](#), which supports the acceleration of new and emerging businesses and encourages innovation to thrive, including start-ups like Binary Crate Pty Ltd, an education technology company aspiring to bridge the widening gap in STEM education through its online learning platform.

- » Joint investments with the Australian Government in the delivery of Cooperative Research Centres that seek to solve industry problems, create new business opportunities and provide a platform for new industries to emerge and thrive.

Western Australia's priority sectors draw on strong local science, research and innovation to ensure they are future-proofed. This translates into economic opportunities and a readiness to lead in key ESG areas. In particular, advances in science, innovation and technology support Western Australia's energy transition, environmental stewardship, and social accountability as well as:

- » continuous improvement in health and wellbeing outcomes for all Western Australians
- » quality education and skills, ensuring everyone can develop the skills to embrace a technological future, including traditionally under-represented groups in STEM disciplines such as women and Aboriginal people
- » providing the evidence base on which to make informed decisions for the future of our community and environment, including sustainable strategies for managing our environment and resources.



A pipeline of promise

There is a continually growing pipeline of promising, early-stage companies in Western Australia whose operations advance social ambitions and leverage science, innovation and technology. Examples include:

- » the development by OncoRes of a handheld imaging tool and console to help surgeons better identify and remove all cancerous breast tissue in the first surgery
- » Artrya's artificial intelligence solution which increases the accuracy of identifying patients at risk of coronary artery disease, resulting in faster, better treatment.



Pawsey Supercomputing Research Centre

The Pawsey Supercomputing Research Centre (Pawsey) is an unincorporated joint venture between the Commonwealth Scientific and Industrial Research Organisation, Curtin University, Edith Cowan University, Murdoch University and The University of Western Australia. It is supported by the Western Australian Government and the Australian Government, and is based in Perth.

Currently home to 200 research projects, Pawsey's services and expertise in supercomputing, data, cloud services and visualisation enables research across a spread of domains and sectors, including astronomy, life sciences, medicine, energy, resources and artificial intelligence. The below examples illustrate Pawsey's cross-sector adaptability.

Contributing to quality health outcomes through research and advancement

Doctor Janis Nolde is using Pawsey facilities to explore the opportunity to train machine learning algorithms using datasets of

patient conditions from before, during and after surgery, including markers of myocardial injury in the blood, to see if they can accurately estimate an individual's risk of post-operative cardiac complications.

Building research capability and advancing the space sector

Pawsey supercomputers have helped researchers track the original location of a group of meteorites from Mars. The study, led by Dr Anthony Lagain from Curtin's Space Science and Technology Centre, worked with a database of 90 million impact craters compiled from a machine learning algorithm running on Pawsey's Magnus supercomputer. While the findings from the study are significant by themselves, the algorithm and supercomputing method used has important implications for future astronomy research given that the algorithm may be retrained to automatically map any celestial body — including Earth.



WA Biodiversity Science Institute (WABSI) and WA Marine Science Institution (WAMSI)

As unincorporated joint ventures supported by the Western Australian Government, WABSI and WAMSI provide leadership and coordination in the delivery of end-user focussed research.

WABSI and WAMSI bring together state and federal governments, industry, the tertiary sector and community (including Traditional Owners) to identify knowledge gaps and coordinate research that helps inform sustainable development, environmental management and the conservation of our terrestrial and marine assets.

The Information Management Program led by WABSI, together with WAMSI and other partners, has informed Western Australia's approach toward the management of public and private sector biodiversity information. This has led to the development of online platforms such as the Index of Biodiversity Surveys for Assessments and the Biodiversity Information Office which make publicly available environmental data and in turn support streamlined proposal development, environmental assessment and regulatory decision-making.

The WAMSI-led Dredging Science Program of research has placed Western Australia as a global leader in the field. Research findings have been implemented globally, and have enhanced the capacity of government and the private sector to predict and manage the environmental impact of dredging.

Advanced manufacturing

Advanced manufacturing enables industry to offer exceptional technical solutions and services that are innovative and competitive.

Although Western Australia already has advanced manufacturing capabilities across the majority of the 8 priority sectors, work is needed to scale up these capabilities. With a highly skilled and technical workforce, industrial capability, production capacity, and the government and industry commitment necessary to foster emerging industries, Western Australia is well positioned to grow its advanced manufacturing ambitions.

The Western Australian Government supports industry to develop its advanced manufacturing capability, including through the \$180 million [Investment Attraction Fund](#), the [Local Capability Fund](#), the Local Manufacturing Investment Fund and facilitating the establishment of the Global Advanced Industries Hub.

From an ESG perspective, advanced manufacturing contributes to more inclusive and sustainable industrialisation. Value-adding clean manufacturing, along with automation and digitisation, contributes to the state's energy transition towards a low-carbon economy as well as creating future-proofed jobs and economic growth.



Global Advanced Industries Hub

The Western Australian Government has committed to the transformation of the Western Trade Coast into a Global Advanced Industries Hub, to position the area to capture the global opportunities currently on offer and cement Western Australia in the global supply chains of the world's emerging industries.

The Western Trade Coast is a major industrial precinct in Perth's south metropolitan area and is already home to a unique ecosystem of interconnected supply chains from established and emerging industries, including critical minerals, chemical manufacturing, hydrogen and defence. Located only 30 minutes south of Perth, it covers 3,900 hectares of land, including the Australian Marine Complex, Kwinana Industrial Area, Rockingham Industry Zone, Latitude 32 and it is the chosen location for Western Australia's new primary container port, Westport. Project planning for Westport is following the Permanent International Association of Navigational Congresses' Working with Nature approach to ensure that every effort is made to avoid, minimise or offset any potential environmental impacts from the new port and infrastructure network.

Business activities across the Western Trade Coast region are a major contributor to the economy. The region currently employs 10,000 direct workers and contributes more than \$15 billion per annum to Western Australia's economy. Critically, the region accounts for 2% of Western Australia's Gross State Product, contributing over a third of all value added in the state's manufacturing sector.

A key focus of the transformation will be the adoption of renewable energy, progressing the state's ambitious net zero emissions target and bolstering Western Australia's ESG credentials and expertise, to support continued engagement with international markets and investors. The establishment of the Global Advanced Industries Hub will highlight Western Australia's robust environmental regulations and the state's growing capability in the renewable energy sector. Hydrogen, critical minerals and batteries, carbon capture, utilisation and storage as well as infrastructure upgrades to transform the power grid are expected to play a transformative role in the energy transition for the area.

From a social perspective, the Global Advanced Industries Hub will support improved economic and social outcomes for Aboriginal people, the local community and Western Australians.



Support for Investors

To support the state's economic diversification agenda, the Western Australian Government has established Invest and Trade Western Australia to promote the state's unique strengths and diverse industries and provide a one-stop shop for incoming trade and investment enquiries.

Through a network of local and international offices, Invest and Trade Western Australia helps investors to navigate the state's investment and trade ecosystem and assists local businesses to access foreign markets.

The Western Australian Government operates international investment and trade offices across 5 regions:

- » ASEAN
- » China
- » India-Gulf
- » North East Asia
- » United Kingdom/Europe

Further information on Invest and Trade Western Australia can be found at www.investandtrade.wa.gov.au



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