



Australian Government
Australian Trade and Investment Commission

Australian Critical Technologies Prospectus



AUSTRALIA

About Austrade

The Australian Trade and Investment Commission (Austrade) accelerates the growth of exporters, attracts foreign direct investment and is responsible for Australia's tourism policy, its programs and THRIVE 2030 - the national strategy for the long-term sustainable growth of the visitor economy. We also lead the nation's international promotion of Australian education and produce Australia's official statistics on tourism.

2,009 export outcomes with an estimated value of **\$4.5 billion** for the 2023-24 financial year

At Austrade, government policy becomes a reality through the creation of commercial outcomes. Our network of experts, in more than 100 offices at home and around the world, help give Australian businesses the competitive edge in the global marketplace. In financial year 2023-24, we worked with Australian businesses to secure over 2,099 export outcomes with an estimated value of \$4.5 billion and facilitated 159 foreign direct investment projects valued at \$11.5 billion, creating or safeguarding more than 12,189 jobs.

With 18 active free trade agreements worldwide, we continue to forge new pathways for exporters and foreign investors, and through helping achieve net zero and supporting First Nations businesses, we are strengthening Australia's economic security and prosperity. We're also working with business and state and territory governments to implement the THRIVE 2030 strategy and are on track to achieve \$230 billion in expenditure by 2030. Our local knowledge, commercial expertise and trusted relationships with decision-makers make the difference. Go further, faster with austrade.gov.au.

Austrade thanks the Department of Industry, Science and Resources and the states and territories for their input into the Prospectus.

CEO's foreword



The 2024 Australian Critical Technology Prospectus provides a clear snapshot of Australia's thriving critical technology landscape. It showcases seven technology fields deemed critical by the Australian Government, including advanced manufacturing; artificial intelligence (AI); advanced ICT; quantum technologies; autonomous technologies; biotechnologies and clean energy generation and storage technologies.

The Prospectus shares insight on the size and geographic spread of these seven fields and provides evidence of specific capabilities that give Australian technology companies and investors in Australia a globally competitive advantage.

It also specifies the drivers of those capabilities, including innovation, strategic partnerships and research and development and includes examples of Australian business success stories.

Importantly, the Prospectus answers the question of "Why Australia?" for foreign businesses, industry associations, foreign funding organisations and governments looking for critical technologies partnerships.

In 2023, Australia attracted \$11 billion in foreign direct investment in critical technologies – more than one-third of all foreign investment in Australian technology. The level of investment reflects Australia's reputation as a leader in the development of game-changing technological advances. It speaks to our reputation as a stable trading partner with a highly skilled workforce.

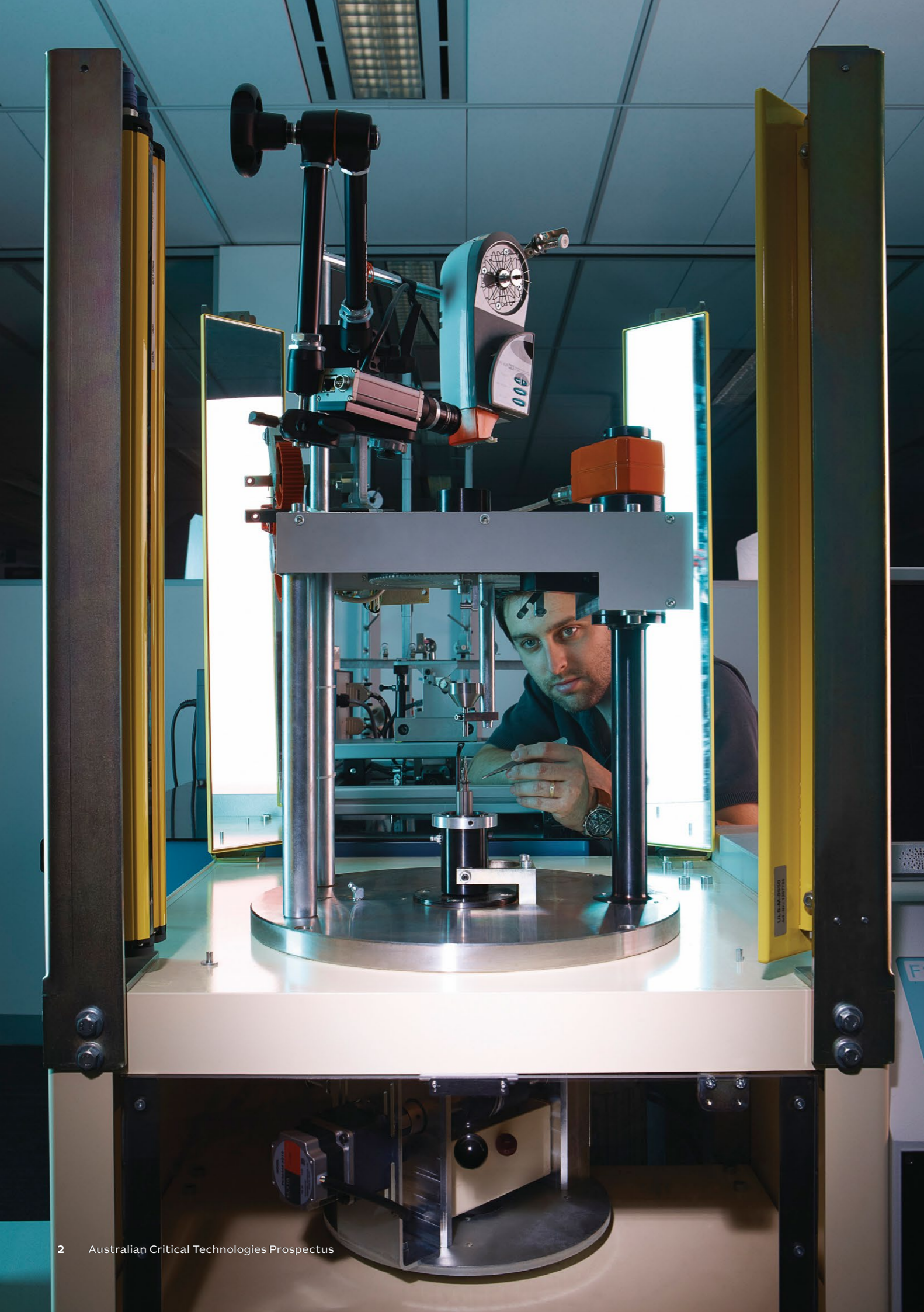
In addition, there is a supportive policy environment with key policies and incentives including through the Australian Government's ambitions for a Future Made in Australia and the \$15 billion National Reconstruction Fund.

The Australian Trade and Investment Commission (Austrade) is the Australian Government's export and investment attraction and promotion agency. With offices around the world, Austrade helps connect Australia's world class critical technology businesses and opportunity with global partners.

Please engage with your local Austrade teams for more information.



Xavier Simonet
Chief Executive Officer, Austrade



Contents

Why Australia for critical technologies	04	Biotechnologies	46
Artificial intelligence technologies	10	Clean energy generation and storage technologies	54
Advanced ICT	18	Quantum technologies	62
Advanced manufacturing and materials technologies	26	References	72
Autonomous systems, robotics, positioning, timing and sensing technologies	36		

All figures used in the report are Australian dollars unless otherwise specified.

Disclaimer

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Before engaging with any company referred to in the report, the Commonwealth directs readers to carry out their own due diligence to ensure any company referred to in the report meets the specific business needs of the reader. Information used in case studies is based on public and confirmed information only.

Acknowledgement of country

In the spirit of reconciliation we acknowledge the Traditional Custodians of country throughout Australia and their connections to land, sea and community. We pay our respect to their elders past and present and extend that respect to all Aboriginal and Torres Strait Islander peoples today.

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Why Australia for critical technologies.



Critical technologies drive transformation across the economy and society, including in areas such as advanced manufacturing, clean energy, healthcare, defence and national security. These technologies play a pivotal role in shaping a positive, better future.

The Australian Government has identified the following technology fields as Australia's critical technologies:



Artificial intelligence (AI) technologies



Advanced information and communication technologies



Advanced manufacturing and materials technologies



Autonomous systems, robotics, positioning, timing and sensing



Biotechnologies



Clean energy generation and storage technologies



Quantum technologies

Australia is an exporter of critical technologies at the forefront of global innovation. Australian critical technology companies deliver results for industries, companies and governments around the world.

Australia is a trusted, reliable trading partner. Trade represents almost half of Australia's GDP and, as an export driven economy, Australia has modern free trade agreements and international partnerships to encourage investment and seize global opportunities.¹

Global partners seek out Australian critical technology solutions – partnering with local companies and institutions to deliver faster, better results and facilitating the seamless integration of Australian technologies into global markets.

Australian critical technology companies are backed by a robust research and development ecosystem, grounded in world-class universities and research institutions, and a history of groundbreaking technological advances.

Australia's proximity to Asia Pacific markets and strong trade linkages to the US, the UK and the EU make us a gateway for local and global companies to grow.

Australian critical technology products are developed within strong regulatory and policy frameworks, meeting high standards of quality and safety. The Australian Government has set out its vision for embracing opportunities and managing risks of critical technologies in the *Critical Technologies Statement*.

Australia's critical technologies



Artificial intelligence (AI) technologies:

AI technologies combine large amounts of data with intelligent algorithms to autonomously solve problems and generate content. Example technologies include machine learning, AI algorithms and hardware accelerators, and natural language processing.

Australian companies use AI to transform fundamental technologies used by industry and society including in health diagnosis, agriculture and the defence industry. Australia's AI advantage is underpinned by a highly skilled and experienced software talent pool and significant data infrastructure capabilities.



Advanced information and communication technologies (ICT):

Advanced ICT integrate telecommunications, computers and software to secure, process and transfer data at greater speed and volume. Example technologies include advanced data analytics, high-performing computing and protective cyber security technologies.

Australian innovation drives new developments in industry and telecommunications including faster internet, improved cyber security, and the development of cloud computing. Australia's advanced ICT success is built on a track-record of novel technology development and cutting-edge research.



Advanced manufacturing and materials technologies:

Advanced manufacturing technologies are used to manufacture and modify materials to improve their performance. Example technologies include additive

manufacturing, such as 3D printing, critical minerals extraction and processing, and advanced composite materials.

Australia pioneers advanced manufacturing technologies in major industries such as defence, health and clean energy. The Australian Government has made significant investments to drive advanced manufacturing across the country including through the Future Made in Australia commitment.



Autonomous systems, robotics, positioning and timing, and sensing:

Autonomous technologies are machines capable of performing tasks and precisely measuring data with minimal human intervention. Example technologies include advanced robotics, autonomous systems operation technology, and drones, swarming and collaborative robots.

Australia's world leading capabilities in mining, agriculture, defence and space drive cutting edge autonomous technologies, including in mining safety and efficiency, on-farm productivity and nanosatellite capability. Australia's autonomous technologies are developed by top research institutions with demand driven by a large and sophisticated customer base in established Australian industries.



Biotechnologies:

Biotechnologies harness cellular and biomolecular processes to improve our health, wellbeing, economy and environment. Example technologies include synthetic biology, including biological manufacturing, novel medicines, and genome and genetic sequencing and analysis.

Australia is home to some of the world's leading biotechnology companies. Our biotechnology sector is at the forefront of

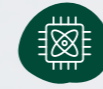
global medical research and innovation including in new medicines and treatments, vaccine manufacturing, and clinical trials. Australia is a preferred destination for clinical trials.



Clean energy generation and storage technologies:

Clean energy technologies provide low emission ways to capture, generate, store and use power, and balance energy production with demand. These technologies include emissions reduction technologies, advanced energy storage, and large-scale renewable energy generation.

Australia has the natural resources, innovation, expertise and investment required for the transition to net zero. Australian clean energy technologies are delivering large scale battery storage solutions, novel decarbonisation innovations, and energy export technology.



Quantum technologies:

Quantum technologies leverage the unique characteristics of matter and light to build advanced technologies that would otherwise seem impossible. Example technologies include quantum computing, post-quantum cryptography, and quantum communications.

Australian quantum technologies are transforming industries including mining (where quantum sensors are used to detect minerals), managing complex timetabling and networking across public transport services, and providing data security and communication solutions to major global banks.

Australia's quantum sector is home to world-leading startups, investment and research.

Australia's competitive advantage

Australia's critical technologies are underpinned by:

 <p>A thriving tech and innovation ecosystem. Australia has active venture capital, Australian multinational tech giants, and 21 unicorn startup companies</p>	<p>Advanced digital economy and world-class infrastructure. Australia is top 10 globally for 5G connected devices and data centres, telecoms investment and digital cities</p>
<p>A strategic location for Asia Pacific expansion. More than 70% of Australia's trade is with fast-growing economies in the Asia Pacific</p>	<p>A tech-savvy nation of digital adopters. Australia is rated at the highest stage of digital readiness according to the CISCO Digital Readiness Index</p> 
 <p>Talented and diverse workforce. Australia is top 4 in the OECD for our capacity to attract and retain highly educated workers</p>	<p>Government driving innovation. Australia has incentives and R&D support including \$1 billion for critical technologies under the National Reconstruction Fund</p>

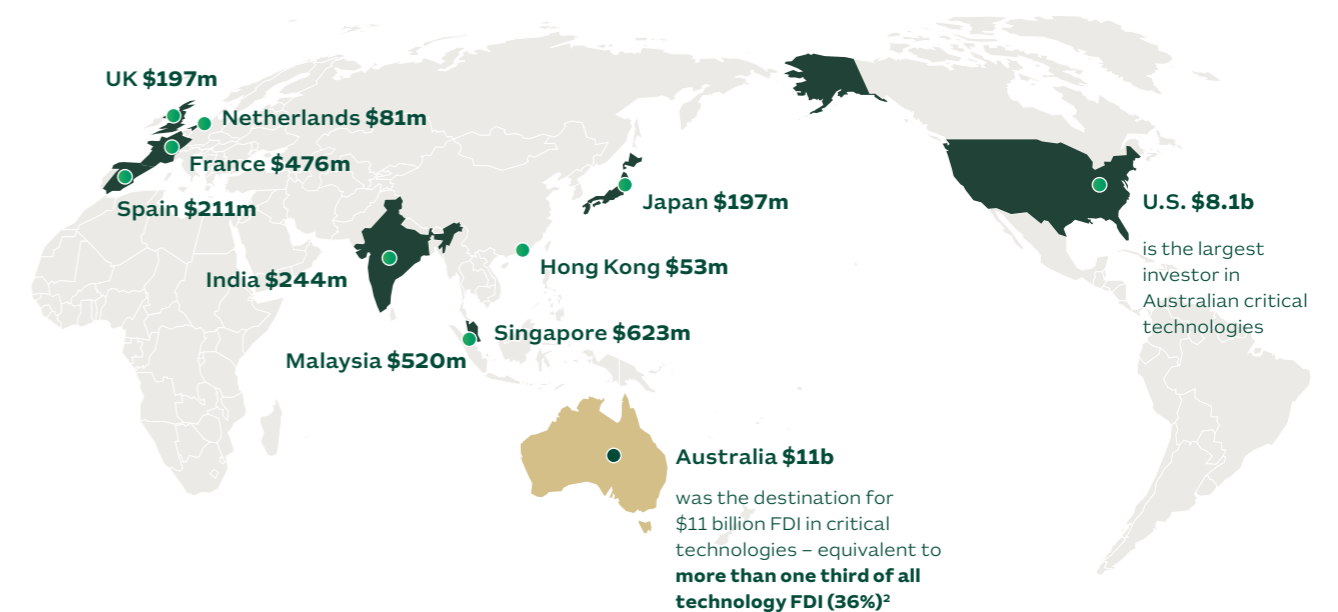
A global trading partner. Australia has 18 active free trade agreements worldwide

An attractive investment opportunity

Australia encourages foreign direct investment and fosters international partnerships and collaboration. Australia's critical technology companies are globally competitive and attracted \$11 billion of foreign direct investment in 2023. **The US is the largest investor in Australian critical technologies, investing \$8.1 billion in 2023, followed by Singapore and Malaysia.**

Australia's top 10 investors in Australia's critical technologies

A\$ foreign direct investment (FDI) announced by source country, 2023¹



² Technology FDI defined as ABS Foreign Investment in Australia at Information and Communication ANZSIC (\$30.3b in 2023)

Artificial intelligence technologies

Artificial intelligence (AI) technologies combine large amounts of data with intelligent algorithms to autonomously solve problems and generate content.



Australian companies use AI to transform the fundamental technologies used by industry and society. Australian AI companies export cutting edge solutions to major economies including the United States, the United Kingdom, Singapore and Canada.³

Australia's AI edge is underpinned by a highly educated and experienced software talent pool.

Australia is a regional hub for AI infrastructure – enabling global technology uptake – including a vast capacity to host data centre infrastructure powered by renewable energy. Data centres provide the computer power and storage capacity required to train, finetune and deploy AI technologies.

The Australian Government is committed to balancing new technology risks with the significant opportunity of AI.

Australia's thriving AI industry

There are **650 AI companies** headquartered in Australia.⁴

AI and automation could generate between **\$170 to \$600 billion** a year towards Australia's GDP by 2030.⁵

In the five years to 2023, foreign investors contributed **\$7 billion** to Australian AI technologies.⁶

There was **\$2 billion in venture capital** invested in Australian AI applications in 2023.⁷

Australian companies use AI to transform fundamental technologies used by industry and society



Health diagnosis

AI-powered solutions help clinicians prioritise their work, boost efficiency and improve the accuracy of diagnoses.

Annalise.ai addresses the twin challenges of increased workloads and limited capacity across the global healthcare system – enhancing patient outcomes in the US, the UK, Europe and Asia.

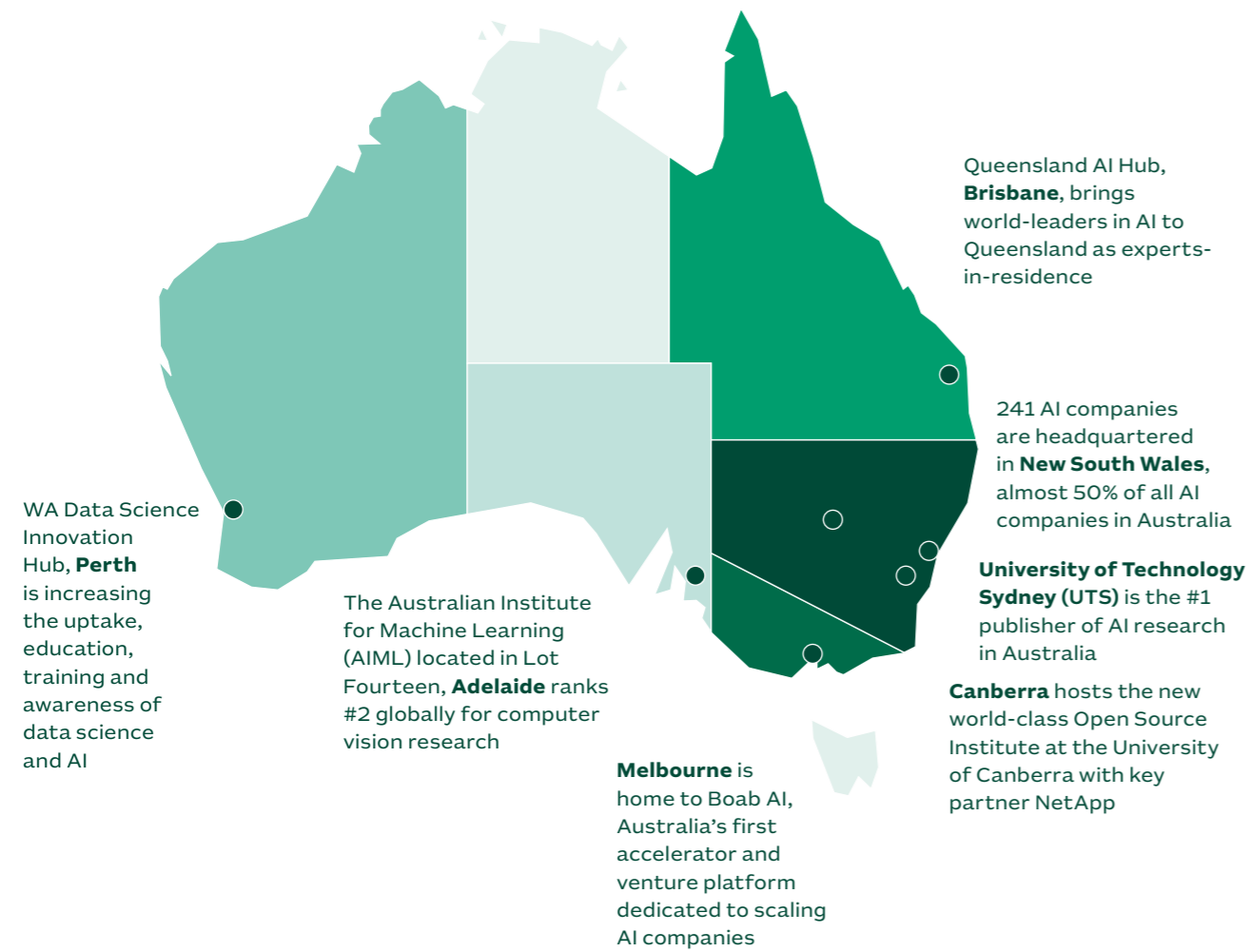


Agriculture management

AI-enabled drones, sensors and satellites collect data to enable farmers to make data-driven decisions.

Sensing+, developed by **The Yield Technology** Solutions, helps large commercial growers make important decisions such as when to plant, feed, irrigate, protect and harvest.

Explore Australia's AI precincts



Microsoft

Microsoft will invest \$5 billion in expanding its cloud computing and AI infrastructure in Australia over the next two years.

This will grow Microsoft's local data centre footprint from 20 sites to 29, spread across Canberra, Sydney and Melbourne.

It will also increase Microsoft's local computing capacity by 250 per cent, enabling it to continue meeting the growing demand for hyperscale cloud computing services.

Microsoft has also committed to help an additional 300,000 Australians gain the skills and capabilities they need to thrive in a cloud- and AI-enabled economy.

Microsoft is partnering with TAFE New South Wales (NSW) to establish the Microsoft Data Centre Academy.



Defence industries

AI can supplement defence technologies to support personnel in high-pressure situations and keep people safe.

Athena AI is one of the only vision-based AI systems on the market that combines AI computer vision, AI enabled decision support and display of the AI information in a user interface.



Supply chain innovation

Young Guns Container Crew, an Indigenous logistics business, has developed an AI-enabled automated packing solution that could increase productivity of packing and unpacking shipping containers by up to 50 per cent. Their design enables previously sequential processes to run in parallel, fully automating the wrapping process, and minimising waiting times and waste.



Improving productivity in recycling

The **Materials Recycling Facility (MRF)**, developed by Cherbourg Council and the Peregrin Digital Hub, is pioneering use of AI by the waste industry. The Facility, a first in a remote Indigenous community, uses AI to identify and sort waste visually and to count items for the purpose of auditing.



Australia is a regional hub for AI infrastructure

Australia's **geographic advantage** includes an expansive land mass, subsea connections, abundant supplies of renewable energy and proximity to Asian markets. This makes Australia a convenient, cheaper and greener option to build data centres relative to other neighbouring markets.

Sydney hosts the third largest data centre in the Asia Pacific region and Melbourne hosts the eighth largest, with Western Australia and the Northern Territory emerging as new data centre locations.⁹

An experienced software talent pool

Australia is in the top four in the OECD for our capacity to attract and retain workers.⁹

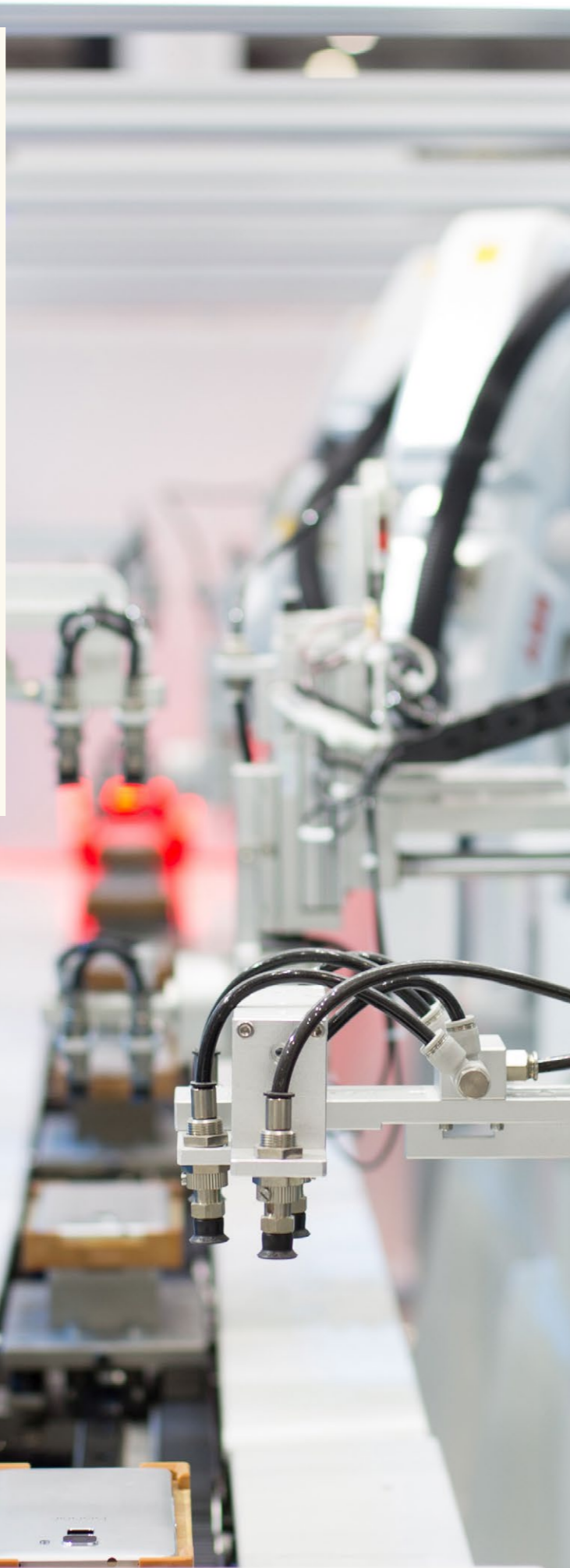
Sydney is home to the highest number of experienced (10+ years) software developers, product managers and cyber security professionals compared to other global tech hubs including Austin, Berlin, Montreal and Denver.¹⁰

Top talent are attracted to Australian universities, with **four universities in the top 100 for AI research**.¹¹

A commitment to responsible AI development

The Australian Government is balancing the risks of new technology with the significant opportunities presented by AI.

The Australian Government has **committed \$40 million to support responsible deployment of AI in the economy** and help to strengthen AI governance and industry capability. This investment includes coordinated development of AI policy across Government, industry analytical capability, and responding to national security risks.¹² Australia is also a founding member of the **Global Partnership on AI**, committed to fostering international collaboration on AI-related priorities including responsible AI, data governance, the future of work, and innovation and commercialisation.¹³



Athena AI



Athena AI's global expansion marks it as an internationally recognised brand, contributing to the innovation landscape in defence technology.

Athena AI is one of the only vision-based AI systems on the market that combines AI computer vision, AI enabled decision support and display of AI information in a user interface.

Athena AI has signed three purchase orders with Original Equipment Manufacturers supplying to the U.S. Department of Defense.

Athena AI's global expansion highlights its commitment to excellence in Unmanned Aerial Systems (UAS), Unmanned Ground Vehicles (UGV), and Battlefield Management.



Advanced ICT

Advanced ICT integrate telecommunications, computers and software to secure, process and transfer data at greater speed and volume.



Australian innovation drives new developments in Industry 4.0, cyber security and telecommunications including new connectivity capabilities, improved cyber security, and the development of cloud computing.

Australian cyber companies provide technology solutions to public and private sector organisations in the United States and the United Kingdom, and across ASEAN, India and Japan.¹⁴

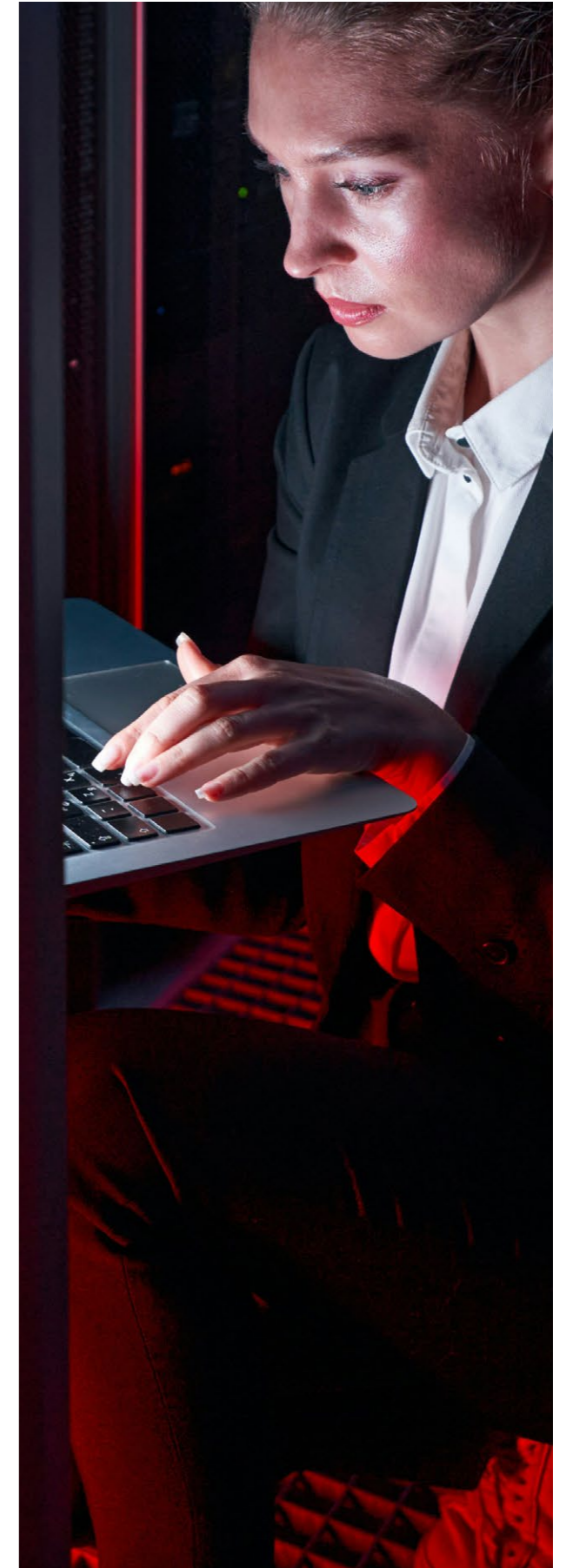
Australia's advanced ICT success is built on a track-record of novel technology development and cutting-edge research.

Australia's thriving advanced ICT industry:

5,535 advanced ICT companies are headquartered in Australia.¹⁵

Australian advanced ICT companies attracted **\$19 billion** in foreign direct investment in the five years to 2023.¹⁶

Australia's advanced ICT industry is worth **\$30 billion**.¹⁷



Australian tech drives new developments in industry, cyber security and telecommunications



New connectivity capabilities

More than 4,000 operational 5G base stations have been established in Australia, driving technology innovation and adoption in regions and industry.

The **Nokia** and **UTS Tech Labs** partnership at the 5G Futures Lab is pioneering new upload capabilities for 5G in industry settings, informing Nokia's global R&D activities.



Global cooperation and capability building

As countries seek to further develop cyber capabilities and raise organisational cyber posture, Australian institutions provide unique, expert opportunities for collaboration.

The **University of Melbourne** has partnered with the **Universiti Kebangsaan Malaysia** to enhance Malaysia's cyber incident response capability. The joint team of researchers will build a reference model to assess practical cyber incident responses in Malaysian organisations.

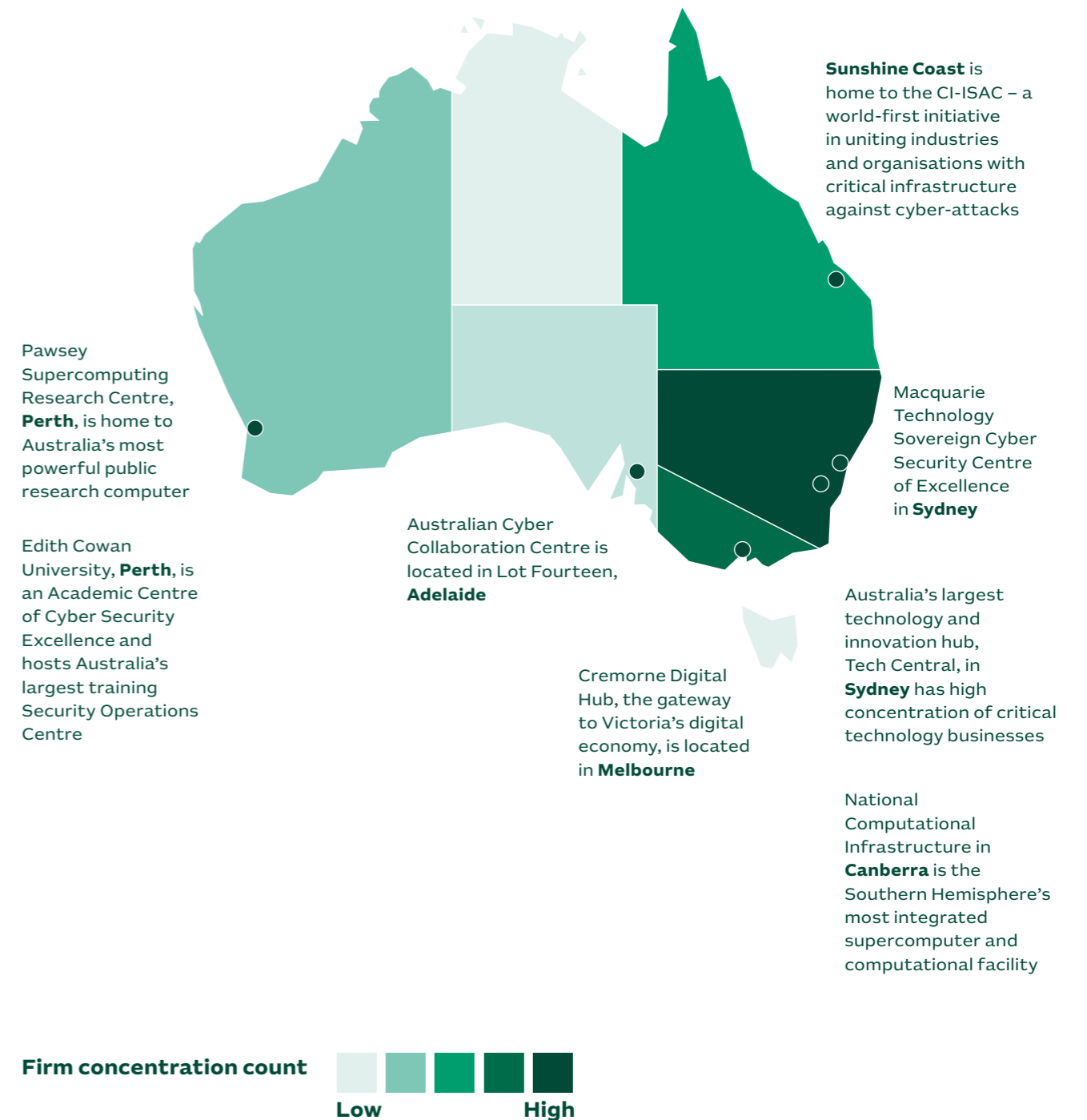


Solving emerging challenges in cyber security

Encryption, intrusion detection systems, behavioural analytics and blockchain technologies secure transactions and provide data protection to cyber threats.

Red Piranha's Crystal Eye XDR (Extended Detection & Response) is a new cyber security approach that provides end-to-end security across all IT and operational infrastructure, including the cloud.

Explore Australia's advanced ICT ecosystem



Nokia and UTS Tech Labs

Nokia and UTS have established the UTS Nokia 5G Futures Lab to expand the boundaries of 5G technology.

Nokia engineers are co-located at the UTS Nokia 5G Futures Lab with UTS academic and technical staff. The teams work together in the multidisciplinary facility on specialised production-grade 5G equipment.

Alongside a live private 5G network for commercial partners and broader industry, the UTS Nokia 5G Futures lab provides an environment for new research opportunities within the ICT sector.

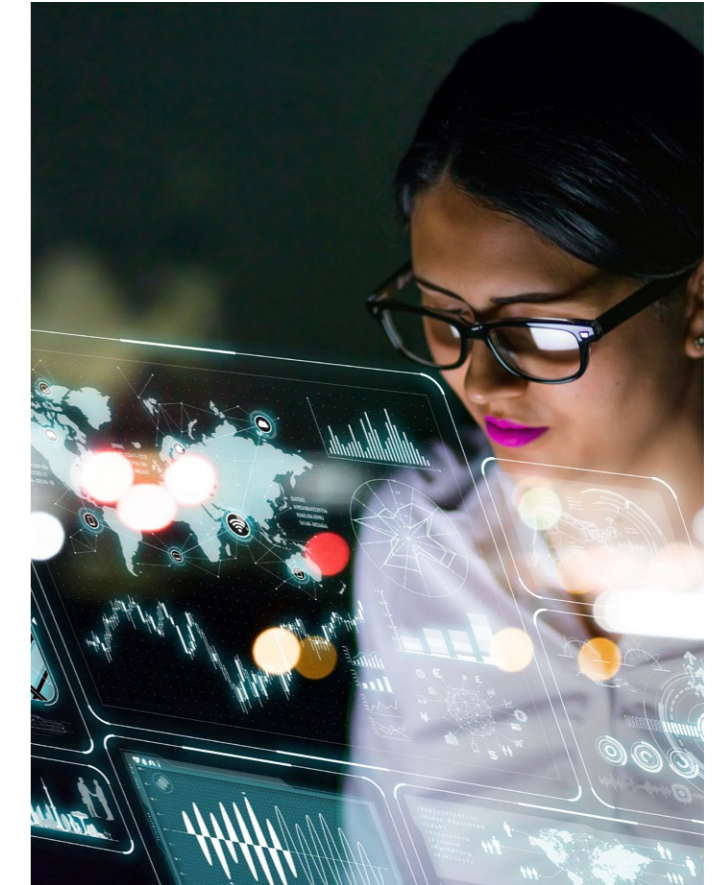
For example, testing conducted during the 5G Connected Cobot project has shown that utilising Nokia's 5G capabilities to offload the processing required from a cobot to a computer "on the edge" extends battery life and enhances cobot performance.



World leading cyber technologies in defence and intelligence

Australia's cyber sector is in the top ten largest cyber sectors in the world by revenue generation¹⁸. Foreign investment inflows into Australian cyber companies outpace countries in the region including Singapore, South Korea, Japan, and India.¹⁹

Harvard University's National Cyber Power Index ranks Australia in the top five most powerful cyber nations; the Index ranks Australia first for defence capabilities and fourth for intelligence.²⁰



2023 – 2030 Australian Cyber Security Strategy

The Australian Government is committed to maintaining Australia's position as a world leader in cyber security. The 2023–2030 Australian Cyber Security Strategy is game-changing for Australia's cyber security:

- We are shifting cyber from a technical topic to whole-of-nation endeavour, focusing on providing better support to civilians and industry.
- We are delivering tangible action on the cyber security issues that matter most to Australian communities and businesses.
- We are harnessing the whole country to tackle cyber problems, enabled by stronger public private partnerships.

Through the Strategy we seek to improve our cyber security, manage cyber risks and better support citizens and Australian businesses to manage the cyber environment around them.

A strong track record of ICT innovation and adoption

Scientists at CSIRO invented wi-fi technology – which is now ubiquitous in everyday life and a foundational technology development.²¹

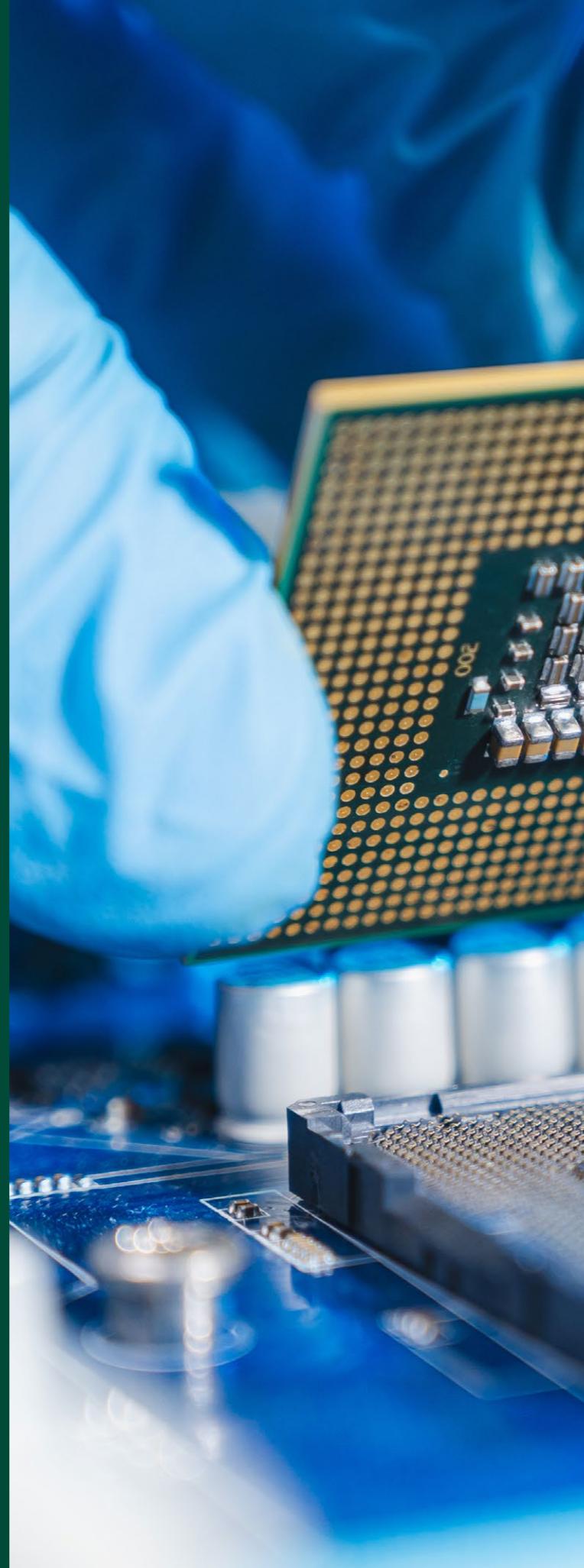
Australia is also a **hub for hyperscale cloud computing**, which enables cloud infrastructure to scale up or down to meet large-scale computing demands. Recent hyperscale computing capability **investments in Australia by Microsoft and Amazon Web Services alone are worth almost \$20 billion.**²²

A global R&D hub for advanced ICT

Australia is a destination of choice for tech R&D. Global companies are attracted to Australia for the generous Research and Development Tax Incentive (RDTI), which provides up to a 43.5 per cent tax offset for eligible R&D expenditures.²³

Google has developed a \$1 billion research hub in Sydney in partnership with Australia's national science agency, the CSIRO.

This Digital Future Initiative focuses on infrastructure, research and partnerships that strengthen local capabilities.²⁴



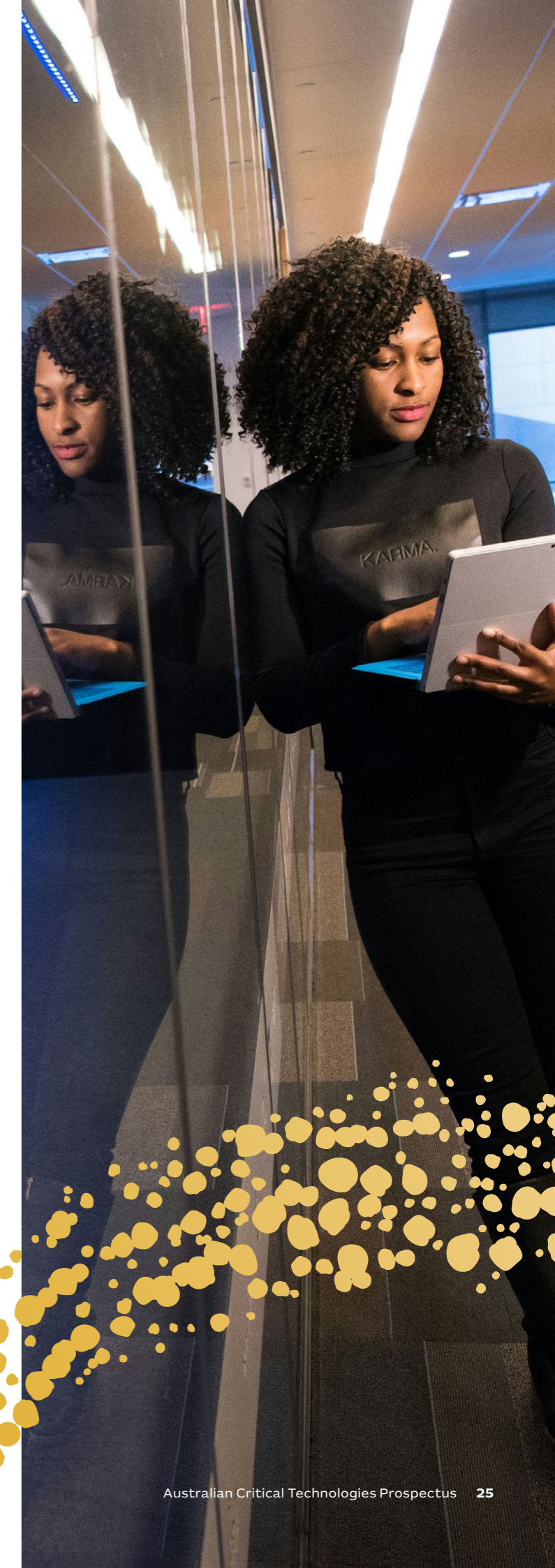
NEXTDC

Australia is well-equipped with the resources to support data centres and hyperscale cloud providers.

NEXTDC, a Queensland-based company and Australia's leading independent data centre operator, currently operates 12 data centre facilities in Australia and is building a flagship data centre in the Northern Territory.

The D1 Data Centre will be the first of its kind in Darwin to provide **100% uptime plus fast, secure and flexible access to major cloud platforms.**

NEXTDC has 10 more facilities under development or at the planning stage including Port Hedland in Western Australia and its first overseas data centre facility in Kuala Lumpur. KL1 will be located in Klang Valley – an important economic centre of Malaysia.



Advanced manufacturing and materials technologies

Advanced manufacturing and materials technologies are used to manufacture and modify materials in ways that improve their performance.



Australia pioneers advanced manufacturing technologies in major industries such as defence, health and clean energy, and excels in applied advanced manufacturing research.

Australian companies are world leaders in providing niche manufacturing solutions to global challenges. This includes precision fabrication and component production such as additive manufacturing.

World's first multi-channel cochlear implant

Australian advanced manufacturing techniques improve device accuracy, speed up production and deliver new technologies to drive better health outcomes.

Cochlear pioneered the world's first multi-channel cochlear implant, an entirely new treatment for hearing loss, in the 1960s. It now exports innovative hearing technologies to 180 countries worldwide.



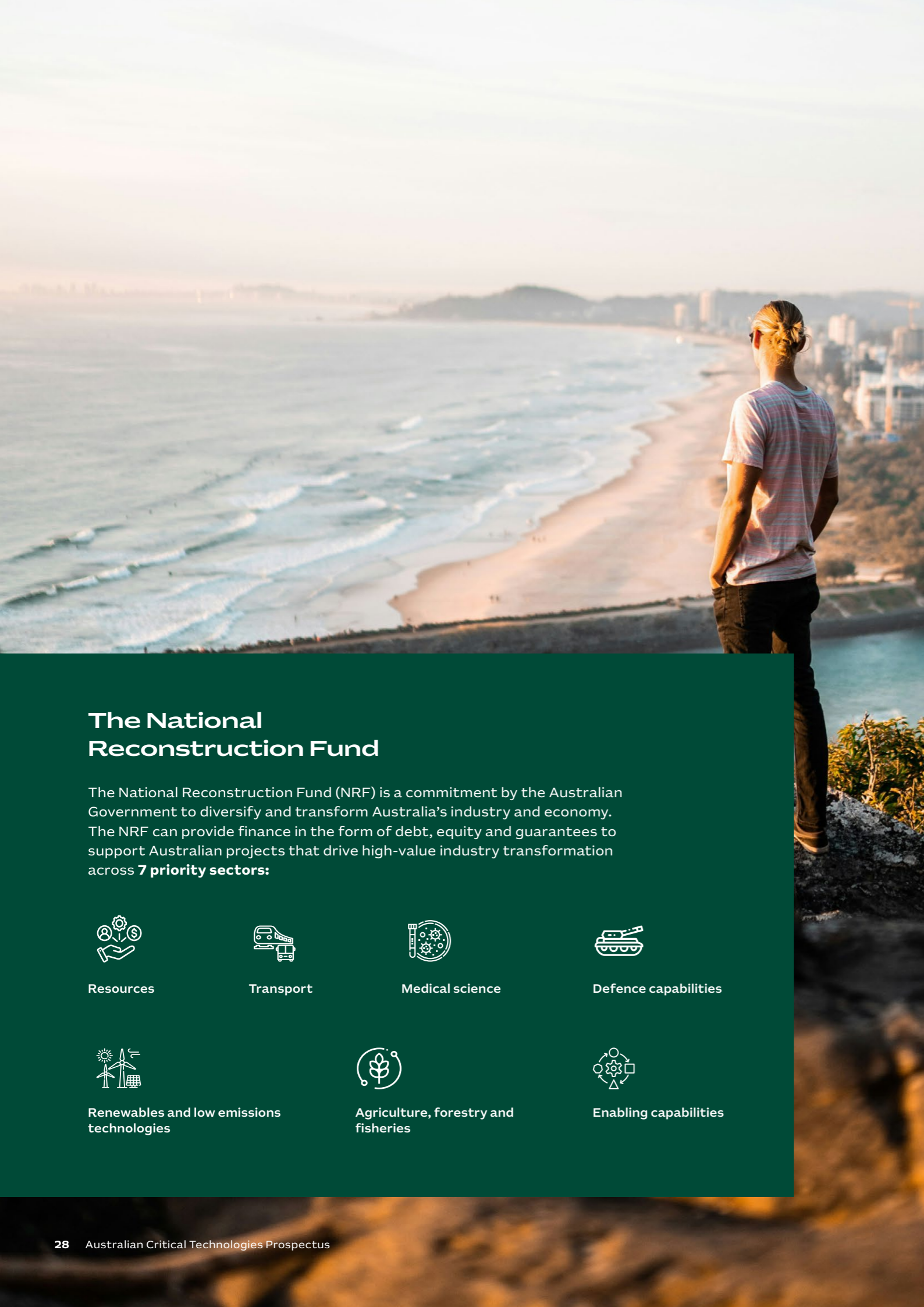
Australia's thriving advanced manufacturing industry:

Manufacturing is one of Australia's most innovative sectors – 25% of national R&D expenditure is in manufacturing.²⁵

\$2 billion in venture capital funding was invested in Australian advanced manufacturing companies in the five years to 2023.²⁶

Foreign direct investment in Australian advanced manufacturing companies reached **\$4 billion** in the five years to 2023.²⁷

The Australian Government is investing in Australia's leading advanced manufacturing capabilities with billions of dollars in investment and enabling regulation to drive growth and scale in the sector.



The National Reconstruction Fund

The National Reconstruction Fund (NRF) is a commitment by the Australian Government to diversify and transform Australia's industry and economy. The NRF can provide finance in the form of debt, equity and guarantees to support Australian projects that drive high-value industry transformation across **7 priority sectors**:



Resources



Transport



Medical science



Defence capabilities



Renewables and low emissions technologies



Agriculture, forestry and fisheries



Enabling capabilities

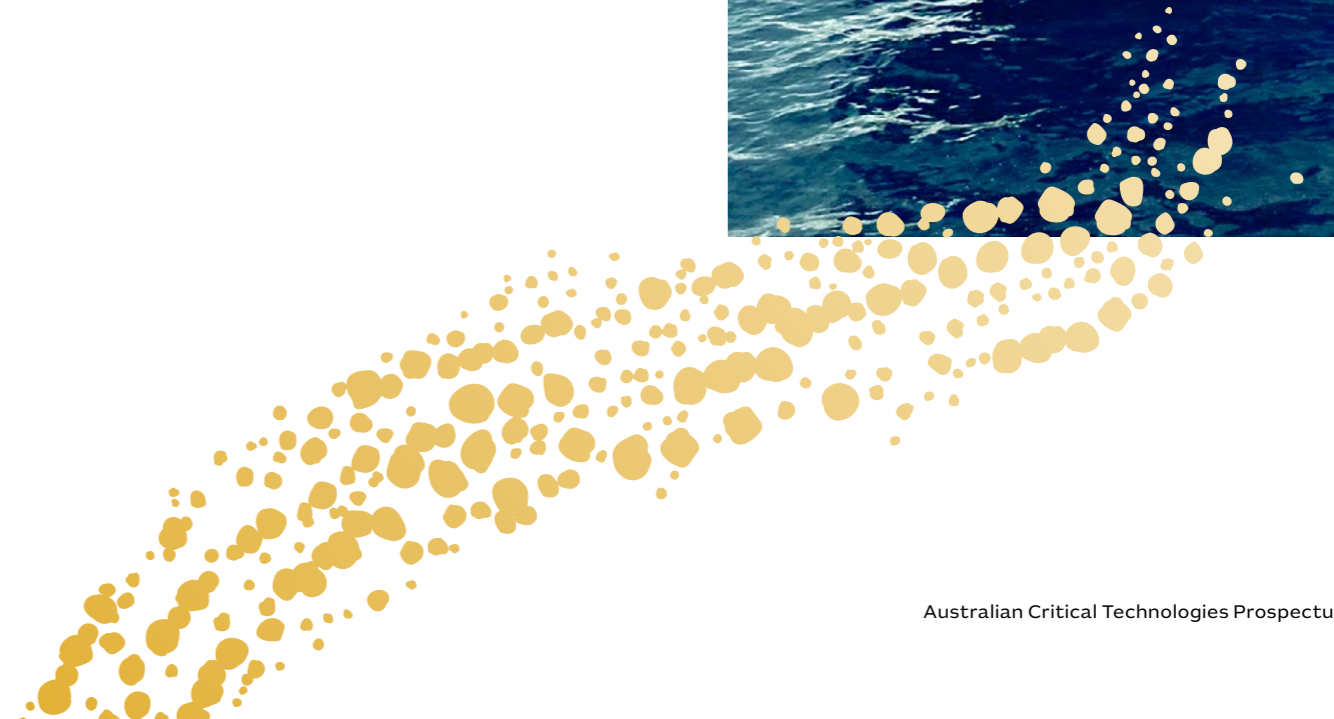
The Whiskey Project Group

NSW-based boat-builder, The Whiskey Project Group has created a radical multi-mission design for 8–12 metre tactical watercraft.

The boats were devised by two navy veterans: Darren Schuback and Ryan Carmichael, both former Navy Clearance Divers and Special Operations Officers.

The company's carbon fibre composite and aluminium boats help protect water operators during complex maritime missions.

The Whiskey Project Group signed a landmark export contract with the US Marines in 2023 and delivery has been exceptionally fast. The first vessels were handed over to the US Marine Corps in February 2024.



Australia pioneers advanced manufacturing technologies in major industries such as defence and clean energy



Defence supply chains

Global defence supply chains rely on Australia's advanced manufacturing sector to deliver new technologies and engineering solutions.

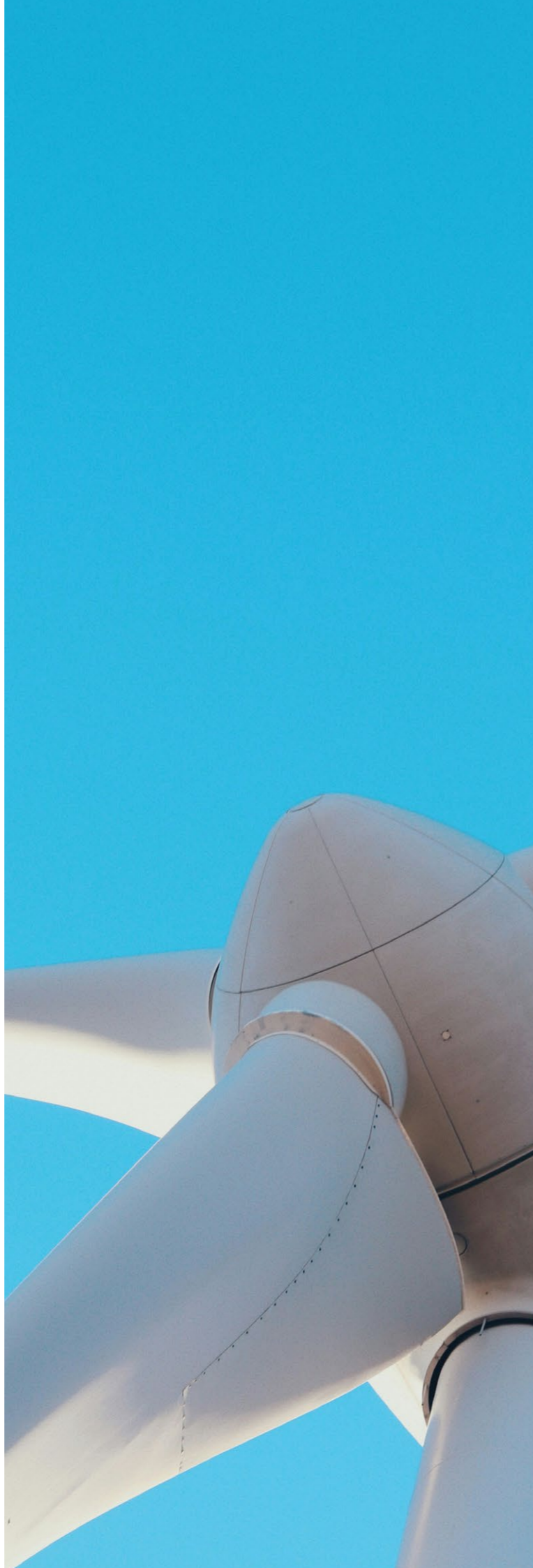
Ferra Group is a world leader in precision and custom engineering. Ferra create exceptional and dependable electromechanical subsystems for air, land and sea. Ferra is a key strategic partner and supplier for Boeing's Wingman aircraft – a stealth unmanned combat aerial vehicle capable of flying alongside crewed aircraft for support and performing independent missions.



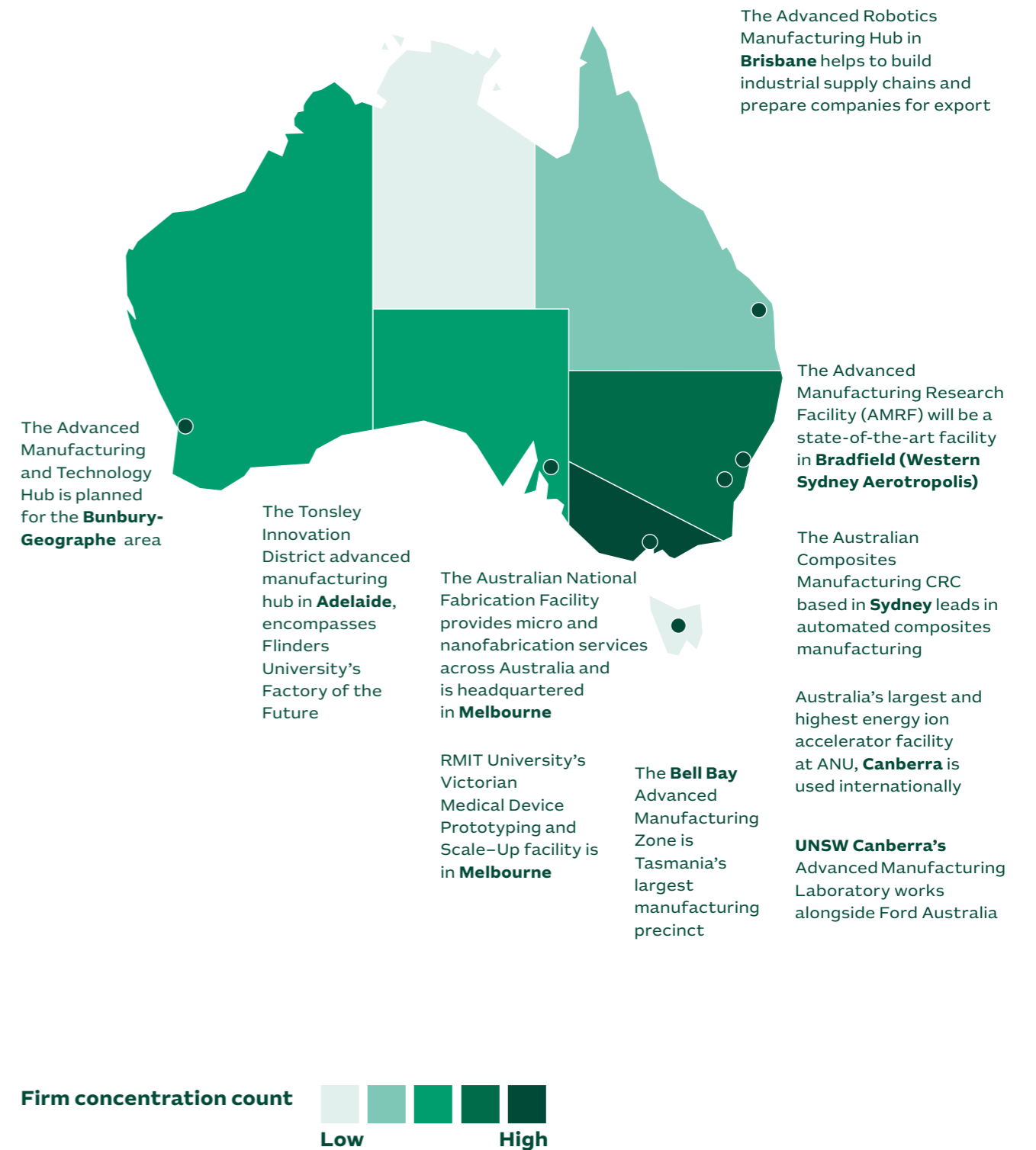
Achieving net zero

Australia's advanced manufacturing solutions are driving progress to net zero by enhancing efficiency, reducing costs, and enabling sustainable production of clean energy technologies.

SunDrive Solar has developed a new, high-efficiency solar cell technology that uses novel materials and processes to create cost efficient and sustainable solar cells.



Explore Australia's manufacturing ecosystem



Pioneering advanced manufacturing technologies

Australian companies are pivotal in international defence supply chains – contributing to some of the **world's most technologically advanced defence programs**.

Australia is a trusted supplier of defence equipment and technology to export markets such as the US, the UK, the EU, the UAE, South-East Asia, Japan and South Korea. For example, Boeing will manufacture its uncrewed MQ-28 Ghost Bat aircraft in Toowoomba, Queensland.

Australia has an **established history in MedTech manufacturing** – covering manufacturing of implants, instruments and equipment intended for therapeutics, monitoring and diagnostics, designed to improve health outcomes.

Victoria is a major hub for MedTech and home to the first ISO-accredited prototyping facility in Asia Pacific for wearable and flexible technologies.²⁸ The Viral Vector Manufacturing Facility will be established in NSW to manufacture viral vector products for research and clinical trials.

Australian expertise with global applications

Advanced Navigation recently launched a high-tech robotics facility for autonomous systems at UTS Tech Labs. Advanced Navigation is one of only four companies in the world with the capability to manufacture strategic grade fibre-optic gyroscopes.

The new facility in Sydney will scale up the manufacturing of Advanced Navigation's world-first AI navigation systems for GPS-denied environments, including its digital fibre-optic gyroscope (DFOG) technology, Boreas.



Australia excels in applied advanced manufacturing research

Manufacturing is one of Australia's most innovative sectors.

25 per cent of national R&D expenditure is in manufacturing.²⁹

This is underpinned by leading research capabilities - with **Australian research in the top six globally** for additive manufacturing and advanced composite materials.³⁰

New South Wales is one of Australia's leading manufacturing states, generating 30 per cent of national manufacturing income and exporting \$18 billion worth of manufactured goods each year.³¹ The Advanced Manufacturing Research Facility (AMRF) in Western Sydney's Aerotropolis will be the first of its kind in Australia with state-of-the-art equipment co-located with industry, research and education experts.

Innovation hubs such as the ARM Hub and UTS Tech Labs foster **collaboration between global leaders and Australian start-ups**, accelerating the creation and adoption of Australian technologies.

Real world applications

Australia is at the forefront of new, high-tech medical device development by leveraging collaboration between researchers, industry, end-users and government.

The Medical Device Partnering Program provides a platform for innovators to undertake rapid research projects that demonstrate proof of concept and common user facilities to prototype ideas for the market.

Investment in Australia's advanced manufacturing

The Australian Government has announced significant investments in Australia's manufacturing capability, such as the **Future Made in Australia** policy and the National Reconstruction Fund. The Future Made in Australia policy is focused on encouraging and facilitating the private sector investment needed to strengthen priority supply chains and develop Australia's manufacturing sector as an indispensable part of the net zero global economy.

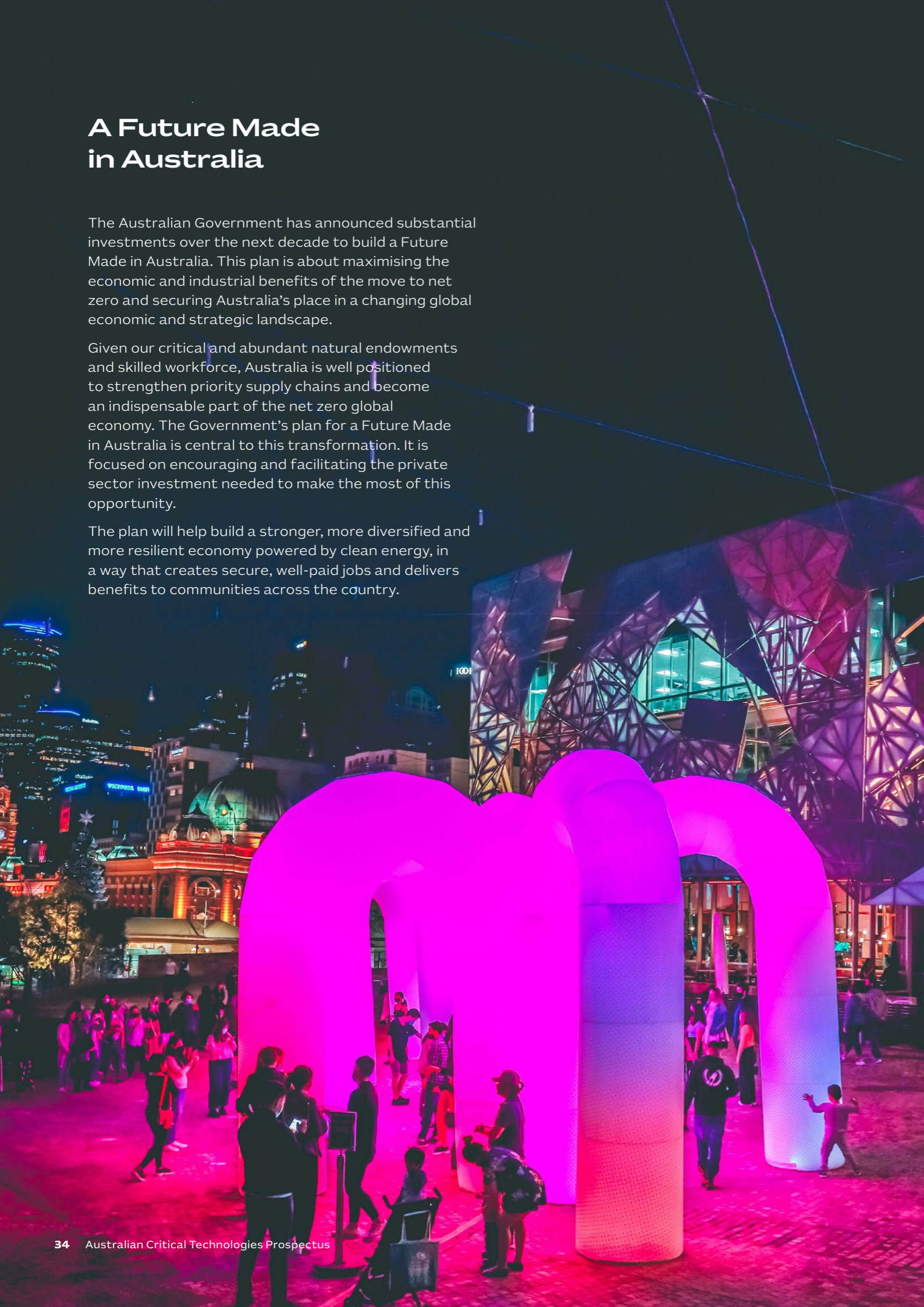
State investments such as the Made in Victoria, Made in Queensland, Tasmania's Action Plan, and the Northern Territory Ecosystem Fund foster state-based ecosystems.³² Widespread regulatory support across the country means Australia is a reliable partner for investment.

A Future Made in Australia

The Australian Government has announced substantial investments over the next decade to build a Future Made in Australia. This plan is about maximising the economic and industrial benefits of the move to net zero and securing Australia's place in a changing global economic and strategic landscape.

Given our critical and abundant natural endowments and skilled workforce, Australia is well positioned to strengthen priority supply chains and become an indispensable part of the net zero global economy. The Government's plan for a Future Made in Australia is central to this transformation. It is focused on encouraging and facilitating the private sector investment needed to make the most of this opportunity.

The plan will help build a stronger, more diversified and more resilient economy powered by clean energy, in a way that creates secure, well-paid jobs and delivers benefits to communities across the country.



SPEE3D



SPEE3D is a trailblazing Australian advanced manufacturing company in global markets with innovative additive manufacturing techniques.

A novel printing technique means SPEE3D's high-speed metal 3D printers can make precision parts at supersonic speeds for vehicles and machines such as tractors and space rockets.

Co-founders Steven Camilleri and Byron Kennedy wanted to reduce the time it takes to create and receive a metal part from weeks or days, to just minutes.

SPEE3D, based in Victoria, has supplied its advanced manufacturing technology and equipment to markets such as France, Germany, Japan, Singapore, the UK and the US.

Autonomous systems, robotics, positioning, timing and sensing technologies



Autonomous systems, robotics, positioning, timing and sensing technologies (autonomous technologies) include robots and other machines that perform tasks on their own with limited guidance from humans. This also includes satellites and systems that precisely measure position, navigation or timing data.

Companies across Australia's manufacturing sector are developing novel autonomous technologies, including transport, material fabrication and packaging. In particular, Australia's leading capabilities in mining, agriculture, and defence have driven cutting edge developments in autonomous technologies. These Australian industries are large and sophisticated customers of autonomous technologies, driving innovation and new applications, and other countries seek out Australia's autonomous technologies expertise.

Western Australia is home to 75% of the world's autonomous trucks

and the world's largest and longest autonomous trains. Rio Tinto and Founders Factory have announced an Australian hub in Perth to launch Australian mining startups into global markets.

Mining safety and efficiency

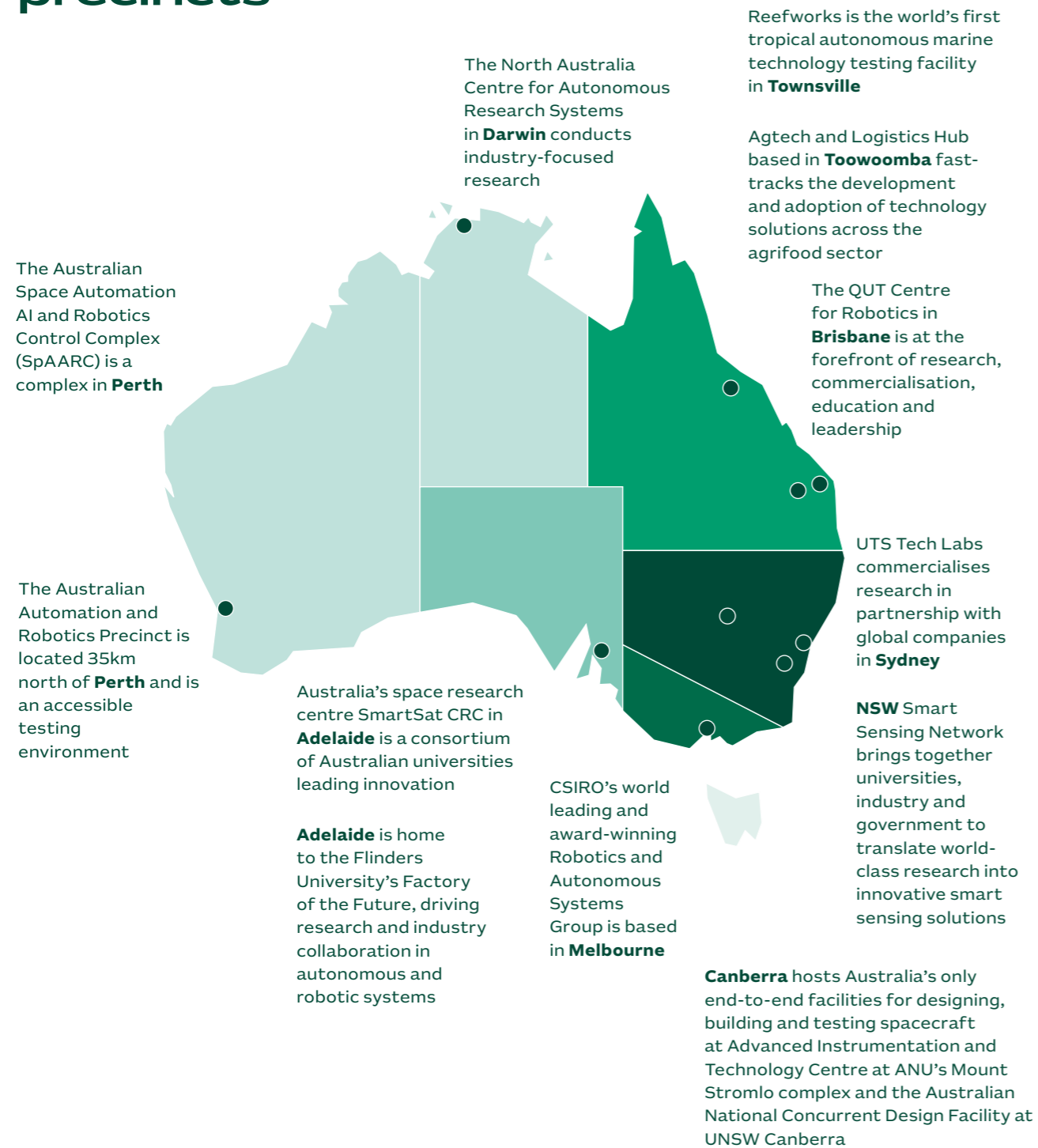
Mining operations are transformed by the automation of processes - enhancing operational efficiency and safety. Australia's mining industries maintain their status as one of the best and safest in the world by using robots to explore dangerous environments, such as an unstable mine shaft.

The **Rio Tinto Gudai-Darri mine** uses cutting edge robotics in the ore sampling laboratory as well as autonomous trucks, trains and drills, which are now standard across the Pilbara, (Western Australia) - supplying one third of global iron ore production, home to the fourth biggest lithium mine in the world and one of Australia's largest gold mines.

Global defence industries are a core customer for Australia's autonomous technologies, particularly in the US Department of Defense and major US Original Equipment Manufacturers.

Innovation hubs, industry networks and common user facilities across Australia are developing startups into global successes.

Explore Australia's autonomous technologies precincts



Australia's thriving autonomous technologies industry:

Australia is home to **180 autonomous technologies systems companies.**³³

Australia-based autonomous technology companies have attracted **\$2 billion in venture capital.**³⁴

In the five years to 2023 2023, Australian autonomous technologies received **\$95 million in foreign direct investment.**³⁵

In 2021, Australian robotics companies generated **\$18 billion in revenue.**³⁶



Australia's world leading capabilities in mining, agriculture and defence drive cutting edge autonomous technologies



Nanosatellite capabilities

Robotics, satellites and sensors are fundamental to space exploration and development. Australia is supporting the launch of new nanosatellite capabilities.

Fleet Space Technologies' satellite-constellation is the foundation for new solutions in space, defence, and critical mineral discovery as it radically reduces the time and resources required to locate potential deposits.



Reconfiguring vehicle to satellite communication

Reconfigurable antenna technology enhances connectivity of autonomous vehicles and drones, extends operational ranges, and ensures secure communication for a wide range of applications.

University of Queensland and global industry leader **EM Solutions** are testing real-world applicability of a state-of-the-art reconfigurable broadband antenna system, addressing the growing need for reliable and secure data transmission across various industries. The project will deliver scalability and cost-effectiveness for civilian and military customers.



Autonomous maritime vessels

Australia's robotics start-ups partner with the Australian Defence Force to develop and trial new capabilities in real life scenarios.

Greenroom Robotics, in collaboration with Austal Australia, Trusted Autonomous Systems, and the Royal Australian Navy Warfare Innovation Navy (WIN) Branch, recently demonstrated the effectiveness and reliability of its Greenroom Advanced Maritime Autonomy (GAMA) Software. The Patrol Boat Autonomy Trial showcases the capability of locally developed autonomous systems and their integration within a full-size Australian made navy vessel.

National Robotics Strategy

Australia's emerging robotics and automation industry is growing in size and influence. The National Robotics Strategy sets four goals to strengthen Australia's competitiveness, boost productivity and support local communities:

1. National capability: Australia has a strong, collaborative robotics and automation ecosystem that is recognised for its strengths, has a thriving domestic market and exports globally.

2. Increasing adoption: Australian industries are supported to integrate robotics and automation technologies into their operations in ways that benefit Australian workers and communities.

3. Trust, inclusion and responsible development and use: Robotics and automation technologies designed and adopted in Australia are safe to use alongside Australian workers and are secure and inclusive by design.

4. Skills and diversity: Australians from all backgrounds contribute to and benefit from the development and adoption of robotics and automation.

A demand-driven startup ecosystem

Australia's geographic advantages have established globally leading mining, agriculture, defence and space industries. These industries rely on autonomous technologies to improve productivity and safety, and provide a large and sophisticated customer base for new products and services. As a result, Australia develops globally competitive autonomous technologies start-ups. **Australia has 8 per cent of global mining tech startups**, more than 4 times its share of tech startups overall (1.7 per cent). Agtech startups also excel, and Australia has 3 per cent of global startups in this industry.³⁷

On-farm productivity

Australian autonomous systems are replacing dangerous, repetitive and labour-intensive tasks on farms, improving on-farm productivity and protecting workers.

QUT Robotics Centre and the **ARM Hub** developed a prototype robotic arm to replace the repetitive task of separating bananas from the stalk. The technology is being trialled by farms in Queensland.

Other countries seek out Australia's autonomous technologies expertise

Australia has renowned capabilities in field robotics, autonomous systems, drone technologies and autonomous submersibles. These capabilities attract some of the world's most technologically advanced organisations – like **NASA**. **NASA** has an agreement with Australia to develop an **Australian-made semi-autonomous rover** to be a part of a future mission to the moon.³⁸ Through AUKUS Pillar II, Australia is collaborating with international partners in the United Kingdom and the United States to **develop uncrewed maritime systems**.³⁹



DroneShield



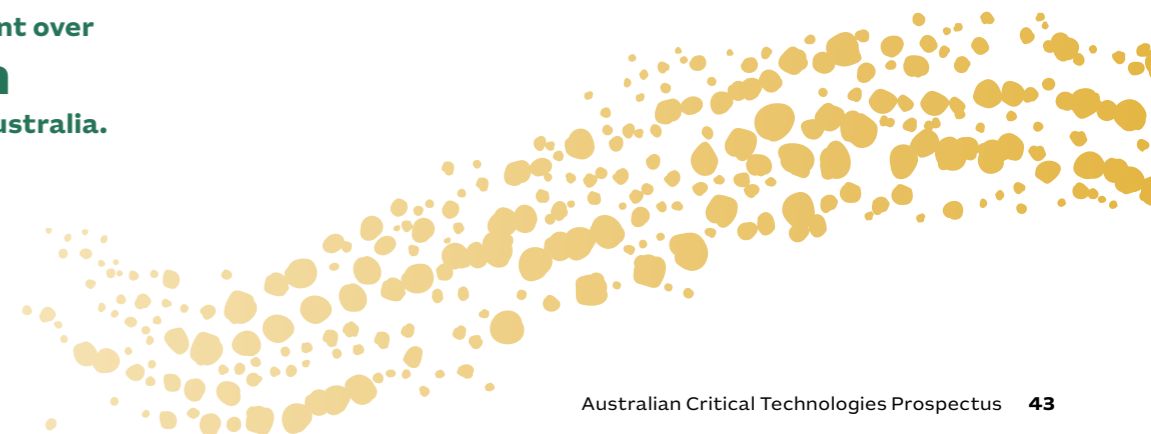
Sydney-based DroneShield's counter-drone systems are now in service with the US Air Force, French Army and Tokyo Police.

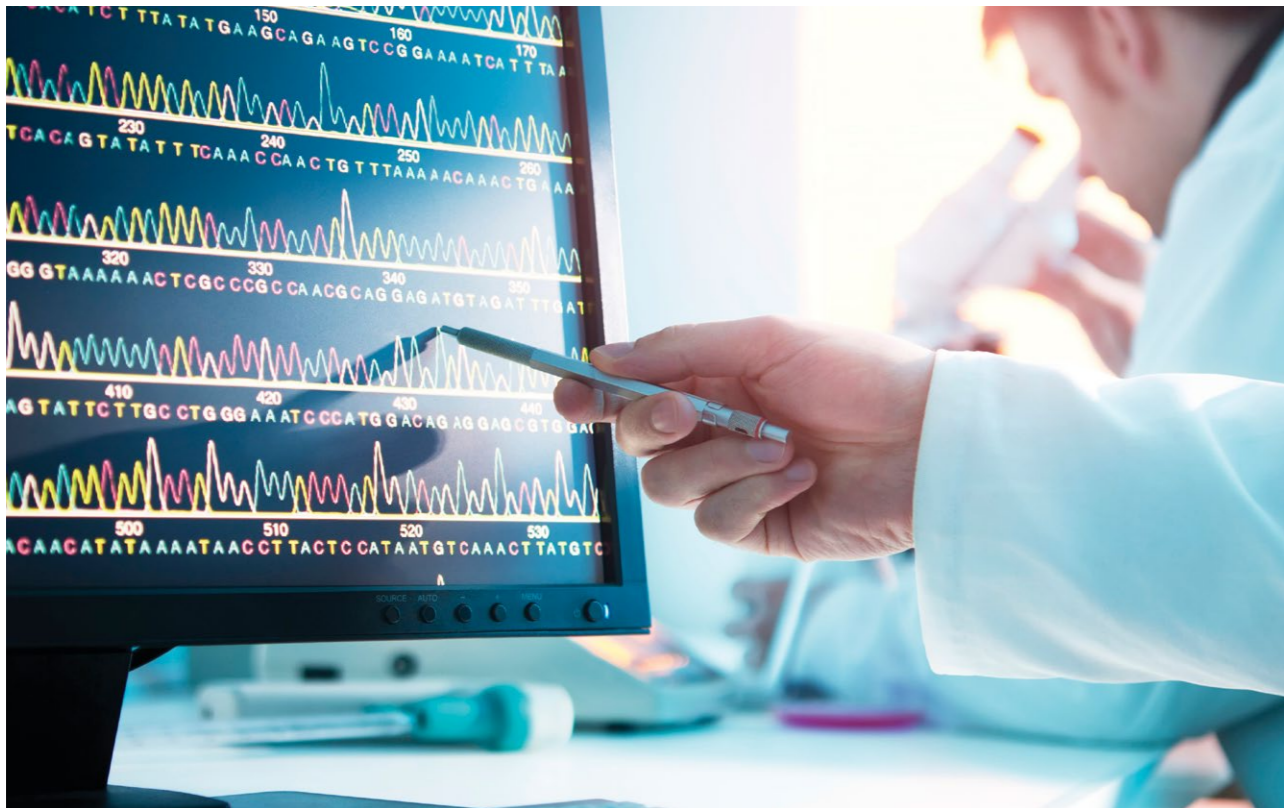
DroneShield was founded in 2015 when the threat posed by maliciously operated drones was marginal.

However, the team forecasted that government agencies would shortly need to prevent drones from conducting illicit surveillance on sensitive sites.

DroneShield gathered local expertise to design a device to counter drones and drone swarms. In particular, a collaboration with the University of Technology Sydney helped exploit local ingenuity in AI.

DroneShield has spent over
\$35 million
in R&D – all of it in Australia.





Innovation hubs, networks, and common user facilities develop startups into global success

Several Australian universities are in the top 100 for remote sensing, robotics and automation and control – making Australia an exciting destination for top talent.⁴⁰

Innovation hubs, networks, and common user facilities co-locate global companies, researchers and start-ups to facilitate knowledge sharing and idea commercialisation. For example, the SmartSat CRC has created the Aurora Space Cluster, a national network of space start-ups and SMEs, to collaborate and connect. Other research centres that work in autonomous technologies include MinEx CRC, Building 4.0 CRC and iMove CRC.

The Advanced Robotics for Manufacturing (ARM) Hub in Brisbane proactively works with companies to integrate robotics into manufacturing operations and provide a test facility to develop novel technologies.

The Agtech and Logistics Hub based in Toowoomba works with innovators and industry to fast-track the development and adoption of technology solutions across the agrifood sector.

Space Machines

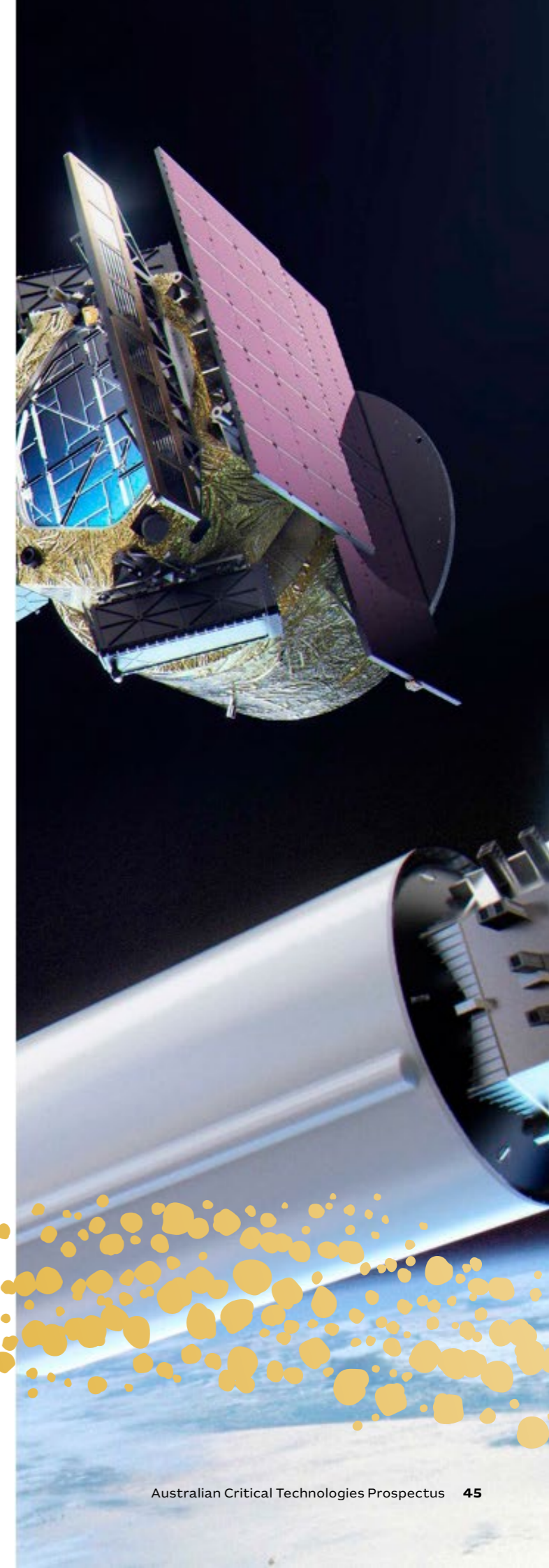
Australia's largest ever spacecraft was launched by Space Machines in March 2024 from its base in California.

The Optimus satellite – built by Space Machines Company – is a 270-kilogram orbital servicing vehicle (OSV).

Designed and built in Australia, it will help transform the satellite industry. It can monitor and repair ageing satellites and decommission old ones.

It also carries payloads from Australia's space-tech pioneers. These include modules for spectral imaging, domain awareness and space-based artificial intelligence.

60% of the satellite's supply chain originates in Australia.



Biotechnologies

Biotechnologies harness cellular and biomolecular processes to improve our health, wellbeing, economy and environment.



Australia is well-established as a global hub for biotechnology companies and the preferred destination for clinical trials. Australia's clinical trials ecosystem is underpinned by advanced research capabilities and infrastructure. Recent modelling suggests Australian biotechnology companies could generate over \$15 billion (U\$10 billion) in exports to the United States in 2030.⁴¹

Growing Australia's medical research and translation capabilities is an ongoing priority for the Australian Government.

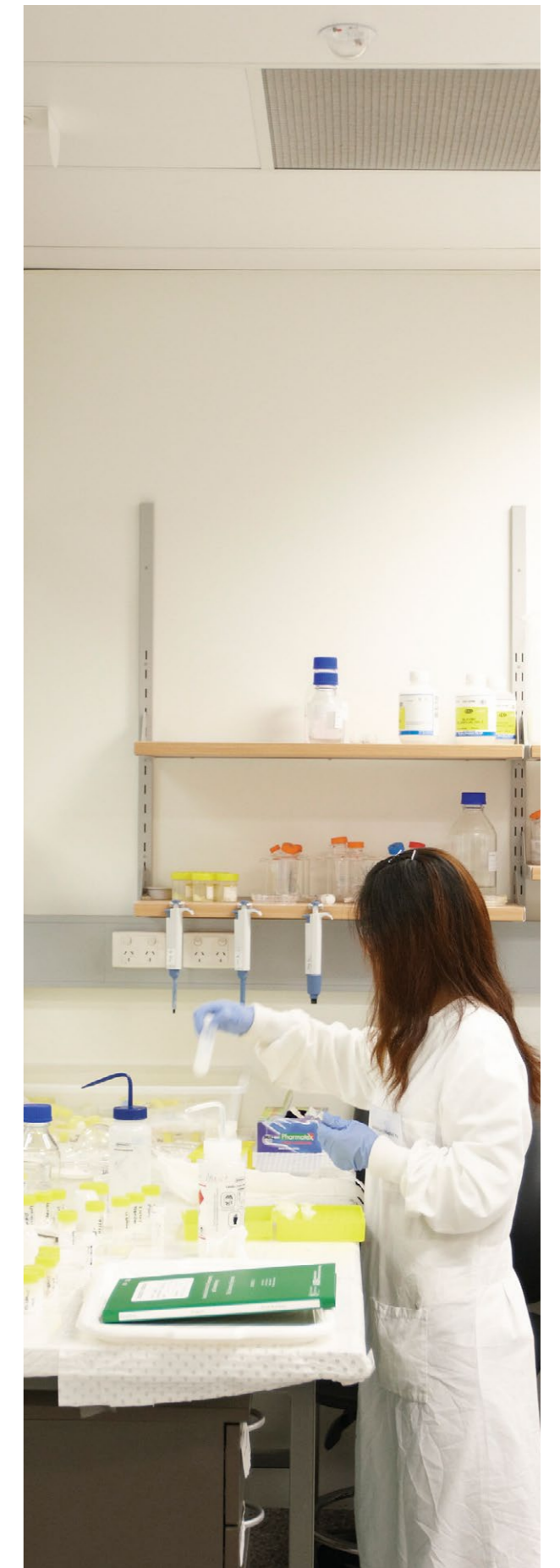
Australia's thriving biotechnologies ecosystem:

Australia's thriving biotechnologies industry has more than **1,400 companies**.⁴²

The total market capitalisation of ASX-listed Australian biotechnology companies is **\$250 billion**.⁴³

In the five years to 2023, Australian biotechnologies received **\$933 million** in foreign direct investment.⁴⁴

By 2040, Australia's synthetic biology sector is projected to generate **\$27 billion in annual revenue**.⁴⁵



Australia's biotechnology sector is at the forefront of global medical research and innovation



New medicines and treatments

Australian biotechnology firms are developing new treatments for HIV, hepatitis, and emerging viral threats. They are at the forefront of novel cancer therapies.

Q-Gen has been supporting research projects and working with world-leading clients in treating cancer, infectious diseases and autoimmune disorders for almost 25 years.



State-of-the-art vaccine manufacturing

Biotechnology is instrumental in vaccine development. Australia has a long history of vaccine development, including the groundbreaking work of Professor Ian Frazer to develop a vaccine for cervical cancer at the University of Queensland.

Moderna is building an mRNA vaccine manufacturing facility worth up to \$2 billion in Victoria - one of the largest advanced manufacturing projects in Australia ⁴⁶.



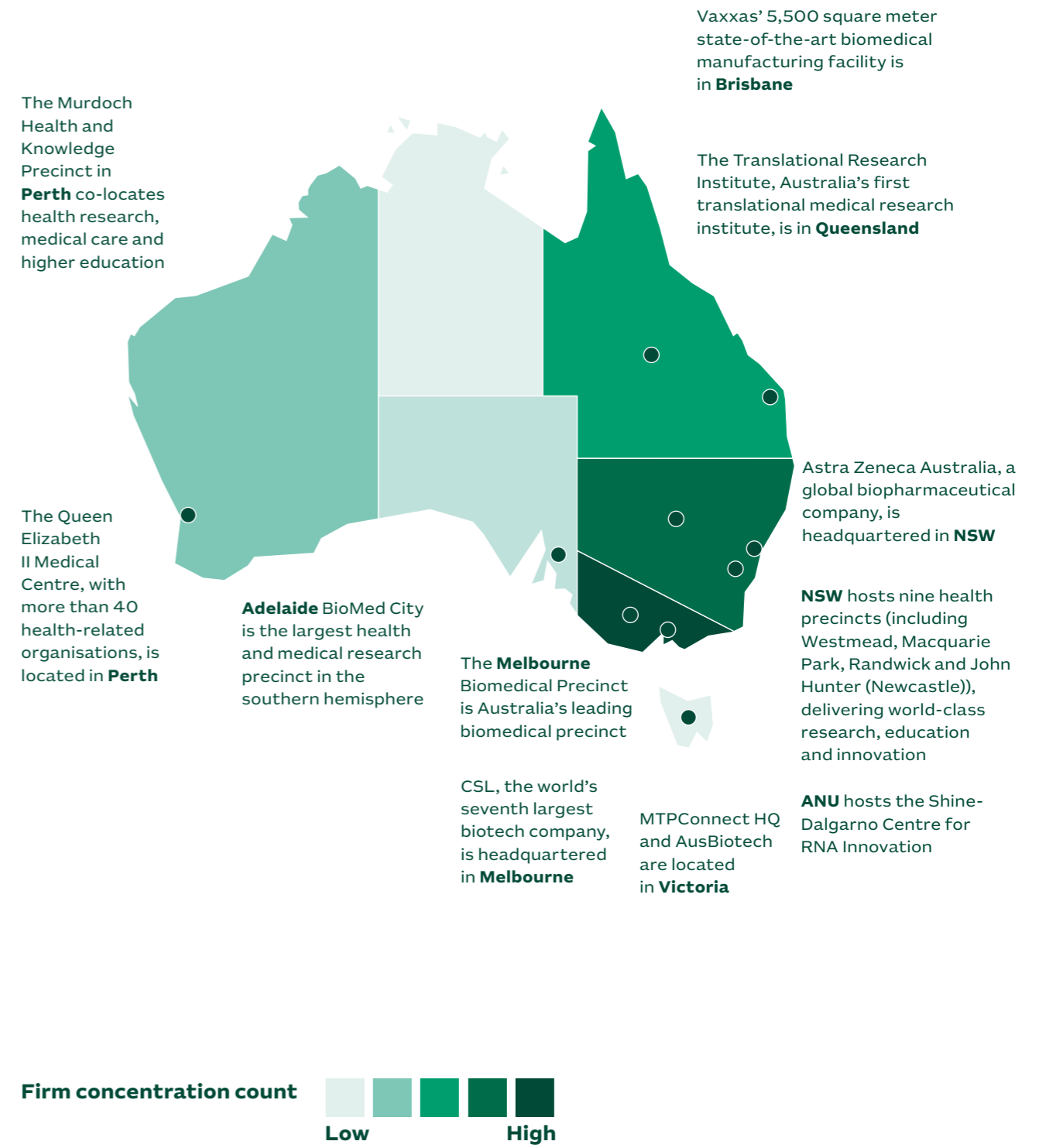
Commercial scale biopharmaceuticals

Thermo Fisher Scientific, together with its pharma services brand **Patheon**, supports Australian biotech firms to make biopharmaceuticals locally. It is the first company in Australia to contract manufacture drugs on a commercial scale using mammalian cell lines.

The Queensland-based facility provides end-to-end technical capabilities for clinical and commercial grade biopharmaceuticals. The co-location of Patheon with the Translational Research Institute and the Princess Alexandra Hospital promotes research, industry and clinical collaboration. Thermo Fisher Scientific has partnered with Brisbane-based NuNerve to develop a new drug that treats motor neuron disease.



Where to find Australia's biotechnologies capabilities



CSL Limited (CSL)

Australia's biotechnology sector is well-established as a global hub for biotechnology companies.

There are **>600** biotechnology companies headquartered in Australia

Among these is CSL, headquartered in Melbourne.

CSL is the seventh largest biotechnology company in the world and has a market capitalisation of \$135 billion.

CSL develops and delivers innovative medicines that help people with serious and life-threatening conditions. CSL manufactures 15 plasma products at the CSL Behring manufacturing facility in Broadmeadows Victoria.



A preferred destination for clinical trials

Australia's high-quality health care system, multicultural population, low administrative barriers, and streamlined approval processes make it an ideal destination for clinical trials.⁴⁷ Australia ranks **third globally for the number of industry Phase 1 clinical trials** and fourth for Phase 2.⁴⁸ In 2021, Australia conducted **11 per cent of clinical trials** investigating cell and gene therapies globally, despite being home to only 0.3 per cent of the world's population.⁴⁹

Regulatory approvals for Phase I clinical trials are three times faster in Australia than in the US, and twice as fast as in the UK.⁵⁰ Regulatory agencies in some of the largest biopharmaceutical markets, such as the US and Europe, accept Australian clinical testing – making Australia an attractive destination for Asia-based Contract Research Organisations.



Clinical trials

Clinical trials are the cornerstone of Australia's biotechnology ecosystem. Australian clinical trial companies leverage world-class medical research facilities and our diverse local population to host international pharmaceutical developments.

Linear is an Australian not-for-profit organisation offering Phase I to Phase III clinical trials. Linear has worked with more than 300 sponsors from 18 countries.

Australia's clinical trials system is underpinned by advanced research

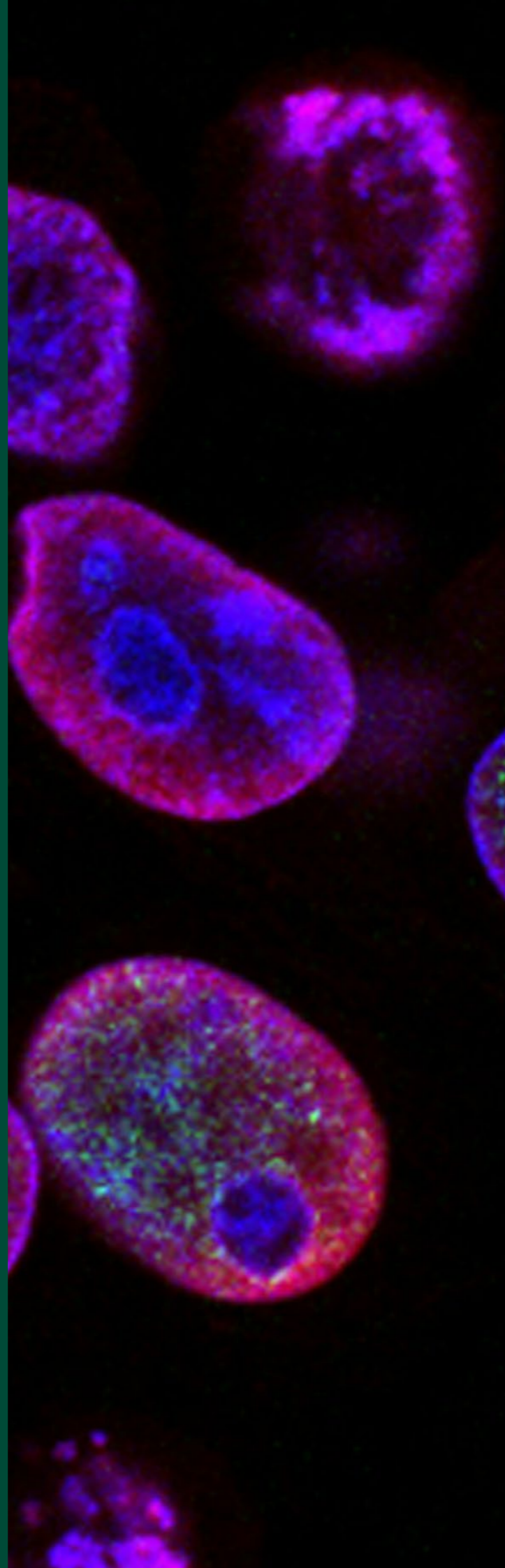
Australia has more than 55 medical research institutes and 40 universities focused on clinical research.⁵¹

Melbourne is one of the few cities in the world with **two universities in the global top 40** for biomedical studies.⁵² Australia has developed strong global partnerships and collaborates on R&D with key partners such as the US, the UK, China, Germany, and Canada.⁵³

Prioritising growth in biotechnology capabilities

Australia offers a wide range of investments, research grants, and tax incentives for biotechnologies. **The Medical Research Future Fund (MRFF) is a long-term investment** to advance Australian health and medical R&D.⁵⁴ The Biomedical Translation Fund (BTF) is a \$500 million venture capital program through licensed private sector fund managers. The BTF is aimed at fostering biomedical research discoveries through commercialisation.⁵⁵

Generous tax incentives are offered for the industry, including the **Patent Box Initiative**, a concessional tax treatment for new patents and the RDTI offers an offset of up to 43.5 per cent for eligible R&D expenditures.⁵⁶



Q-Gen Cell Therapeutics



Australia's biotechnology successes are underpinned by the research capabilities and advanced infrastructure of medical research institutes such as Q-Gen.

Q-Gen is the cellular therapy manufacturing facility of QIMR Berghofer Medical Research Institute.

For almost 25 years, Q-Gen has supported research projects and worked with world-leading clients in treating cancer, infectious diseases and autoimmune disorders.

It also collaborates with commercial partners from around the world to advance cell therapy research and treatments.



Clean energy generation and storage technologies

Clean energy generation and storage technologies provide low emissions ways to capture, generate, store and use power, and balance production with demand.

Australia is abundant with the natural resources required for clean energy generation – providing a home-grown advantage for Australian clean energy technologies such as batteries, green hydrogen and solar power. For example, the Australian battery industry is forecast to grow 24 per cent per year to 2030.⁵⁷

Australia's long history in the resources sector is foundational for the innovation, expertise, and investment required for the transition to net zero. Established customer markets for Australian energy and resources products, such as the Asia Pacific, are key customers for Australia's clean energy technology exports.

Australia's thriving clean energy industry:

Australia is home to **364 clean energy technology companies.**⁵⁸

Australian clean energy technologies attracted **\$1.6 billion** in venture capital in the five years to 2023.⁵⁹

\$56 billion in foreign direct investment was announced into Australian-based clean energy technology companies in the five years to 2023.⁶⁰

The Australian and state governments' commitments to reduce carbon emissions are an ongoing driver for the development and adoption of new low emissions technologies across the country.

Australia's abundant natural resources are foundational to innovative clean energy technologies



Renewing the built environment

ClearVue Technologies is the leading global supplier of energy-generating clear solar glass, revolutionizing various industries, including building and construction, agriculture (greenhouses), and public infrastructure (autonomous self-illuminating signage), among others.

Some of the projects currently utilising ClearVue solar glass include Murdoch Research Greenhouse (Australia), Aqua Ignis Sendai Greenhouse (Japan) and Jinmao Luxury Villa (China).



Supplying the world's energy

Australia's geography means it has abundant sunshine for solar power, extensive coastlines, and strong winds for significant geothermal and biomass resources and for wind energy.

SunCable is developing the Australia-Asia PowerLink, set to be the world's largest integrated renewables project, transmitting renewable energy from Australia to Singapore. SunCable will manufacture high voltage submarine cables in Tasmania.



Decarbonising heavy industry

New Australian green hydrogen technologies are accelerating the world's shift away from fossil fuels in hard-to-abate sectors such as steelmaking, chemical manufacturing, and heavy transport.

Hysata has developed a fundamentally new type of alkaline electrolyser that is significantly more energy efficient than the best present-day commercial electrolysers.

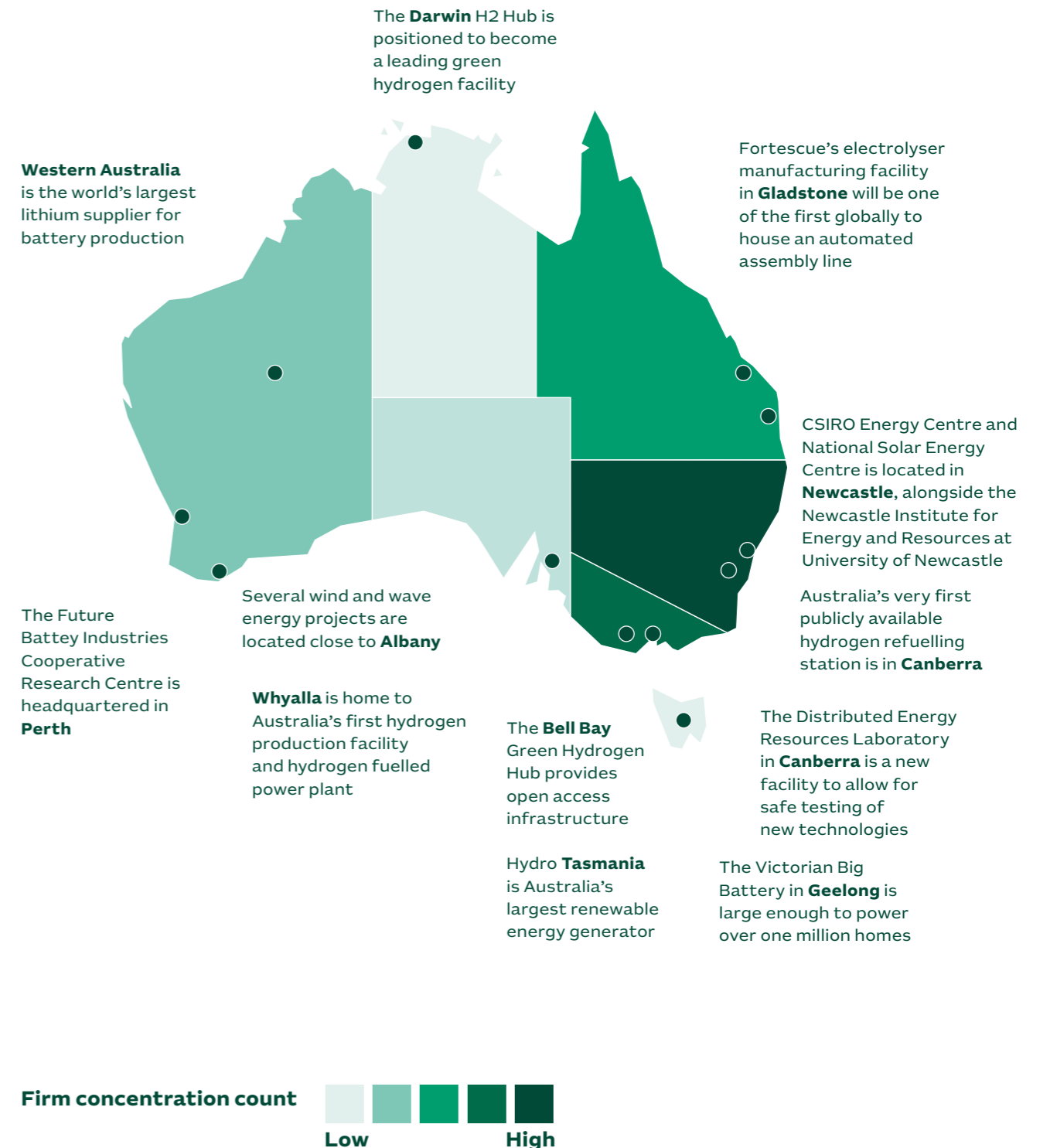


Next generation battery storage

Australian high-performance cathode minerals are ready for the next generation of lithium-ion batteries – critical for electric vehicle and stationary energy storage.

Pure Battery Technologies, a Queensland-based company commercialising advanced cathode materials for lithium-ion batteries, and the **University of Queensland** are delivering low-cost processes for producing critical battery materials and pilot-scale high performance cathode production.

Explore Australia's clean energy precincts



Australia has abundant natural resources for clean energy generation

Australia is the largest producer of solar energy per capita and has high-quality wind and hydro resources.⁶¹

Australia has 262,000km² of land – equivalent in size to New Zealand – that is highly suitable for hydrogen production using renewable sources.⁶²

Australia alone could meet projected global hydrogen demand.

Australia has one of the **largest recoverable critical minerals deposits** in the world, including high-quality cobalt, lithium, manganese and rare earths.⁶³ Australia is the largest exporter of lithium globally and supplies 45 per cent of the world's lithium demand.⁶⁴

Edify Energy

Edify Energy has partnered with Germany's Siemens Energy Global to develop a green hydrogen production facility in Queensland.

The energy project – called EGH2 – will involve applied research at universities in Australia and Germany.

The project will produce green hydrogen from Australia's abundant supplies of solar power, supplemented by wind power.

Today, the company has successfully overseen the development, structuring, financing and delivery of utility-scale solar projects and large battery energy storage systems in New South Wales, Victoria and Queensland.

Globally attractive destination for large scale battery storage

Battery storage allows for the efficient storage and distribution of intermittent renewable energy sources, ensuring stable supply.

Australia's land mass and sophisticated energy market make it an attractive destination to launch new clean energy technology products.

Redflow's zinc-bromine flow battery is providing the world with a sustainable energy storage solution. Made from recyclable materials, the rugged battery is a safer, higher-performing and longer-lasting alternative to lithium-ion batteries.

Cutting edge clean energy technologies

Australia is in the top five most attractive investment destinations for renewable energy technologies.⁶⁵

These investments are driving developments in the battery supply chain – with the **Australian battery industry forecast to grow 24 per cent annually to 2030**.⁶⁶ The Australian Government recently announced the National Battery Strategy with a commitment to support development of battery manufacturing in high value opportunities such as energy storage systems for renewable grids, battery active materials, and batteries for transport manufacturing.

There are over **70 large-scale renewable energy projects** under construction across Australia, representing \$21 billion in investment.⁶⁷ Australia is already a **key supplier of energy to the Asia Pacific** region, with more than two-thirds of energy production exported overseas.⁶⁸

Innovation and expertise for net zero

Australia boasts one of the **highest renewable energy patent ratios worldwide, comparable to the US and Germany**.⁶⁹

Eight Australian universities rank in the **top 100 for energy science and engineering** and Australia is in the top seven for clean energy research.⁷⁰ Australia has a long history of innovation in this sector; the University of New South Wales played a **pivotal role in developing modern solar technology** (used in 90 per cent of the world's solar panels today) and continues to pioneer new technology cells.⁷¹

Hysata

Hysata's vision is to accelerate the world's shift away from fossil fuels to green hydrogen in the hard-to-abate sectors.

Electrolysers are the key technology to produce green hydrogen. Electrolysers today, however, are inefficient, expensive, and difficult to scale. Hysata was founded to address those challenges.

Hysata recently closed the largest Series B round in Australian clean tech history, **with a \$167 million (US\$111 million) investment.**

This milestone demonstrates global recognition for Hysata's game changing high efficiency electrolyser from major strategic and financial investors.



Quantum technologies

Quantum technologies leverage unique characteristics of matter and light to further technology and scientific developments. Australian companies leveraging quantum properties can build advanced technologies that would otherwise seem impossible.

Australia's quantum companies are solving complex global challenges and outperforming global competitors in areas such as quantum computing, quantum sensing, cybersecurity and data analytics.

Australian quantum technologies are transforming industries including mining, where quantum sensors are used to detect minerals, managing complex timetabling and networking across public transport services, and providing data security and communication solutions to major global banks.

This success attracts major investment and a global talent pipeline – all underpinned by a thriving quantum research sector.

CSIRO predicts that quantum technologies could generate more than \$4 billion in revenue and 16,000 new jobs in quantum related technology fields in Australia by 2040.⁷²

Australia's thriving quantum industry:

There are **18 quantum companies** with headquarters in Australia.⁷³

Quantum companies in Australia have raised **\$600 million** in venture capital in the five years to 2023.⁷⁴

By 2030, the market for Australian quantum technologies is expected to **grow to \$6 billion**, with an annual growth rate of 6 percent.⁷⁵

Australia's quantum companies are solving complex global challenges



Quantum computing

Australia's quantum sector is at the forefront of global technology development. US-based quantum technology leader, **PsiQuantum**, will build the world's first utility-scale fault-tolerant quantum computer in Australia.

PsiQuantum will build and operate the warehouse-sized quantum computer in Brisbane, Queensland. Brisbane will also be PsiQuantum's Asia Pacific headquarters and regional hub.

Two of its founders – Professors Jeremy O'Brien and Terry Rudolph – are Australian.



World-first quantum materials

Nitrogen-vacancy (NV) diamond enables highly sensitive quantum applications, such as quantum sensing.

The Quantum Diamond Foundry in Victoria will provide a world-first certified supply of quantum diamond materials for advanced applications. This new facility will enable quantum companies like Quantum Brilliance to quantify the physical characteristics of a diamond from any supplier.



Optimising industrial processes

Quantum science can be applied to improve our understanding of industrial processes.

An Australian start-up, **Jovian Tech**, is building process instrumentation to measure the spin-isomer ratio in hydrogen molecules. Chemical engineers can use information from Jovian Tech to optimise hydrogen production plant operations and lower costs in the hydrogen economy.



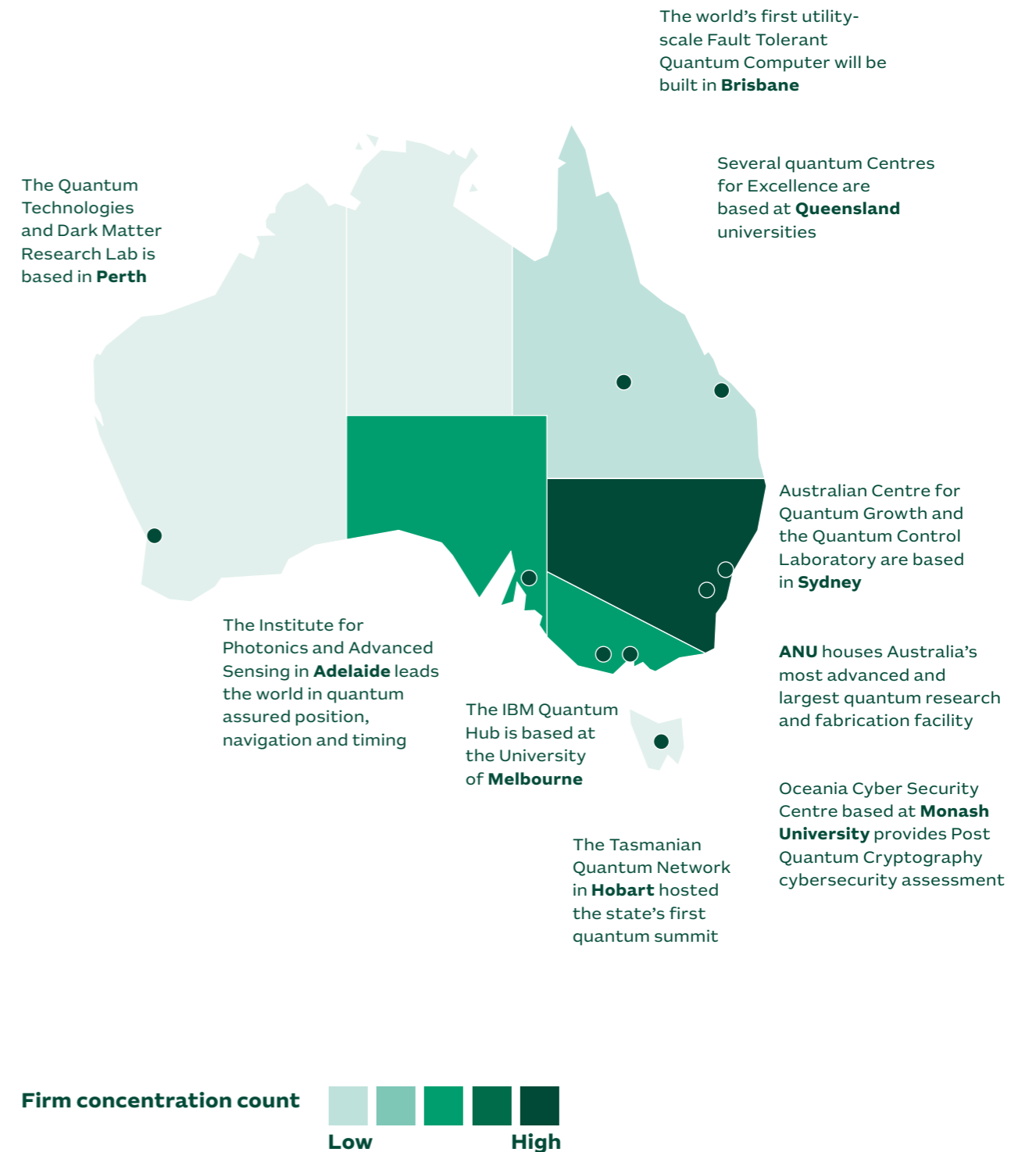
Data analytics

Australian quantum solutions are used by major companies improve data analytics through enhanced optimisation, better handling of high-dimensional data, better machine learning and enhanced security.

Commonwealth Bank of Australia's CommBank IQ provides fast, current, and highly relevant data insights to deliver better, data-driven products and automate decision making.



Explore Australia's quantum technologies precincts



Australia's world-leading quantum startups and industry leaders

Australia is home to **3 per cent of the world's quantum startups**, double the proportion of Australian startups across all sectors.⁷⁶ Australia's quantum ecosystem is attracting global talent, investment and industry leadership.

Australia has already led breakthroughs in areas such as quantum theory, quantum optics, semiconductor and superconducting devices, atomic physics, precision timing and sensing, cybersecurity. These have existing and near-term applications in medicine, automation, non-GPS navigation, and communications.

Quantum technologies have attracted major government support – **with the recent announcements worth up to \$1 billion**, and Victoria, New South Wales, and Queensland investing \$2.5 billion in quantum commercialisation.⁷⁷

The complete quantum value chain

Australia's domestic quantum ecosystem supports an end-to-end quantum value chain.

Silicon Quantum Computing (SQC) secures raw materials from a local provider **Silex Systems**. Down-stream of the hardware, SQC procures services from quantum software company **Aqacia**, which helps develop machine learning tools focused on accelerating quantum computing chip development and insights.

At the other end of the local value chain, SQC has had a long-standing relationship with the **Commonwealth Bank** and **Telstra**. As the technology continues to mature, these essential partnerships have informed the company of the valuable use cases and accelerated the development of the full quantum computing stack in SQC to meet these requirements.



Quantum Brilliance and Trellis

Autonomous vehicles, robotics, and smartphones are examples of edge computing devices. However, edge technology does not have the computational ability necessary to handle complex algorithms yet, limiting the application of mainstream edge computing devices for heavy-duty computing.

Australian quantum computing companies are expected to change this. As part of the Quantum Pioneers Program, the Pawsey Supercomputing Research Centre partnered with Quantum Brilliance to enable industry and research teams to explore the possibilities of edge quantum computing.

Quantum Brilliance worked with an industry partner, Trellis, to develop the Quantum Decoder, a hybrid quantum-classical application that seeks to improve speech transcription algorithms. The Quantum Decoder promises to be both fast and accurate. It uses a quantum computer to decode the input signal in a reasonable timeframe with no loss of information. This provides better accuracy at the same computational speed as similar-sized classical systems.



Australian quantum technologies attract global investment

Australia's quantum sector attracts investment from some of the world's most significant companies including Salesforce and Airbus.⁷⁸

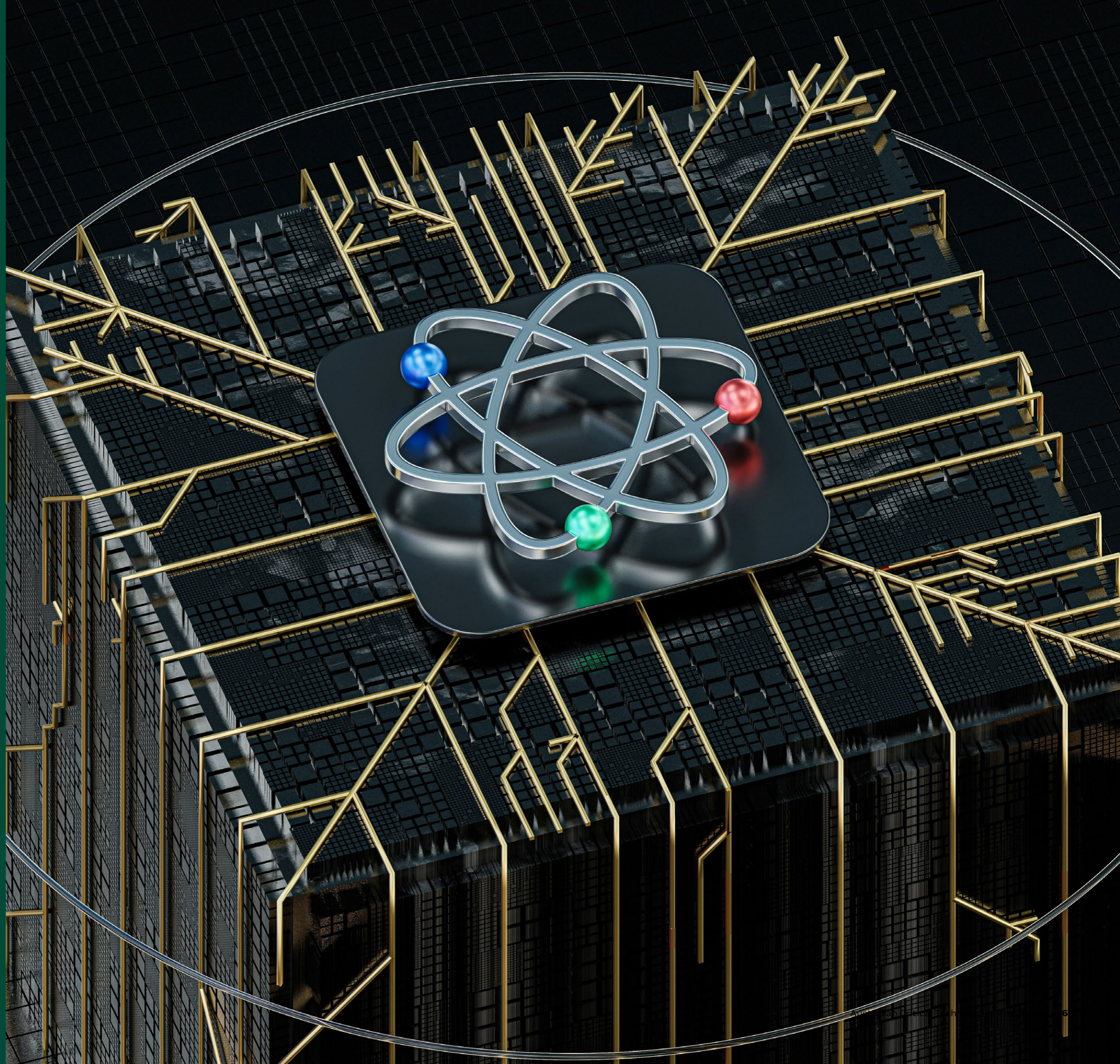
Australia attracts 4 per cent of global venture capital investment in quantum, well in excess of Australia's global GDP share of 1.6 per cent.⁷⁹ The average venture capital deal size for Australian quantum companies is \$22 million, outperforming leading international markets including Asia, the Americas and Europe.⁸⁰

A world-class quantum research and talent pipeline

Australia ranks in the world's top five universities for high impact quantum research and patents.⁸¹

The **Australian Centre for Quantum Growth** was established at the University of Sydney to foster collaboration and grow the quantum ecosystem and industry, with \$18 million in funding from the Government.

Australia's quantum capabilities attract international talent - half of Australia's leading quantum researchers studied overseas before choosing to work in Australia.⁸²



Protecting sensitive data requires the ability to fight the cyber threat from quantum computers. QLABs has developed quantum technology into the next generation of quantum cyber security products.

Australian cyber security company **QuintessenceLabs (QLabs)** is catching the attention of Fortune 500 companies worldwide, including a major global bank.

Working with Quintessence Labs, the bank explored a Quantum Random Number Generation (QRNG) solution to ensure the timely delivery of high-quality randomness consumed by the cryptographic processes running in the virtual machines.

The QRNG network appliances were deployed in all of the bank's data centres around the world, delivering entropy as a service.

After the QRNG solution, response times improved by up to 100 times.

QLabs exports to over 10 countries including the United States, Mexico, Canada, Germany, France, the UK and Singapore. QLABs is working with the World Economic Forum Global Futures Council on Cyber Security to develop policy guidance on quantum technologies.



Australia's National Quantum Strategy

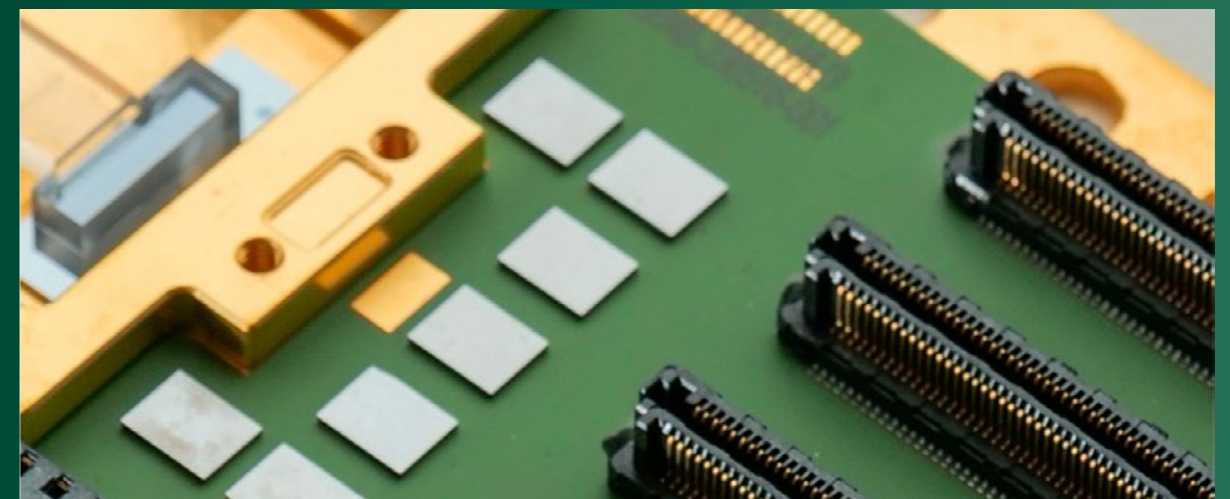
Australia's quantum opportunity is immense. Australia is recognised as a global quantum leader, with some of the best minds in quantum research and applied technology.

The Australian Government is taking action to grow the tech sector – including quantum technologies – to improve our economy's long-term performance and the prosperity of all Australians.

The National Quantum Strategy is the Australian Government's plan to grow the quantum industry in Australia. The strategy sets out a long-term vision for how Australia will take advantage of the opportunities of quantum technologies.

Through the strategy, we will:

- invest in, connect and grow Australia's quantum research and industry to compete with the world's best
- drive commercialisation through new programs to incentivise the continued growth of quantum use cases
- create pipelines for investment in industry-ready quantum technologies through the National Reconstruction Fund
- support new quantum infrastructure to ensure it meets the Australian industry's needs now and into the future
- cement Australia as the world's top destination for quantum talent
- strengthen Australia's international partnerships and influence as well as opportunities for Australian quantum companies
- champion responsible innovation and ensure the growth of Australia's quantum industry supports economic prosperity while safeguarding our national interests.



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