Australian Government

CTPCO

CRITICAL TECHNOLOGIES
POLICY COORDINATION OFFICE

The Action Plan for Critical Technologies

The Action Plan for Critical Technologies

Operationalising the Blueprint with tangible actions

The Blueprint for Critical Technologies outlines a vision for protecting and promoting critical technologies in Australia's national interest. The Blueprint is underpinned by four goals and seven action pillars, with a focus on promoting and protecting critical technologies through a national interest lens that balances the economic opportunities of critical technologies with their national security risks.

The Action Plan for Critical Technologies demonstrates the Australian Government's tangible actions to protect and promote critical technologies and categorises these actions under the Blueprint's response framework. In essence, the Action Plan operationalises the Blueprint.

The Action Plan identifies critical technologies in our national interest and demonstrates government action

The List of Critical Technologies specifies the technologies in the national interest. For all technologies listed now, the Government will apply a rigorous analytical framework to determine where policy gaps exist or may emerge. Noting that new critical technologies will emerge over time, the Government will frequently review the List to ensure the right technologies are identified. The Australian government has a comprehensive suite of actions in place already to promote and protect critical technologies – including existing research and business investments and policy actions. We will continue to review our suite of policy actions to ensure they remain fit for purpose as the environment changes and new challenges emerge. Where needed, the Government will deploy a variety of policy levers – including economic, national security and diplomatic levers – and make calculated decisions to address these challenges.

When pursuing actions to promote and protect critical technologies, the Government will prioritise policies that promote our liberal values of openness and transparency, a rules-based international order and a free and prosperous Indo-Pacific. However, the COVID-19 pandemic also demonstrates that pursuing actions to build our sovereign capability and resilience is vital to our national interest. The Government will ensure all actions to protect and promote critical technologies are proportional, targeted and sustainable.

The Government has four policy response categories available when pursuing actions on critical technologies. Table 1 gives an overview of each category of policy response and their corresponding policy levers.

A response framework for critical technologies

Table 1

CATEGORY A No regrets	Generally lowest costs	Low-cost actions that build resilience, regardless of the scale of the problem. These actions are designed to support government, industry, academia and Australian citizens in responding to the challenges and opportunities presented by critical technologies
CATEGORY B Responsive support	Generally lower costs	Responsive support for market resilience. Responsive support involves few costs unless a disruption occurs. In a critical technologies context, examples of disruptions that government might need to respond to 'reactively' include unwanted tech transfer and a supply disruption to a critical technology. Broader disruptions such as recessions, pandemics and environmental catastrophes also have flow-on consequences for Australia's ability to protect and promote critical technologies and therefore require a Government response
CATEGORY C Pre-emptive support	Generally moderate costs	Early and targeted action where a disruption to a critical technology is expected to significantly impact the national interest and there is an imperative to anticipate challenges and opportunities rather than respond to them. Managing the impacts of disruption involve upfront and ongoing costs, regardless of whether disruption occurs
CATEGORY D On-shoring & regulation	Generally highest costs	Actions that directly regulate economic and social activity and/or divert resources from areas backed by private investment. These actions may seek to establish a sovereign capability for a critical technology or to mitigate risks such as unwanted tech transfer. These actions generally incur higher costs because they can distort markets, require upfront and ongoing government investment and impose regulatory burden on industry

The Action Plan for Critical Technologies

Following from the response framework in Table 1, Table 2 demonstrates the Government's comprehensive suite of recent actions to promote and protect critical technologies across all four policy response categories

Government actions to promote and protect critical technologies

Table 2

No regrets	Responsive support	Pre-emptive support	On-shoring & regulation
New announcements • List of Critical Technologies in the National Interest • Short List of Critical Technologies for Initial Focus • Technology Cards - for Short List of Critical Technologies outlining where Australia sits in the world, key applications, government investment and opportunities and risks • Critical Technology Supply Chain Principles	**New announcements** • Defence Innovation Hub investment in AI applications for Defence **Existing initiatives** • Critical Minerals Facilitation Office • Global Business & Talent Attraction Taskforce • Global Talent Visa program • Universities Foreign Interference Taskforce • National Manufacturing Workforce Strategy • 'Secure-G' Connectivity Test Lab • Telecommunications Security Review	**New announcements** • Australia-India Centre of Excellence for Critical Technologies • Quantum Commercialisation Hub **Existing initiatives** • Modern Manufacturing Strategy • Critical Minerals Loan Facility • AI Action Plan • Australian 5G Innovation Initiative • National Hydrogen Strategy • Clean Energy Finance Corporation • Supply Chain Resilience Initiative	**Existing initiatives** • Defence & Strategic Goods List • Foreign investment restrictions for critical technologies • Sovereign mRNA vaccine capability

More information on the Government's actions to protect and promote critical technologies

List of critical technologies in the national interest

The Government has developed a list of critical technologies in the national interest. The list consists of 63 technologies in eight categories that are either critical for Australia today or are expected to become critical within the next ten years. From this list of 63 technologies, the CTPCO has identified an interim short list of nine technology areas for initial focus.

Tech cards for critical technology areas

For each of the nine technology areas for initial focus, the Government has developed a set of tech cards. The tech cards are intended to provide an easily accessible snapshot of the technology, its applications, the underpinning science, our research strengths, venture capital and patents, key Commonwealth priorities and investments, and opportunities and risks.

Government actions to protect and promote critical technologies

As part of this Action Plan, the Government is launching a package of new initiatives to protect and promote critical technologies. This package focuses initially on 'no regrets' and 'pre-emptive' actions. Focusing on these two actions ensures the Government protects and promotes critical technologies in a way that is low-cost, proactive and engages key international partners. This package builds upon a strong foundation of work already underway across government in the critical technologies space.

List of critical technologies in the national interest

The safe and responsible development and deployment of critical technologies brings enormous opportunities, underpinning exponential improvements in productivity, facilitating economic growth and high quality jobs, enabling all Australians and businesses to securely participate in the digital economy, improving our health, raising our living standards, and improving our defence and national security capabilities. The Australian Government's framework and actions for capitalising on critical technologies to drive a technologically-advanced, future-ready nation by promoting and protecting critical technologies can be found at:

www.pmc.gov.au/domestic-policy/critical-technologies-policy-coordination-office

Australia's National Interest

In 2020, the Australian Government set out to identify current and emerging critical technologies and assess their impact on Australia's national interest. In order to maximise the opportunities, and manage the risks associated with these technologies, we look at these technologies through a national interest lens. Australia's national interest includes economic prosperity, national security and social cohesion. Advances in technology underpin our future prosperity, however, they also have the potential to harm our national and economic security interests, and undermine our democratic values and principles.

About the List

In order to assist with the identification of critical technologies in the national interest, the Australian Government has developed Australia's initial List of critical technologies in the national interest ("the List"). The 63 technologies on the List have the capacity to be used in many different ways, with many having implications for defence and security, but often also broader applications.

Our aim in developing the List is to provide guidance and a clear signal about the critical technologies that may have national interest implications for Australia today or within the next ten years. The List is part of Government's guidance and assistance to society, academia and businesses to build the right skills and acquire the necessary tools to efficiently and effectively adopt critical technologies in a safe and secure manner.

This List itself does not imply any recommended or prohibited actions —inclusion of a technology on the List does not imply guaranteed prioritisation or that there is a real or perceived risk to national security from that technology. Conversely, technologies not on the List are not, in and of themselves, unimportant or excluded from future consideration by government. This List is an overarching list that is separate to other more targeted lists of technologies developed by government to address specific policy requirements; for example, the Defence and Strategic Goods List (DSGL).

Technologies on the List are not presented in order of importance, by sector or by application. An initial attempt has been made to identify standalone technologies, at a similar level of granularity, for inclusion on the List. Some important business models and products (e.g. Software as a Service (SaaS) and social media platforms), critical infrastructure (e.g. electricity networks and cloud computing), and converged technologies (e.g. the Internet of Things and technology-enabled misinformation campaigns such as "fake news") are therefore not included on the List.

The List

The List does	The List is not
• Provide a central list of critical technologies to assist with consistent discussion and decision making across sectors.	• Static. Government intends to update the List regularly.
• Indicate technologies that may require increased focus to promote or protect our national interest.	• A list of technologies that will be, or should be, additionally regulated or controlled.
• Indicate technologies that may require additional risk management.	• A list of technologies where the government intends to prevent or limit collaboration with international research partners.
• Indicate technologies where additional development or understanding may be required.	• Intended to override or replace other specific government technology lists, such as the DSGL.

Development of the List

Government first developed an initial list based on existing technology lists from across government and key international partners. This initial list underwent broad consultation across government, academia and industry. The most extensive consultation occurred in the agriculture and health sectors, on technologies considered potentially critical to them. The first round of feedback focused primarily on the granularity and explanation of technologies; the need to ensure the list captured specific critical technologies; the mapping of technologies to university course and research codes; and areas for inclusion where Australia had a strong capability in a technology. The list was revised significantly to take account of the feedback and a further round of targeted consultation was undertaken. Key feedback from that round of consultation was the need to provide more information on the purpose of the List, add applications across all technologies, and to improve the presentation of the List.

Next steps

We recognise there is more to do. The List does not cover instances of technological convergence, which are also likely to be critical; we anticipate further work in this area in the coming months. We will also ensure all stakeholders have an opportunity to provide input to regular reviews of the List, which will take account of changes in strategic priorities and emerging research.

List of critical technologies in the national interest

The technologies on this list are current and emerging technologies that have been identified as having a significant impact on our national interest (economic prosperity, national security and social cohesion). Many of the technologies on the list have implications for defence and security, but also often have broader applications.

Advanced materials and manufacturing

AI, computing and communications

Biotechnology, gene technology and vaccines

Energy and environment

Quantum

Sensing, timing and navigation

Transportation, robotics and space

List of critical technologies in the national interest

Many technologies on this List have implications for defence and security.

Advanced materials and manufacturing

Additive manufacturing (incl. 3D printing)

Manufacturing physical objects by depositing materials layer by layer according to a digital blueprint or 3D model. Additive manufacturing systems use a variety of techniques to print objects in various sizes (from nanoscale to room-sized) and materials (including plastics, ceramics and metals). Applications for additive manufacturing include rapid prototyping and making custom or small quantity components.

Advanced composite materials

New materials created by combining two or more materials with different properties, without dissolving or blending them into each other. Advanced composite materials have strength, stiffness, or toughness greater than the base materials alone. Examples include carbon-fibre-reinforced plastics and laminated materials. Applications include vehicle protection, signature reducing materials, construction materials and wind turbine components.

Advanced explosives and energetic materials

Materials with large amounts of stored or potential energy that can produce an explosion. Applications for advanced explosives and energetic materials include mining, civil engineering, manufacturing and defence.

Advanced magnets and superconductors

Advanced magnets are strong permanent magnets that require no or few critical minerals. Applications for advanced magnets include scientific research, smartphones, data storage, health care, power generation and electric motors.

Superconductors are materials that have no electrical resistance, ideally at room temperature and pressure. Applications for superconductors include creating strong magnetic fields for medical imaging, transferring electricity without loss, and hardware for quantum computers.

Advanced protection

Clothing and equipment to protect defence, law enforcement and public safety personnel and defence platforms from physical injury and/or chemical or biological hazards. Examples include helmets, fire-retardant fabrics, respirators, and body armour.

Continuous flow chemical synthesis

Systems that produce fine chemicals and pharmaceuticals using continuous-flow processes, rather than batches. Compared to batch chemistry, flow chemistry can make fine chemicals and pharmaceuticals faster, more consistently and with less waste products. Applications for continuous flow chemical synthesis include rapid analysis of chemical reactions, and manufacturing industrial chemicals, agrichemicals and pharmaceuticals.

Coatings

Substances applied to the surface of an object to add a useful property. Examples include anti biofouling coatings that prevent plants or animals growing on ships or buildings, super-hydrophobic coatings that repel water from solar panels or reduce drag on the hulls of ships, electromagnetic absorbing coatings that make airplanes and ships less visible to radar systems, thermal coatings that reduce heat loss and increase energy efficiency, and anti-corrosion coatings that prevent rust.

Critical minerals extraction and processing

Systems and processes to extract and process critical minerals safely, efficiently and sustainably. Australia has an abundance of critical minerals and has the opportunity to be a global leader in the ethical and environmentally responsible supply of key critical minerals. Applications for critical minerals extraction and processing include mining, concentrating minerals, and manufacturing battery-grade chemicals.

High-specification machining processes

Systems and devices that can cut and shape raw materials into complex and highly precise components. Examples include computer numerical control (CNC) mills, CNC lathes, electron discharge machining, precision laser cutting and welding, and water jet cutting. Applications for high-specification machining processes include making aerospace parts, and making components for other manufacturing devices.

Nanoscale materials and manufacturing

Materials with essential features measuring less than 100 nanometres and technologies for their manufacture. Applications for nanoscale materials include, paint, pharmaceuticals, wastewater treatment, data storage, communications, semiconductors, capturing carbon dioxide, and nanoscale tracking markers for critical materials.

Novel metamaterials

New synthetic materials that have properties that do not occur naturally, such as the ability to bend light or radio waves backwards. Applications for novel metamaterials include energy capture and storage, radio antennae, and adaptive camouflage.

Smart materials

Materials that have properties that change in response to external action. Examples include shape memory alloys that change shape when heated and self-healing materials that automatically repair themselves when damaged. Applications for smart materials include clothing, body armour, building materials and consumer electronics.

AI, computing and communications

Advanced data analytics

Systems, processes and techniques for analysing large volumes of data (i.e. 'big data') and providing useful and timely insights, usually with limited human intervention. Applications for advanced data analytics include medical diagnosis and treatment, acoustic analytics, regulatory compliance, insurance, climate monitoring, infrastructure forecasting and planning, and national security.

Advanced integrated circuit design and fabrication

Systems and processes to design sophisticated integrated circuits and manufacturing processes to fabricate integrated circuits using process nodes below 10 nanometres. Examples include systems-on-chip (SoC), field programmable gate arrays (FPGAs), stacked memory on chip and specialised microprocessors for defence industry.

Advanced optical communications

Devices and systems that use light to transfer information over optical fibre or free space (i.e. air or the vacuum of space) and use laser technologies, adaptive optics and optical routing to transfer information faster, more reliably, more efficiently and/or using less energy. Applications for advanced optical communications include high-speed earth satellite communications, short-range visible light communications (i.e. 'Li-Fi'), narrow-beam laser communications and multi-gigabit broadband and corporate networks.

Advanced radiofrequency communications (incl. 5G and 6G)

Devices and systems that use radio waves to transfer information over free space (i.e. air or the vacuum of space) and use novel modulation techniques, advanced antenna designs and beamforming technologies to transfer information faster, more reliably, more efficiently and/or using less energy. Applications for advanced radiofrequency communications include communications satellites, cellular networks (e.g. 5G and 6G), wireless local area networks (e.g. Wi-Fi), short-range wireless communication (e.g. Bluetooth), sensor networks, connected vehicles, implantable medical devices and mobile voice and data services for public safety and defence.

Artificial intelligence (AI) algorithms and hardware accelerators

Artificial intelligence (AI) algorithms are computer algorithms that perform tasks normally requiring human intelligence. Applications for artificial intelligence algorithms include personal and workplace virtual assistants, process automation, virtual and augmented reality, creating more realistic video game environments and characters, public transport planning and optimisation, crop and livestock management, and defence.

Artificial intelligence hardware accelerators are computer hardware optimised and purpose built to run artificial intelligence algorithms faster, more precisely or using less energy than is possible using non-optimised general purpose computer hardware. Applications for artificial intelligence hardware accelerators include processing on board smartphones, portable virtual and augmented reality systems, and low power internet of things (IoT) sensors.

Distributed ledgers

Digital systems for recording transactions, contracts and other information across multiple systems or locations. Distributed consensus mechanisms eliminate the need for a central authority to maintain the ledger, making transactions and stored records less susceptible to cyber-attacks or fraud. Blockchain is an example of a distributed ledger, with the digital currency Bitcoin utilising blockchain as its ledger for financial transactions. Applications for distributed ledgers include cryptocurrencies, verification of supply chains such as for product provenance and emissions monitoring and verification, tracking recoverable and recyclable product content, land records, and share trading.

High performance computing

Computer systems that exceed the performance capabilities of consumer devices (i.e. widely available desktop and laptop computers) by an order of magnitude. High performance computers—such as supercomputers—can process large volumes of data and/or perform complex calculations that are impossible or impractical using consumer devices. Applications for high performance computing include climate modelling, computational chemistry and high quality computer graphics for film and television.

Machine learning (incl. neural networks and deep learning)

Computer algorithms that automatically learn or improve using data and/or experience. Machine learning is a type of artificial intelligence. Applications for machine learning include computer vision, facial recognition, cybersecurity, media creation, virtual and augmented reality systems, media manipulation (e.g. deepfakes), content recommendation systems, and search engines.

Natural language processing (incl. speech and text recognition and analysis)

Systems that enable computers to recognise, understand and use written and/or spoken language in the same ways that people use language to communicate with each other. Natural language processing is a type of artificial intelligence. Applications for natural language processing include predictive text, language translation, virtual assistants and chat bots, summarising long documents, sentiment analysis, and making technologies more accessible and inclusive.

Protective Cyber Security Technologies

Systems, algorithms and hardware that are designed to enable a cyber security benefit. Applications for cyber security technologies include but are not limited to; operational technology security, trust and authentication infrastructures, protection of aggregated data sets, protection of AI systems and supply chain security.

Biotechnology, gene technologies and vaccines

Biological manufacturing

Processes that use living cells to make useful chemicals or materials. Examples include fermentation products, biologic medicines such as antibodies and enzyme replacement therapies, and enzymes for environmental remediation and recycling plastics.

Biomaterials

Natural or synthetic materials that can safely interact with biological systems (e.g. the human body) to support medical treatment or diagnosis. Applications for biomaterials include medical implants, such as artificial joints and heart valves, scaffolds to promote bone and tissue regrowth, biosensors and targeted drug delivery systems.

Genetic engineering

Tools and techniques for directly modifying one or more of an organism's genes. Existing techniques include CRISPR gene editing and molecular cloning. Applications for genetic engineering include making crops that are more nutritious or require less water or pesticides, treating genetic diseases by replacing faulty genes with working copies and cell therapies that treat diseases by extracting, modifying and reimplanting patients' own cells.

Genome and genetic sequencing and analysis (Next Generation Sequencing)

Tools and techniques for quickly sequencing (i.e. 'reading') the genetic material of human beings, other living organisms and viruses, and for analysing and understanding the functions of those sequences. Applications for genomics and genetic sequencing and analysis include identifying the genes associated with particular diseases or biological functions, identifying new communicable diseases, crop and livestock breeding and predicting how effective drugs will be for different patients.

Nanobiotechnology

Devices, tools and techniques that use the special properties of nanostructures to monitor or modify living organisms. Applications for nanobiotechnology include more targeted pesticides, biosensors that can detect and count flu viruses, and bioactive nanocapsules that can deliver drugs to where they are needed and nowhere else, reducing side effects and enabling more doctors to use more powerful drugs.

Nanoscale robotics

Nanoscale machines made from components like DNA. Applications for nanoscale robotics include targeted drug delivery, identifying cancer cells and moving molecules to assemble drugs or other nanoscale robots.

Neural engineering

Systems and devices that directly monitor, or interact with, the brain or nervous system. Applications for neural engineering include biofeedback monitoring, sensory prosthetics and devices to supplement or replace damaged nerves.

Novel antibiotics and antivirals

Systems for identifying or designing new types of antibiotic and antiviral drugs that can treat bacterial and viral infections in humans and animals safely and effectively. New antibiotic and antiviral drugs must be continually developed and tested to ensure there are drugs available to treat both new infectious diseases and existing bacterial and viral diseases that become resistant to existing drugs. Examples include drugs to treat Methicillin-resistant Staphylococcus aureus (MRSA) and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

Nuclear medicine and radiotherapy

Nuclear medicine uses radioactive substances to diagnose or treat diseases. Applications for nuclear medicine include imaging internal organs and tissues, viewing biological processes and using radiopharmaceuticals to treat cancers and other diseases.

Radiotherapy uses ionizing radiation to treat diseases by damaging the DNA in targeted cells, killing those cells. Applications for radiotherapy include treating some types of cancer and treating other diseases caused by overactive cells.

Synthetic biology

Designing and constructing biological systems and devices that have useful functions not found in nature. Applications for synthetic biology include creating microorganisms that can clean-up environmental pollutants and recycle plastics, manufacturing animal-free meat and dairy products, and biological computers.

Vaccines and medical countermeasures

Tools and techniques to quickly develop and manufacture vaccines, drugs, biologic products and devices used to diagnose and treat emerging infectious diseases and medical conditions caused by exposure to harmful chemical, biological, radiological, or nuclear substances. Applications for vaccines and medical countermeasures include public health emergencies, industrial accidents and defence.

Energy and environment

Biofuels

Solid, liquid or gas fuels produced from biological or organic sources. Examples include biogas and biodiesel derived from plant biomass, and bioethanol from crops such as corn and sugar cane.

Directed energy technologies

Systems and devices that transfer energy between two points in free space. Applications for directed energy technologies include powering consumer electronics, recharging electric vehicles, powering aerial drones, ground-space energy transfer, wireless sensor networks and internet of things devices, and advanced weapons.

Electric batteries

Devices that produce electricity from stored electrochemical energy and tolerate multiple charge and discharge cycles. Electric batteries utilise various materials and chemistries (e.g. lithium-ion (Li-ion), nickel metal hydride battery (Ni-MH)) and form factors (e.g. flow batteries for stationary grid storage, polymer electrolytes for vehicles and personal devices). Applications for electric batteries include electrified road and air transport, smartphones and personal electronic devices, medical devices and grid energy storage.

Hydrogen and ammonia for power

Sustainable production, storage, distribution and use of hydrogen (H2) and ammonia (NH3) for heat and electricity generation. Hydrogen and ammonia are potential low or zero emission, zero-carbon alternatives to fossil fuels and electric batteries. Applications for hydrogen and ammonia include energy storage and as a fuel source for aviation and marine transport, long distance road transport and heating.

Nuclear energy

Electricity generation using the energy released when the core of an atom (called the atomic nucleus) splits into two or more lighter atomic nuclei. Applications include energy production for self-contained and/or remote uses, such as space travel, submarines, scientific research and medical isotope production.

Nuclear waste management and recycling

Processes to safely dispose of, or reuse or reprocess for useful purposes, radioactive waste products from medical, industrial and research practices. Examples include converting radioactive liquid waste into synthetic rock to minimise leeching, and reprocessing spent radioactive fuel for use in long-life, low-power batteries. Applications include environmental protection and extending the useful life of nuclear material.

Photovoltaics

Devices that convert solar energy into electricity using layers of semiconductor materials. Applications for photovoltaics include low-emissions power stations, rooftop solar power, spacecraft and personal electronics.

Supercapacitors

Electrochemical devices that can store large amounts of energy in small volumes. Supercapacitors store less energy and for shorter durations than rechargeable batteries (hours or days, rather than months or years), but can accept and deliver charge much faster than rechargeable batteries, and tolerate many more charge and discharge cycles than rechargeable batteries before performance degrades. Applications for supercapacitors include regenerative braking, smartphones and personal electronic devices, grid energy storage and defence.

Quantum

Post-quantum cryptography

Mathematical techniques for ensuring that information stays private, or is authentic, that resist attacks by both quantum and non-quantum (i.e. classical) computers. The leading application for post-quantum cryptography is securing online communications against attacks using quantum computers. Because quantum computers can efficiently solve the 'hard' mathematical problems we currently rely on to protect online communications, Australia needs post-quantum cryptography to ensure communications stay secure once quantum computers are available.

Quantum communications (incl. quantum key distribution)

Devices and systems that communicate quantum information at a distance, including cryptographic keys. Applications for quantum communications include transferring information between quantum computers and sharing cryptographic keys (which are like secret passwords) between distant people in a way that means it is impossible for anyone else to copy.

Quantum computing

Computer systems and algorithms that depend directly on quantum mechanical properties and effects to perform computations. Quantum computers can solve particular types of problems much faster than existing 'classical' computers, including problems that are not practical to solve using even the most powerful classical computers imaginable. Applications for quantum computing accurately simulating chemical and biological processes, revealing secret communications, machine learning and efficiently optimising very complex systems.

Quantum sensors

Devices that depend directly on quantum mechanical properties and effects for high precision and high sensitivity measurements. Applications for quantum sensors include enhanced imaging, passive navigation, remote sensing, quantum radar, and threat detection for defence.

Sensing, timing and navigation

Advanced imaging systems

Imaging systems with significantly enhanced capabilities, such as increased resolution, increased sensitivity, smaller devices, faster image capture or otherwise novel and useful capabilities. Applications for advanced imaging systems include healthcare, creative industries, surveillance, and scientific research.

Atomic clocks

Devices that keep time by measuring the frequency of radiation emitted or absorbed by particular atoms. Atomic clocks are the most accurate timekeeping devices known and are used (directly or indirectly) for tasks where measuring time with precision and consistency is essential. Applications for atomic clocks include active and passive navigation systems, processing financial transactions and synchronising telecommunications networks.

Gravitational-force sensors

Devices that detect minute changes in Earth's gravitational field. Applications for gravitational-force sensors include passive navigation enhancement and detecting mineral deposits, concealed tunnels and other subsurface features that create tiny variations in Earth's gravitational field.

Inertial navigation systems

Systems and devices that can calculate the position of an object relative to a reference point without using any external references. Applications for high precision inertial navigation systems include replacing or augmenting other navigation systems that require external references—like GPS—in places where external signals can be blocked or corrupted; e.g. underground or in cities with narrow streets and tall buildings.

Magnetic field sensors

Devices that can detect and measure the strength and/or direction of magnetic fields. Applications for magnetic field sensors include passive navigation, imaging for health, metallurgy, scientific research and threat detection for defence.

Miniature sensors

Miniature devices (generally smaller than 10 mm3) that can detect and record or communicate changes in their environment, such as temperature, radiation, vibration, light, chemicals or moisture. Applications for miniature sensors include 'smart dust' wireless sensor networks to monitor environmental conditions in agriculture or near possible sources of pollution.

Multispectral and hyperspectral imaging sensors

Multispectral imaging sensors capture data across several discrete ranges across the electromagnetic spectrum, such as red, green, blue and near infrared light; hyperspectral imaging sensors further this approach by capturing hundreds of much smaller ranges across the electromagnetic spectrum. Applications for multispectral and hyperspectral imaging sensors include healthcare, defence, agriculture, manufacturing, measuring soil carbon content for carbon sequestration, and machine vision for autonomous vehicles and robots.

Photonic sensors

Devices that use light to detect changes in the environment or in materials. Applications for photonic sensors are broad, ranging from mainstream photography, through to sensors for environments where electrical or chemical based sensors are impractical or unreliable, such as laser based gas sensors to detect explosive materials or flexible photonic sensors embedded inside the human body to monitor bodily processes.

Radar

Systems that listen for radio waves and microwaves reflected off objects and surfaces—such as people, buildings, aircraft and mountains—to 'see' how far away and how fast those objects are moving. Active radar systems send their own radio signals to reflect off objects; passive radar systems listen for radio signals sent by targets or reflections of signals already present in the environment (e.g. television signals). Applications for radar include weather forecasting, situational awareness, connected and autonomous vehicles, virtual and augmented reality systems, and defence.

Satellite positioning and navigation

Networks of satellites that broadcast precise time signals and other information, which Earth-based devices can use to calculate their location and for navigation. Advanced systems enable greater location accuracy and faster location finding, and greater resistance to unintentional signal interference and intentional jamming or spoofing. Applications for satellite positioning and navigation include consumer and commercial transport, construction and surveying, tracking valuable goods, and defence.

Scalable and sustainable sensor networks

Sensor devices and systems than can be cost-effectively deployed in large numbers and over large areas to monitor physical conditions and communicate findings to one or more locations. Applications for scalable and sustainable sensor networks include smart electricity grids, intelligent transportation systems and smart homes.

Sonar and acoustic sensors

Systems that listen for soundwaves created by, or reflected off, objects—such as boats, submarines, fish and underwater mountains—to identify those objects and/or 'see' how far away and how fast those objects are moving. Applications for sonar and acoustic sensors include monitoring marine wildlife, and threat detection, identification and targeting for defence.

Transportation, robotics and space

Advanced aircraft engines (incl. hypersonics)

Engine technologies that enable greater speed, range, and fuel-efficiency for aerial vehicles. Examples include hypersonic technologies such as ramjet and scramjet engines that allow aircraft and weapons to travel beyond Mach 5 (i.e. flying more than five times the speed of sound).

Advanced robotics

Robots capable of performing complex manual tasks usually performed by humans, including by teaming with humans and/or self-assembling to adapt to new or changed environments. Applications for advanced robotics include industry and manufacturing, defence and public safety, and healthcare and household tasks.

Autonomous systems operation technology

Self-governing machines that can independently perform tasks under limited direction or guidance by a human operator. Applications for autonomous systems operation technology include passenger and freight transport, un crewed underwater vehicles, industrial robots, public safety and defence.

Drones, swarming and collaborative robots

Un-crewed air, ground, surface and underwater vehicles and robots that can achieve goals with limited or no human direction, or collaborate to achieve common goals in a self-organising swarm. Applications for drones, swarming and collaborative robots include public safety, environmental monitoring, agriculture, logistics, and defence.

Small satellites

Satellites with relatively low mass and size, usually mass under 500 kg and no larger than a domestic refrigerator or washing machine. Applications for small satellites include lower-cost earth observation constellations and wide area communications networks.

Space launch systems (incl. launch vehicles and supporting infrastructure)

Systems to transport payloads—such as satellites or spacecraft—from the surface of the Earth to space safely, reliably and cost-effectively. Applications for space launch systems include launching defence, commercial, and scientific and research payloads into earth orbit.

List of critical technologies of initial focus

Critical minerals extraction and processing	
Advanced explosives and energetic materials	Critical minerals extraction and processing
Advanced Communications (including 5G and 6G)	
Advanced optical communications	Advanced radiofrequency communications (incl. 5G and 6G)
Artificial intelligence	
Advanced data analytics	AI algorithms and hardware accelerators
Machine Learning	Natural Language Processing
Cyber security technologies	
Protective cyber security technologies	Machine learning (also in AI)
Genomics and genetic engineering	
Genetic engineering	Genome and genetic sequencing and analysis (Next Generation Sequencing)
Synthetic biology	
Novel antibiotics, antivirals and vaccines	
Novel antibiotics and antivirals	Vaccines and medical countermeasures
Low emission alternative fuels	
Biofuels	Hydrogen and ammonia for power
Quantum technologies	
Post-quantum cryptography	Quantum communications (incl. quantum key distribution)
Quantum computing	Quantum sensors
Autonomous vehicles, drones, swarming and collaborative robotics	
Advanced robotics	Autonomous systems operation technology
Drones, swarming and collaborative robots	

Government actions to protect and promote critical technologies

New Government actions to protect and promote critical technologies

- Quantum Commercialisation Hub
- Australia-India Centre of Excellence for Critical Technology Policy

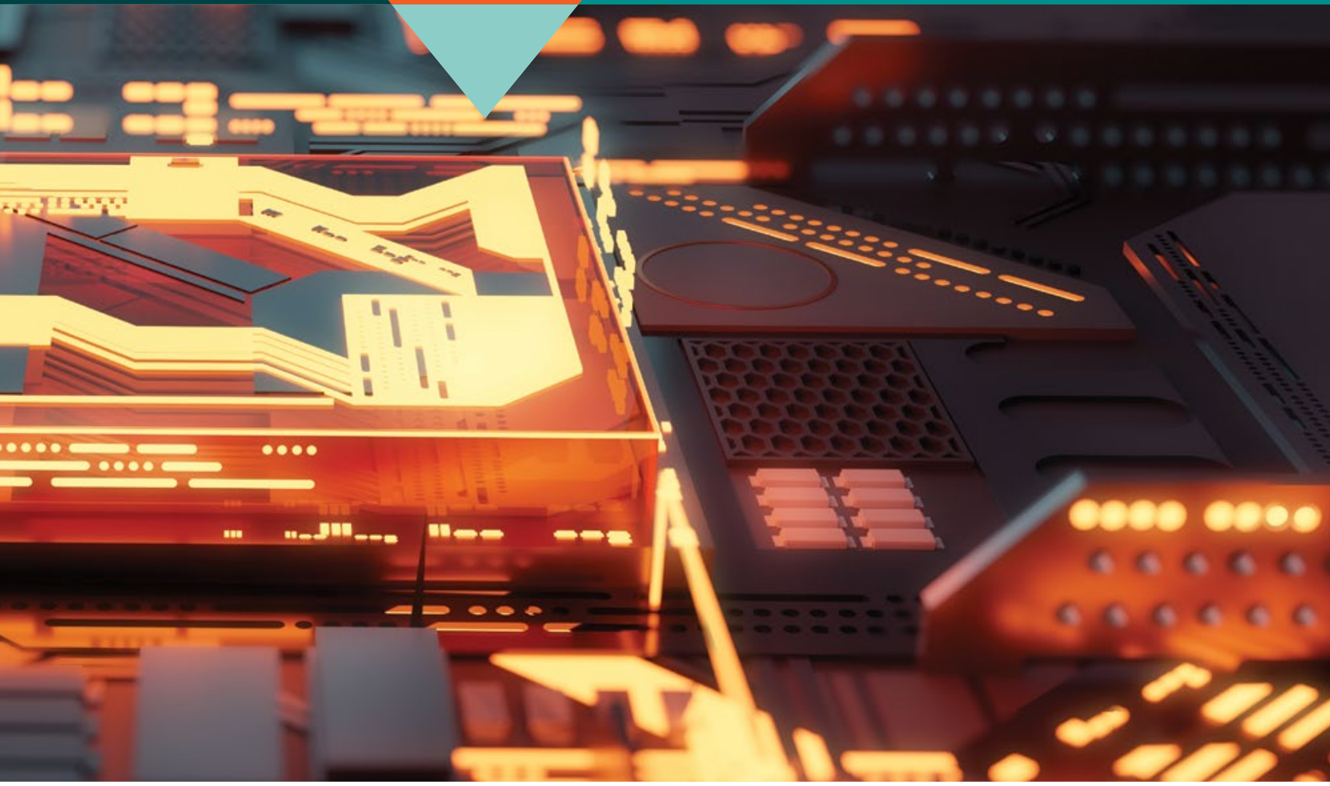
Quantum Commercialisation Hub

The development, commercialisation and adoption of quantum technologies could deliver Australia $4 billion in economic value and create 16,000 new jobs by 2040. There are also national security dividends. Quantum technologies will be key to Australia's future defence and national security capabilities, and vital in shielding our public and private sectors from advanced cyber attacks.

Australia is already a global leader in several areas of quantum technologies, including sensing, but requires targeted government action to unlock greater private sector investment and create a self-sustaining quantum industry. At present, there are supply side and demand side barriers to scaling a quantum technologies sector. On the supply side, quantum technologies are expensive to produce and take a long time to get to the stage where there is a 'product' to sell. There is also a lack of coordination in the sector preventing scale-up. On the demand side, Australia's small market size means we cannot support a sector based on domestic demand alone. In addition, Australia – rightfully – protects our quantum technology companies, products and expertise through a range of mechanisms such as foreign investment and defence export controls. Industry says this chills demand for products and overseas investment in Australia.

To address these challenges and take advantage of the opportunities presented by quantum, the Government is seeking to establish the Quantum Commercialisation Hub to work with like-minded countries to help commercialise Australia's quantum research, coalesce action around areas where Australia can have a comparative advantage, slot into international supply chains and improve access to international customers and investors.

The Hub will be established with Commonwealth and industry co-funding, focused on commercialising quantum research and building market demand for Australian products, both



domestically as well as in partner countries. It will create global supply chain opportunities and support the collaborative, mutually beneficial exchange of skills in a way that supports our national security and economic interests. It will also support joint commercialisation projects and joint ventures. The Hub will leverage existing quantum technology infrastructure and work with states and territories to ensure a joined up, national approach. The establishment of the Hub with international partners will help to create pathways for investment from trusted sources and send a powerful signal to global investors acting as a counterbalance to Australia's legitimate foreign investment and export controls.

Enabling Australian-based quantum companies to more easily access international markets and supply chains will drive investment in Australia's quantum industry and support the onshore retention of Australian talent and businesses, which will be a fundamental driver of growth in Australia's quantum industry.

The Hub proposal builds on CSIRO's quantum technology roadmap, and supports the 2021 Digital Economy Strategy and the Government's Blueprint for Critical Technologies. Additionally, it will assist in the development of enabling, cross-cutting technologies that will underpin the future of Australian manufacturing and growth of the National Manufacturing Priority areas, as outlined in the Modern Manufacturing Strategy.

Australia-India Centre of Excellence for Critical Technologies

The establishment of an Australia-India Centre of Excellence for Critical and Emerging Technologies will:

- Strengthen our partnership with India – the world's second largest internet market and powerhouse in critical technology policy;
- Seek to shape technology governance so that it aligns with our values and supports an open, inclusive and resilient Indo-Pacific;
- Reduce delays in policy and regulatory development for new and emerging technologies;
- Promote investment opportunities and innovation between Australia and India in technology; and
- Serve as a prototype for a broader Indo-Pacific critical technology network.

Experts will work closely to develop multidisciplinary policy advice and associated products to help guide the responsible development and use of critical technologies. Inclusive programs for women and youth in tech will underpin the objective of an open, citizen-centric model of technology governance. Fellowships for Quad and ASEAN partners will expand the Centre's reach and impact.

The Centre of Excellence is among the flagship initiatives of Australia's new Action Plan for Critical Technologies, and an important part of delivering on Australia's strategy for protecting and promoting technologies, the Blueprint for Critical Technologies. The Centre will promote Australia as a trusted partner for investment, research, innovation and collaboration, and support regional resilience and competitive, trusted and diverse technology innovation

Australian Prime Minister Scott Morrison (right) shakes hands with the Prime Minister of India Narendra Modi during a bilateral meeting at the ASEAN East Asia Summit in Bangkok, Thailand, Monday, November 04, 2019. (AAP Imag/Lukas Coch)

markets. It will provide a practical platform for Australia and India to work together to shape technology governance that aligns with our values and supports an open, inclusive and resilient Indo-Pacific.

It builds on the Prime Minister-led Comprehensive Strategic Partnership (CSP) commitments to enhance cooperation in our cyber and critical technology relationship with India; supports Australia's domestic Digital Economy Strategy; our International Cyber and Critical Technologies Engagement Strategy; and the Quad 'Principles on Technology Design, Development, Governance, and Use'.

Existing Government initiatives to protect and promote critical technologies

The following existing initiatives demonstrate the Government is pre-emptively seizing opportunities and mitigating risks across the critical technologies landscape.
These existing initiatives align closely with the Government's new short list of critical technologies. The initiatives include:

- Australia's Civil Space Program
- 5G and Future Connectivity Initiatives
- The AI Action Plan
- The National Hydrogen Strategy
- The Medical Research Future Fund

Australia's Civil Space Program

Australia's Civil Space Strategy

The Australian Civil Space Strategy 2019-28 outlines the Australian Government's plans to transform and grow our space industry. The sector's potential is recognised in the Strategy. It sets out an ambition to triple the Australian space industry market size from $3.9 billion to $12 billion and create an additional 20,000 jobs by 2030. Spill over effects will see further jobs and economic growth. Since 2018 the Australian Government has invested more than $700 million in the civil space sector as part of its plan to grow the sector.

Every day, modern Australia relies on space-based technology for critical services including communications and internet, navigation and positioning, and infrastructure monitoring, as well as responding to emergencies such as extreme weather events and bushfires.

The Australian Government is developing a suite of technical roadmaps under each of the six National Civil Space Priority Areas to inform investment opportunities for Australia. The following best align with the Government's List of Critical Technologies in the National Interest:

- **Communications Technologies and Services** – satellite communications (SATCOM) allow communications where regular radio communications and telecommunications cables are not available or viable. For example, SATCOM is critical for communications with ships in maritime jurisdictions.
- **Earth Observation** – Earth observation from satellites enables images to be taken from space for multiple uses, for example monitoring bushfires, water resources and agricultural land.
- **Space Situational Awareness** – space situational awareness (SSA) is the tracking and monitoring of satellites and space debris using ground based assets such as telescopes and radars. It is essential for space traffic management (expected to be published in December 2021).
- **Remote Operations and Robotics** – Australia is a world leader in remote asset management in industries such as mining, oil and gas. Australia can leverage this capability for remote operation and exploration in space (expected to be published in December 2021).

- **Position, Navigation and Timing** – position, navigation and timing (PNT) satellites provide precise location and timing signals used across industries such as banking, civil aviation and shipping (expected to be published mid-2022).
- **Access to Space** – access to space refers to launch capability, for example enabling satellites to be launched into space (expected to be published mid-2022).

Increasing collaboration with international partners

The Australian government is expanding collaboration with international partners on civil space in order to maximise opportunities for the space sector. In September 2021, Australia joined Quad leaders to announce collaboration on opportunities to share satellite data for peaceful purposes such as monitoring climate change, disaster response and preparedness, sustainable uses of oceans and marine resources, and responding to challenges in shared domains. Australia will also deepen space cooperation with the United States and the United Kingdom through AUKUS.

Future initiatives

The completion of the technical roadmaps for each National Civil Space Priority Area in 2022 will provide the Australian Government with an additional range of opportunities to develop further initiatives to address critical gaps in the space sector.

5G and future connectivity initiatives

The Government is committed to protecting Australia's current and future connectivity. The networks Australians and our economy rely upon now and into the future must support trusted, safe and secure connections online. Australians, businesses and governments are increasingly relying on mobile connectivity to work, study and socialise.

The security and economic success of Australia’s current and future telecommunications networks are dependent on early action to pre-emptively identify and address risks and stimulate diversity in the market. The deployment of 5G (and, in future, 6G) communications without proper safeguards could create vulnerabilities that deliberately or inadvertently cause disruption, with cascading effects for Australia’s economy, security, and sovereignty. To meet this challenge and advance the Government’s vision of being a leading digital economy by 2030, work is underway to support 5G deployment and security, future telecommunications (6G) security, and scale these efforts internationally.

5G deployment

The Government is supporting the timely rollout of 5G in Australia to enable the next wave of industry productivity, and to promote the growth of Australia’s digital economy.

Industry expects, and needs, to lead the deployment of 5G. Government also has a role in supporting network rollout by modernising policy and regulatory frameworks and removing barriers that would delay rollout and adoption unnecessarily. The Government is supporting the early deployment of 5G in Australia by:

- Making spectrum available in a timely manner;
- Actively engaging in international spectrum harmonisation activities;
- Streamlining arrangements to allow mobile carriers to deploy infrastructure more quickly; and
- Reviewing existing telecommunications regulatory arrangements to ensure they are fit-for-purpose.

5G innovation

5G is expected to be foundational digital infrastructure for many sectors, and will support the uptake of digital tools. Wider adoption of 5G will allow businesses to automate routine tasks, gather more detailed data about their activities, and develop new products and services, all of which can contribute to business productivity and growth.

The Australian 5G Innovation Initiative is supporting businesses to deliver 5G trials and testbeds, and demonstrating benefits of 5G technology in a range of sectors. These trials will demonstrate emerging 5G uses to help build Australia's 5G ecosystem.

In total, 19 successful projects, spanning key sectors of the economy including agriculture, construction, manufacturing and transport, have received nearly $20 million in funding. One example of the projects funded under the program is testing 5G to live stream 3D construction site scans to office workers, such as engineers, for review and input. Using this technology, workers can immediately receive feedback and input from office workers, without the need for scheduled meetings, travel, safety inductions and other time, cost, and safety constraints. The application will reduce delays and errors, helping ensure that projects are constructed as planned and delivered on time and within budget.

Funding: $22.1 million

Future connectivity security initiatives

The Government has legislative and regulatory mechanisms in place to uplift the security by design of Australia's 5G and future connectivity networks. New legislative reforms, including the ***Security Legislation Amendment (Critical Infrastructure) Bill 2020***, complement existing obligations under Telecommunications Sector Security Reforms to the ***Telecommunications Act 1997***, helping to uplift the security and resilience of Australia's networks.

As well as this, the Department of Home Affairs is implementing two programs to improve the security of Australia's 5G and future connectivity networks under the Government's Digital Economy Strategy:

The 'Secure-G' Connectivity Test Lab will encourage the diversification of the 5G equipment market and secure Australia's future connectivity. Co-designed with industry, the test lab will enable businesses to test measures, protocols, standards and software that underpin transparent and secure 5G connectivity. The test lab will also support new companies to test innovative secure technology solutions that support a competitive and diverse telecommunications market, helping them scale and be commercialised.

The 6G security and development program will support foundational research into the security requirements of 6G and future connectivity technologies. This will enable Australia to stay ahead of the curve by ensuring technologies are designed with security in mind from the ground-up, and help to shape international future connectivity standards in a way that aligns with Australia's values and expectations around security.

Concurrent to these programs, Home Affairs is exploring the viability, security and regulatory implications of Open Radio Access Network (Open RAN) solutions within the Australian domestic context, to promote telecommunications market diversification.

Funding: $32 million

Working internationally on future connectivity security

International efforts are essential to the advancement of our future connectivity security and the Australian Government will continue to work through the Quad and other international forums, like the Prague 5G Security Conference and the Five Countries Ministerial process, as well as bilaterally with likeminded partners across the globe, to share information and inform national and international telecommunications security priorities—including market diversification, supply chain security, and critical infrastructure legislative reform. Success in these key forums will be key in ensuring secure by design advanced telecommunications well into the future.

AI Action Plan

To show it is serious about Australia's vision to be a global leader in developing and adopting AI, the Australian Government invested $124.1 million in new, targeted measures associated with the AI Action Plan in the 2021-22 Budget. This brings the Government's total investment in direct AI support since 2018 to $470 million.

Australia's AI Action Plan sets out a shared vision for Australia to be a global leader in developing and adopting trusted, secure and responsible artificial intelligence (AI). It outlines the Australian Government's actions to realise this vision and ensure all Australians will share the benefits of an AI-enabled economy.

As a key part of the Government's Digital Economy Strategy, the AI Action Plan supports businesses to enter new markets, invest in their own digital transformation, and deliver globally competitive products and services. Building our domestic capability in AI also ensures we are well prepared to counter national security threats, while simultaneously supporting innovation and developing Australia's AI expertise in areas of competitive strength.

The AI Action Plan will be implemented under 4 focus areas.

- **Focus 1: Developing and adopting AI to transform Australian businesses** – support to help businesses develop and adopt AI technologies to create jobs and increase their productivity and competitiveness
- **Focus 2: Creating an environment to grow and attract the world's best AI talent** – support to ensure our businesses have access to world-class talent and expertise
- **Focus 3: Using cutting edge AI technologies to solve Australia's national challenges** – support to harness Australia's world-leading AI research capabilities to solve national challenges, and ensure all Australians have an opportunity to benefit from AI
- **Focus 4: Making Australia a global leader in responsible and inclusive AI** – support to ensure AI is inclusive and technologies are built to reflect Australian values

The AI Action Plan aligns with other priority areas of Government, including our Modern Manufacturing Strategy. This strategy will see Australia recognised as a high-quality and sustainable manufacturing nation, and create jobs for current and future generations. It is also consistent with:

- Our commitment to creating a safer online world for Australians through our Cyber Security Strategy 2020
- Our desire to create a high-skilled workforce for jobs of the future
- The Government's commitment to provide the right incentives to businesses and innovators through lower taxes.


AI

National Hydrogen Strategy

The Australian Government has invested over $1.2 billion to specifically support delivery of the actions agreed in the National Hydrogen Strategy and to help accelerate the hydrogen industry's growth. This is complemented by billions more in funding committed to related clean energy technology, manufacturing and infrastructure support. These investments into the Australian hydrogen industry could generate more than 8,000 jobs, many in regional Australia, and over $11 billion a year in GDP by 2050. They will also advance the goals of the Technology Investment Roadmap as we ramp up our efforts to achieve net-zero carbon emissions by 2050 whilst also supporting economic growth and lowering energy costs.

Why Hydrogen?

Hydrogen is a flexible, safe, transportable and storable fuel. It can be used to power vehicles and generate heat and electricity. When used as a fuel, hydrogen's only by-product is water. Clean hydrogen refers to hydrogen produced with zero or low emissions. This is possible with hydrogen that is produced from electrolysis powered by renewable electricity or from fossil fuels such as coal or natural gas where a substantial amount of the resulting carbon emissions are captured and permanently stored.

Australia has a mix of all the key ingredients needed to be a major global player in a thriving clean hydrogen industry. We have abundant land and low cost renewable electricity generation, with some of the most consistent wind and solar resources in the world. We also have extensive fossil fuel energy reserves and stable carbon storage sites, ideal for fossil fuel based hydrogen production.

Australia has a rapidly growing clean hydrogen sector. In June 2021, Australia had the world's largest pipeline of announced hydrogen projects. If all these projects are completed, Australia could be one of the world's largest hydrogen producers by 2030. There are over 70 projects under development across Australia, with 16 projects that are operating or under construction and a further ten projects at an advanced stage of development planning. These projects span the hydrogen supply chain, including hydrogen production from renewables, gas blending trials, transport trials, storage projects, ammonia production, and feasibility studies for export supply chains, among others.

National Hydrogen Strategy

To capture the opportunity presented by the hydrogen industry, Australian governments have developed a National Hydrogen Strategy, released in November 2019.

The Strategy includes 57 nationally coordinated government actions that are the first steps for industry development.

Actions are themed around national coordination, developing production capacity supported by: local demand; responsive regulation; international engagement; innovation, research and development; skills and workforce development; and earning community confidence.

Government action to support hydrogen industry growth

All levels of government are delivering the Strategy and taking early actions to overcome barriers facing the industry. So far, the Australian Government has:

- Built international relationships, including partnership agreements with Germany, Singapore and Japan, to build hydrogen supply chains and advance technology research
- Developed a proposed approach for a domestic hydrogen Guarantee of Origin scheme and helped shape the design of an international methodology
- Announced hydrogen funding programs, including $464 million for the 'Activating a Regional Hydrogen Industry: Clean Hydrogen Industrial Hubs' program
- Invested over $300 million to support development of carbon capture and storage (CCS) and carbon capture, use and storage (CCUS) projects
- Awarded over $100 million to three 10 MW hydrogen electrolyser projects through the Australian Renewable Energy Agency (ARENA)
- Provided more than $300 million in funding for research, development and demonstration activities through the Clean Energy Finance Corporation (CEFC)

State and territory governments are helping develop the industry by implementing the National Hydrogen Strategy and their own hydrogen strategies. Together, the federal, state and territory governments have collaborated on a number of fronts, including regulatory frameworks, infrastructure, skills and regional investments in hydrogen hubs.

Medical Research Future Fund

The Medical Research Future Fund incentivises investment in critical health technologies

The Medical Research Future Fund (MRFF) is a $20 billion long-term investment supporting Australian health and medical research. MRFF activities put patients at the core, with a focus on translating research into practice to benefit all Australians.

Investments are made according to national priorities, supporting research in areas of unmet need or with transformational potential. The Australian Medical Research Advisory Board (AMRAB), an independent group of experts, sets the MRFF strategy and priorities following consultation with the Australian public. The MRFF strategy and priorities inform Australian Government investment in MRFF funding. The strategy and priorities are set in accordance with the *Medical Research Future Fund Act 2015*, and require regular consultation with the public.

The MRFF invests across 4 research themes (Patients, Researchers, Research Missions, and Research Translation) and supports projects that leverage cutting edge precision medicine technologies

MRFF funding aligns with the List of Critical Technologies in the National Interest, particularly those relating to biotechnology, healthcare, and vaccines. Many of the currently funded projects leverage techniques in biological manufacturing, biomaterials, genetic engineering, next generation sequencing, nanobiotechnology, nanoscale robotics, and neural engineering, including:

- ‘Anatomics – 3D printing and the manufacture of 'StarPore', a novel porous polyethylene implant material’ is a breakthrough implant material now applied in facial implants for reconstructive surgery, with devices made in Australia and shipped internationally.

- ‘ZERO Childhood Cancer National Precision Medicine Program’ – A World-leading personalised medicine trial for <21 year olds with high-risk cancer that aims to identify the genetic drivers of each cancer and tailor treatments for increased survival with reduced side-effects. Early results (Oct 2020) showed 70% of children who received the recommended, personalised treatment, had a positive response (tumour stopped growing, shrank, or completely regressed). Currently, over 500 children are enrolled. By the end of 2023, all Australian children with cancer will be able to participate.
- ‘Mackenzie’s Mission’ – A project that identifies a couple’s risk of having a child with a severe genetic condition, giving couples family planning choices. It will evaluate the outcomes of screening while addressing concerns (psychosocial impacts that couples report, the test’s health economic impacts, ethical issues). Up to 10,000 couples will take part.
- ‘Treating muscle injury and wasting disorders’ – Using muscle stem cells, the project identified a new function for a molecule to activate the body’s own muscle stem cells to repair injury or disease. This could change treatment options for the tens of thousands of Australians experiencing the debilitating effects of muscle injuries and wasting diseases.

Next steps...

The Government will apply a rigorous analytical framework to determine whether any policy gaps exist, or may emerge, for critical technologies in the national interest.

Where gaps exist, the Government will evaluate existing policy levers and consider introducing new policies.

CTPCO Action Plan (print)

ISBN 978-1-925364-84-2

Other uses

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