ATSE SUBMISSION

2025-26 pre-budget submission

Australian Academy of Technological Sciences & Engineering

Activating R&D as the engine of the economy

To enhance Australia's global competitiveness and position research and development (R&D) as a key driver of economic growth, ATSE proposes a comprehensive strategy to achieve an investment target of 3% of GDP expenditure on R&D by 2030, in line with the Government's policy platform. The in-progress Strategic Review of R&D will provide a pathway, but the nation cannot afford to continue neglecting R&D in the meantime. This Budget presents opportunities to support foundational research, incentivise industry investment, scale successful innovation programs, leverage government procurement policies, and enhance R&D collaboration across sectors. These actions are key to reversing the decline in Australia's R&D intensity – now just 1.68% of GDP, of which 53% is funded by industry – well below the expenditure of peer nations.

A well-supported, strategic approach to R&D will boost economic returns and enhance Australia's resilience against future interrelated challenges such as climate change, pandemics, antimicrobial resistance, and food and water security. The Budget should prioritise fundamental research in key areas such as agriculture and food, water resource management, renewable energy, Traditional Knowledge, and medical research – all of which will be needed to deliver the translatable research of the future.

Effective innovation policies require continuity, consistency and a commitment to long-term results that extend beyond immediate political cycles.

In innovation-led economies like South Korea and Finland, successful industrial policy implementation is often underpinned by policy stability, ensuring consistent support for projects and mitigating risks of policy churn[1]. Developing a long-term strategic plan, modelled on the former Queensland Smart State initiative, would provide a framework for the Government's vision to stimulate greater industry participation in the innovation system. As highlighted in ATSE's upcoming report *Practical Steps for Boosting Australia's Innovation Ecosystem*, the innovation pipeline is non-linear, involving iterative discovery, development and application cycles. Knowledge creation and commercial outcomes are symbiotic, and it takes time to realise the economic value of research. Reflecting these values in innovation metrics can drive cooperation across the innovation system and incentivise support for collaboration and integration between fields. ATSE's report also highlights the EU's Horizon Europe program as a leading example of strategic directionality in innovation policy. While it is critical for Australia to implement a range of strategies, joining Horizon Europe would be beneficial for Australian R&D.
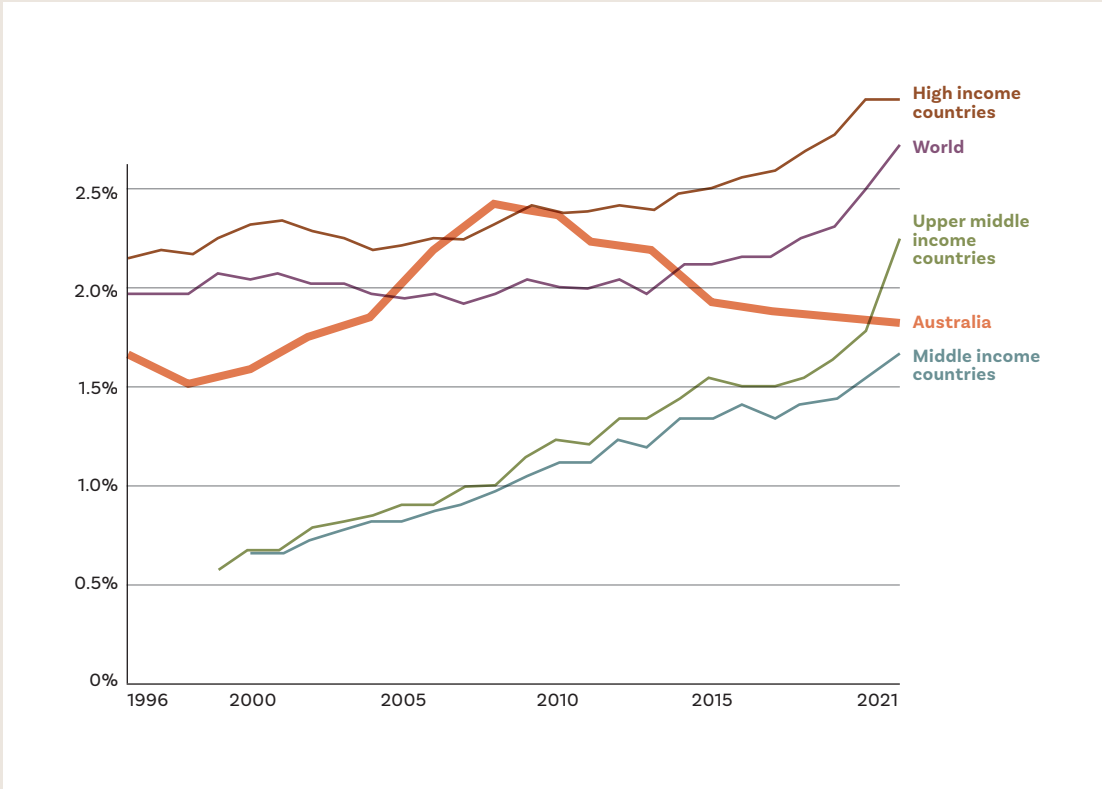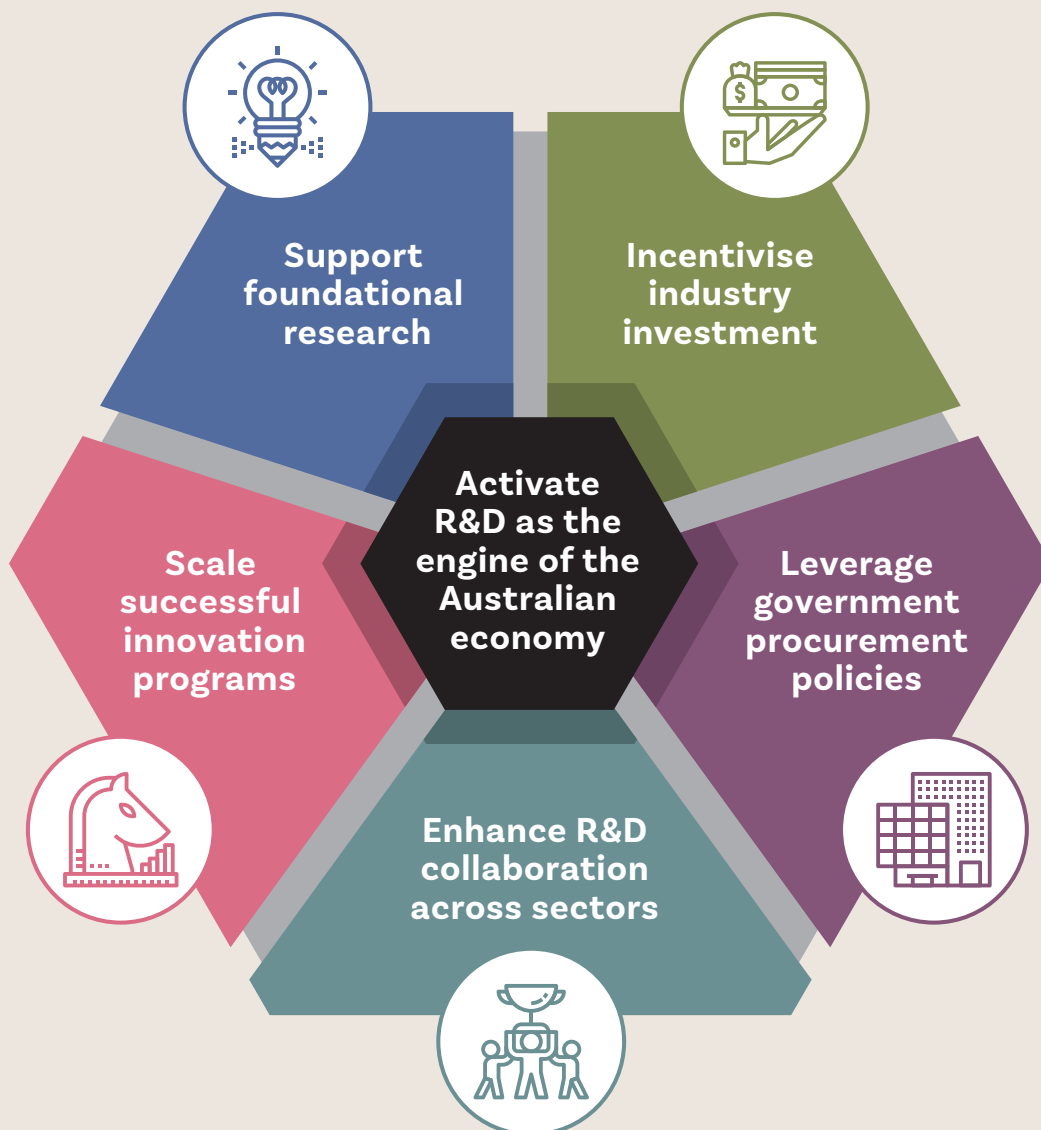
FIGURE 1: Research & development spending as a share of GDP, showing Australia's relative decline.
Data Source: World Bank 2024

Strengthening national research agencies and infrastructure with adequate funding is pivotal to tackling national challenges and catalysing innovation. The National Collaborative Research Infrastructure Strategy (NCRIS) provides an important foundation for maintaining facilities, enabling access, and fostering collaboration. Additional institutions that are valuable for Australia's research strengths and priorities are not currently included in NCRIS funding. Examples include atmospheric composition observing networks, high performance computing infrastructure for weather and climate research[2], and a national mathematics research institute. Expanding the successful NCRIS program would bring funding stability to more Australian research infrastructure. Without reliable, long-term investment, Australia risks falling behind other countries with established and growing investments in research infrastructure, such as the United States, China and Japan.

Other strategies highlighted in ATSE's *Practical Steps for Boosting Australia's Innovation Ecosystem* report include using government procurement to stimulate local innovation, and providing incentives such as tax benefits to encourage commercialisation. Strategies to support diverse engagement in the innovation system, such as the recommendations of the Decadal Plan for Future Female Entrepreneurship and Business Leadership, can also improve outcomes[3].

A well-supported, strategic approach to research and development is a key driver of economic growth.

Activate R&D as the engine of the Australian economy

- Support foundational research
- Incentivise industry investment
- Leverage government procurement policies
- Enhance R&D collaboration across sectors
- Scale successful innovation programs

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KEY RECOMMENDATION 1

Develop a comprehensive strategy to boost R&D funding to a formal target of 3% of GDP, including a funding uplift and stimulating industry investment in R&D.

Estimated cost: $2 billion per year ongoing

Key implementation levers include:

- Long-term grant funding for new 'moonshot' initiatives aligned with Future Made in Australia and the National Science and Research Priorities.
  Estimated cost: $400 million over ten years.

- An implementation plan for elevating Aboriginal and Torres Strait Islander knowledge systems, as identified in the National Science and Research Priorities.
  Estimated cost: $1 million over one year to develop the plan.

- A long-term plan (in the style of Queensland Smart State) to grow and scale businesses and industries, and improve coordination of the innovation system with industry.
  Estimated cost: $1 million over one year to develop the plan.

- Government procurement policies to support innovative and genuine domestic technology development.

- Programs to facilitate collaboration and growth between SMEs and other innovation actors, including access to research infrastructure.

- Incentives for investors to back STEM start-ups, potentially through additional tax incentives.
  Estimated cost: $95 million per year ongoing.

SUPPORTING RECOMMENDATION 1
Provide sustainable funding for developing and maintaining research infrastructure and institutions.
Estimated cost: An additional $130 million per year ongoing.

SUPPORTING RECOMMENDATION 2
Recommence negotiations for Australia to associate with Horizon Europe.
Estimated cost: $230 million over four years, if negotiations are successful.

SUPPORTING RECOMMENDATION 3
Establish R&D evaluation metrics that recognise both commercial success and broader societal impact, including advancements in fundamental knowledge to help guide future policy directions.
Estimated cost: This could be addressed within the Strategic Examination of R&D and would not require additional funding.

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# Building and sustaining a STEM-skilled workforce

In an increasingly technology-driven economy, it is imperative to uplift STEM literacy across the future workforce and cultivate a base of highly skilled STEM professionals. State and federal government initiatives are going some way to build up the STEM-skilled workforce, but further action is needed to improve accessibility of STEM careers and meet future skills needs. By fostering a diverse and inclusive STEM workforce, we ensure that all Australians have the opportunity to contribute to and benefit from advancements in technology and science. At a school level, targeted investments can showcase STEM as offering attractive career paths, particularly for underrepresented student cohorts. Industries that will remain essential for Australia's future – such as energy and agriculture – can be highlighted at a school level. For example, partnerships with stakeholders such as Research and Development Corporations (RDCs) and State Farming Organisations (SFOs) can enhance quality of STEM awareness and education.

ATSE urges a whole-of-lifecycle approach through all levels of education, including supporting post-secondary education to deliver the professionals Australia will need, as well as initiatives to promote STEM workforce retention and development.

KEY RECOMMENDATION 2

Uplift STEM education in schools to make STEM careers aspirational, including by:

- Supporting teachers to deliver STEM education through rolling out STELR kits – hands-on, curriculum aligned teaching and learning resources with a sustainable energy focus – to more schools across Australia.

  — Expanding STELR to local government areas most impacted by the clean energy transition. This could include having STEM teachers travelling to communities to train teachers on delivering STELR modules.
  Estimated cost: $20 million for 600 schools.

  — Expanding STELR resources to cover grades 3–6 (currently aligned with the curriculum for grades 7–12).
  Estimated cost: $200,000 over one year.

- Using partnerships to deliver school-based programs to showcase agricultural science and technology careers.

- Supporting schools to deliver education in innovation, digital skills and mathematics

- Investing in a 'Brand Engineering' marketing campaign to lift the desirability of careers in engineering.
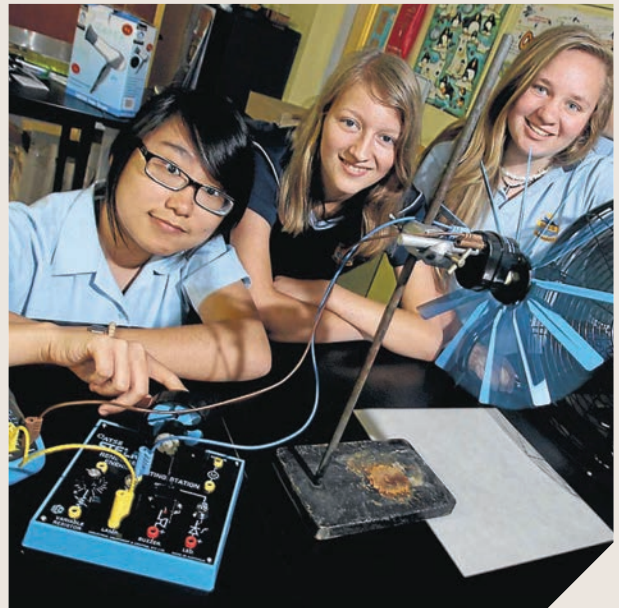
KEY RECOMMENDATION 3

Strengthen post-secondary STEM programs, including by:

- Funding the full cost of teaching STEM degrees.
  Estimated cost: $500 million per year ongoing.

- Funding engineering placements.
  Estimated cost: $36 million per year ongoing.

- Fully funding the recommendations of the Diversity in STEM Review.

- Fully funding the recommendations of the Universities Accord.

- Supporting universities to develop and deliver courses across the range of disciplines needed, including engineering and social sciences, to improve Australia's energy transition, decarbonisation and resilient infrastructure capabilities.

SUPPORTING RECOMMENDATION 4
Support lifelong learning and workforce development, through:

- Scaling initiatives such as ATSE's Diversity & Inclusion Toolkit to support small and medium employers to foster diversity in the STEM-skilled workforce.
  Estimated cost: $150,000 over one year.

- Fostering an AI-literate workforce by continuing to invest in AI upskilling, encouraging partnerships, and by providing tax incentives for businesses.

- Expanding accessibility of programs for displaced coal and gas workers to participate in the energy transition (including mining and renewable energy).
  Estimated cost: $90 million over four years.

- Supporting workforce development and skilling in STEM SMEs: develop and extend grant programs (such as the Building Women's careers program) to focus explicitly on engaging and supporting small-medium enterprises that rely on STEM skills; subsidise graduate positions to enable SMEs to employ new graduates; and expanding the proven *ATSE Elevate: Boosting diversity in STEM* scholarship program to include vocational STEM training pathways.
  Estimated cost: $1.5 million over one year for SME STEM grants; $11 million over four years for a vocational Elevate program.

Managing climate change and building a prosperous future through the energy transition

The Australian Government has a unique opportunity to guide the nation towards a sustainable and prosperous future by investing in the energy transition both locally and with international partners. This would position Australia as a global climate action leader ahead of the anticipated COP31 summit.

Uplifting government investment to internationally competitive levels will pave the way for the next stages of the energy transition. Energy R&D investment is at a critically low level. Analysis from the Australian Council of Learned Academies (ACOLA) found that Australia's expenditure on energy research, development and demonstration (relative to economy size) has declined over the past decade, in contrast to comparator economies, and that the majority of government investment was in fossil fuels[4]. Priority areas for research, as identified by ACOLA, include clean hydrogen, energy storage, low emissions materials, soil carbon and ultra-low-cost solar. Social sciences research on community engagement, social licence and social impacts will be required to enable the systems solutions for the energy transition[5]. While carbon capture and storage has not shown significant promise so far, it is a potential avenue for private sector exploration. With an adequate supply of critical minerals being vital for electrification and the energy transition, research for new discovery and mining methods is also important. Investing in these research areas is not just an environmental imperative but a strategic economic decision for the nation's future.

ATSE recognises the Australian Government's progress in rolling out mature, low-carbon technologies. The upcoming Budget presents an opportunity to make strategic investments that further progress the energy transition. This can include demand-side measures such as accelerating household energy upgrades through low-cost loan schemes[6], developing programs to decarbonise transport in cities, and supporting high-emitting industries to develop and adopt emissions-reduction technologies. Additionally, backing the new National Health and Climate Strategy and Implementation Plan with full funding for its 49 actions would allow further emissions reductions from healthcare while addressing the impacts of climate change on the health of Australians.

Strengthening industry and research partnerships with Indo-Pacific nations on climate change mitigation and adaptation will also enable mutual emissions reduction goals and contribute to the success of COP31. Priority actions include deepening understandings of the challenges faced by these nations, sharing of engineering solutions and relevant Traditional Knowledge for climate change adaptation, and increasing trading partnerships for clean energy products and services to support a global reduction in greenhouse gas emissions, which will, in turn, support Australia's ability to end new fossil fuel mining in the future.

Australian organisations with access to research and industry networks can be engaged to build up these partnerships in the Indo-Pacific region. For example, ATSE's delivery of the Global Science and Technology Diplomacy Fund, in collaboration with the Academy of Science, provides grants for strategically important research in collaboration with partners in the Asia-Pacific region.

KEY RECOMMENDATION 4

Uplift government investment in R&D needed for the energy transition to levels competitive with our key international comparators.

KEY RECOMMENDATION 5

Reduce greenhouse gas emissions through targeting demand, including:

- Creating low-cost loan schemes for households to finance energy upgrades.
  Estimated cost: $26 million per year.

- Supporting demand side management for households and businesses to enable the transition to a high-renewable electricity grid.

- Developing programs to decarbonise cities that support active and public transport as a core element of the net zero transition and climate-sensitive urban design.

- Funding the National Health and Climate Strategy Implementation Plan.

- Supporting innovation for high-emitting industries to reduce emissions.

SUPPORTING RECOMMENDATION 5
Create and fund the management of a transparent national framework for greenhouse gas accounting and monitoring in infrastructure.

Estimated cost: $5 million over four years.

SUPPORTING RECOMMENDATION 6
Strengthen collaboration with Indo-Pacific nations on climate change mitigation and adaptation, including through:

- Increasing trading partnerships for clean energy products and services, to support a global reduction in GHG emissions.
  Estimated cost: $200 million over four years.

- Supporting the sharing of Traditional Knowledge and Western science collaborations across the region to progress adaptation and decarbonised climate-resilient livelihood options in remote and island communities.
  Estimated cost: $40 million over four years.

Safeguarding food and water in a changing climate

Agriculture and water security are particularly vulnerable to the effects of climate change. At the same time, effective management of these sectors is crucial for reducing greenhouse gas emissions and improving environmental sustainability.

Australian farmers are already among the most energy and resource efficient food producers globally. The Australian Government has a vital role to play in leveraging this existing strength and intensifying research and development in promising areas, supporting farmers to adopt new innovations for the changing climate and reducing emissions. Promising areas of research that could revolutionise sustainable farming include methane reduction from ruminant livestock, water conservation, reduced nitrous oxide emissions, carbon storage in soil, alternatives to chemical pesticides and incorporation of Traditional Knowledge for land management.

Developing a National Agriculture and Food Production Adaptation Plan would provide a framework to guide the Australian Government's collaboration and support of primary producers and manufacturers. Creating a plan to engage the entire food system was recommended by the 2023 parliamentary committee report *Australian Food Story: Feeding the Nation and Beyond*[7]. The report proposes that a national food plan would address production and distribution of food, supply chain resilience, access to food, nutrition and health, and waste management. This framework would support implementation of new technologies, including for circular economy practices and supply chains, AI and automation, and resilience to extreme weather events and biosecurity challenges. In alignment with Australia's energy transition, there is also scope in this plan to develop policy incentives for integration of solar and wind farms into agricultural landscapes. The National Agriculture and Food Production Adaptation Plan, along with the upcoming Australian Government Drought Plan, will need to be backed by government investment to ensure food security in the years to come.

Planning for water security is vital not only for farming but also for sustaining life in our cities and towns, and for maintaining our ecosystems. Water management in Australia is complex and fragmented, involving numerous stakeholders and authorities. An independent overarching body would bring order and enable transparent and evidence-based decision-making. While the recent National Water Reform has been welcomed, without a unifying authority in the form of a renewed National Water Commission, implementation will remain challenging and inefficient. Regardless of the governance structures, there is no time to waste in improving outcomes for the Murray-Darling Basin (MDB), which provides water for 12% of the population. ATSE also recommends investment in applying new technologies for water quality data collection and data management[8], and water treatment technologies[9], to support safe and secure water supplies for all Australians, including in rural and remote areas.

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SUPPORTING RECOMMENDATION 7
Develop and deliver a National Agriculture and Food Production Adaptation Plan.

Estimated cost: $1.5 million over two years to develop the plan.

SUPPORTING RECOMMENDATION 8
Fully fund the Australian Government Drought Plan to support drought mitigation and preparation.

SUPPORTING RECOMMENDATION 9
Create a renewed independent national water management authority (i.e. National Water Commission), to provide objective unbiased advice on national water management.

Estimated cost: $20 million per year for four years.

SUPPORTING RECOMMENDATION 10
Leverage current capital investments in water infrastructure to minimise spending and resource wastage, supporting resilient communities and protected environments.

SUPPORTING RECOMMENDATION 11
Prepare for the future of the MDB to support water and energy security, resilient communities, Indigenous communities and positive environmental outcomes:

- Invest in water management technologies across the Basin.

- Establish time-limited taskforces on key Basin issues including water quantity, water quality, cultural water, economic instruments, modelling, satellite and Geographic Information System data, water trading and risk assessment.

- Establish, maintain and resource a central data custodian for all water quantity and water quality monitoring data, all modelling and all other relevant data inputs for driving decision-making, publicly available and shared by all stakeholders.
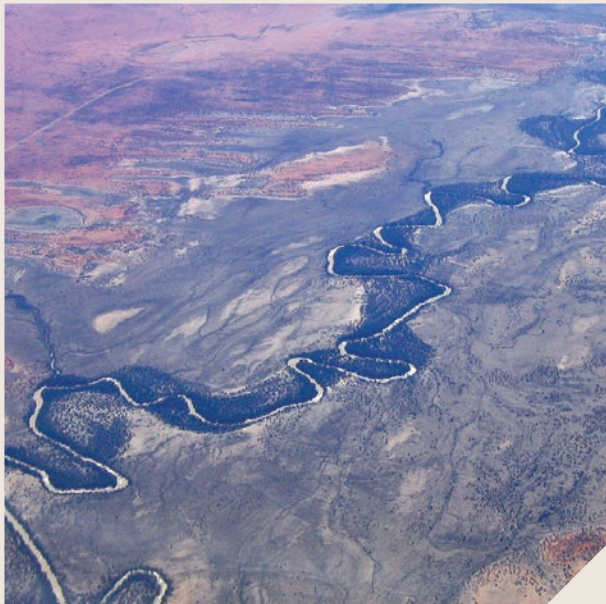
SUPPORTING RECOMMENDATION 12
Fund the development of water treatment technologies that are appropriate and tailored for the needs of Aboriginal and Torres Strait Islander communities.

Leveraging the benefits of new digital technologies

Emerging technologies are driving global economic transformation. The Australian Government has laid the groundwork with strategic investments, a new regulatory framework for Artificial Intelligence, and the National Framework for the Assurance of AI in Government[10]. The challenge in the next financial year is to create the settings for a digital future that is not only technologically advanced but also equitable and inclusive. For instance, if fully funded, the new Roadmap for First Nations Digital Inclusion will bridge the digital divide, empowering First Nations communities with infrastructure, devices and training. These initiatives can be scaled more broadly to close the digital divide for other groups including rural and remote, low-income, culturally and linguistically diverse, and older Australians, and Australians living with a disability. Simultaneously, the adoption of healthcare-specific AI technologies has the potential to improve outcomes and efficiency in our healthcare and aged care systems, offering personalised, person-centred care, early disease detection and remote monitoring capabilities that will enhance Australians' quality of life. AI also has the potential to improve productivity across priority sectors, including manufacturing and construction. Developing sovereign capability and building on our research strengths will enable Australia to realise productivity dividends and be a global leader in digital transformation. It is crucial to pair adoption of new technologies with investing in a STEM-skilled workforce that can continue to progress innovation.

SUPPORTING RECOMMENDATION 13
Support national research capability in the development and adoption of AI to accelerate the productivity and competitiveness of Australian enterprises.

Estimated cost: $90 million per year.

SUPPORTING RECOMMENDATION 14
Provide additional funding for implementing recommendations of the Roadmap for First Nations Digital Inclusion, including conducting a socioeconomic analysis of closing the digital divide and the cost of inaction.

Estimated cost: $1 million over one year to develop the socioeconomic analysis. Other recommendations not costed.

SUPPORTING RECOMMENDATION 15
Implement healthcare-specific AI frameworks to facilitate the safe and secure delivery of benefits such as personalised person-centred and respectful care, early disease detection and remote monitoring capabilities.

Estimated cost: $30 million over four years.

ENDNOTES

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10. Commonwealth of Australia 2024, National Framework for the Assurance of AI in Government, accessed from < https://www.finance.gov.au/sites/default/files/2024-06/National-framework-for-the-assurance-of-AI-in-government.pdf>

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