

# SCIENCE AND AUSTRALIA'S POSITIVE FUTURE

## POSITION STATEMENT 2022

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Australians look to science to provide the knowledge, solutions and advice to guide us through the challenges of an uncertain world – whether they be global pandemics, geopolitical uncertainty, or climate-induced natural disasters like that of Black Summer.

Science affects every domain of society, government, national identity and security. We are living through one of the most far-reaching upheavals since the Industrial Revolution, touching every sphere of work, leisure and life. The question is, how will we embrace the possibilities of science and secure the benefits of this transformation for Australians?

The science which helped inform public health measures during the pandemic and designed, tested and manufactured vaccines resulted from decades of patient, deliberate investment worldwide and in Australia. We could never know at the time of investment that the outcomes would have provided us with the knowledge to respond to a global pandemic.

The pandemic has tested science systems globally. Global science development and vaccine platforms, the product of decades of investment in basic science – have performed well. However, the pandemic has exposed weaknesses in local and international public health preparedness and cooperation. Similarly, the Black Summer bushfires exposed weaknesses in Australia's know-how to mitigate climate-induced natural disasters, the challenges of adapting to a changing climate, and our ability to prepare for the next natural disaster.

As a nation, we face the genuine risk that the Australian science system could emerge from the pandemic weaker than it began. For scientists, the pandemic in Australia has brought about great purpose and great uncertainty. Too many have been affected by reduced funding, job losses, increased workload and declining morale.

To secure Australia's future, the Academy calls on the next Australian government to secure Australian jobs and Australian industries with science through:

1. securing the scientific base through a long-term investment strategy for science
2. advancing a cohesive, national approach to securing new jobs and industries through science and technology
3. establishing robust and permanent mechanisms for independent science advice to inform policy across all of government
4. undertaking a national whole-of-government review of the science and research system.

## JOBS, INDUSTRY AND SCIENCE

Advanced industrial societies depend on a secure and active science sector to help deliver high-wage jobs and high-value industries to maintain the standard of living for their people and to propel economic growth. Australia is no different.

As Australia looks to future sources of growth to decarbonise our economy and transform traditional industries, science will play a vital role in developing the ideas, technologies, systems and processes needed. Science is already helping to decarbonise traditional industries like steel and aluminium, assisting agriculture deal with changes in rainfall and climate risk, and in uncovering new minerals needed for a clean economy. And we can look to science to deal with future risks – like national security threats, major health challenges such as anti-microbial resistance, climate adaptation, advanced digital technologies like AI and quantum computing, and future pandemics.

Such a role relies on decades of consistent funding from governments across the innovation pipeline. Despite one-off funding for research and science during the pandemic, in 2021 the Australian Government's investment in science was 0.56% of Gross Domestic Product (GDP) – which is lower than peer nations – and has declined over the past decade.

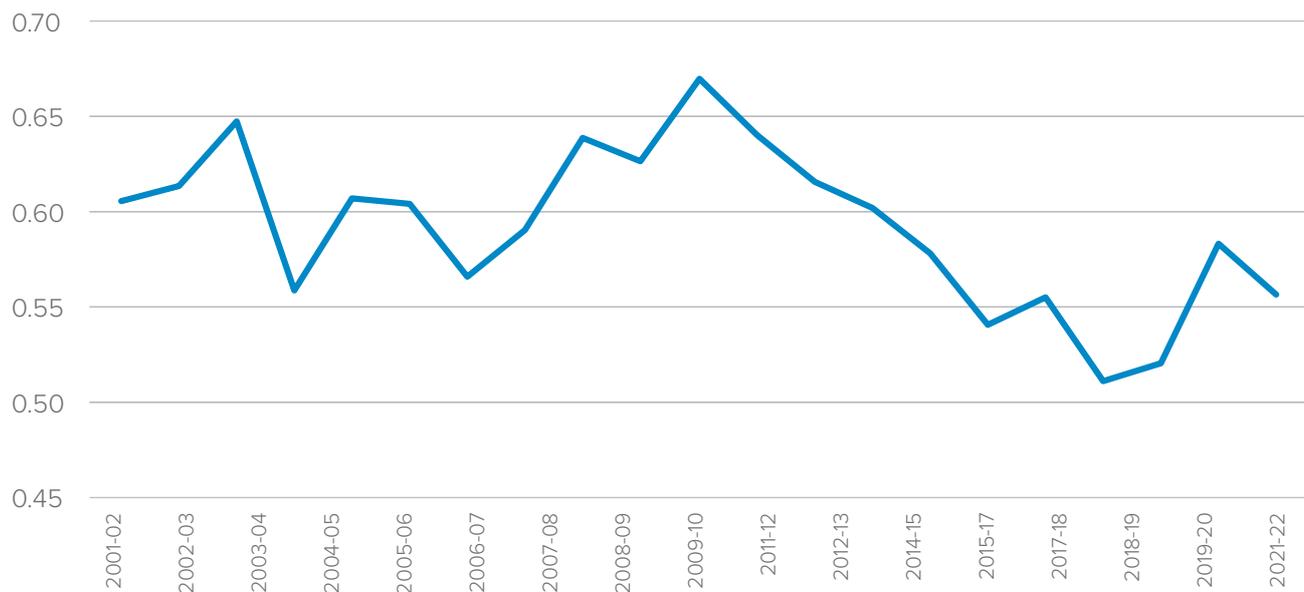
**“Pure research is merely that research which has not yet been applied.”**

George Porter, Chemist and Nobel Prize winner

**“...for every dollar invested in Australia, there is a \$3.5 return on investment.”**

CSIRO Futures, Quantifying Australia's returns to innovation, November 2021

### AUSTRALIAN GOVERNMENT INVESTMENT IN R&D (PERCENTAGE OF GDP)



Source: Australian Government Science, Research and Innovation Budget Tables, December 2021

## A MOMENT OF TRUTH FOR AUSTRALIA

Modern science just doesn't happen. It is founded on a partnership between scientists, industry, civil society and government. Only the Australian Government has the capacity and responsibility to create the environment where industry and scientists can take risks essential for discovery and technological advancement.

Australia's approach to funding science is not fit for purpose and does not support Australia's technological ambitions. Instead of growth relying on long-term patient investment by government in national priorities, it is over-reliant on variable income from external sources such as industry and international student fees – both of which have been impacted by the pandemic.

Today, Australia's science funding system is characterised by a real declining base level of government support for public science agencies and universities, and increased short-term project funding from all levels of government.

Science can secure our future economic and social prosperity and prepare us to deal with the known and unknown events that the twenty-first century presents.

**“History has shown that it is federally sponsored research that provides the truly ‘patient’ capital needed to carry out basic research and create an environment for the inspired risk-taking that is essential to technological discovery. Often these advances have no immediate practical usability but open ‘technology windows’ that can be pursued until viable applications emerge.”**

An open letter to the US Congress from the executives of America's leading technology companies, May 1995

### US CREATES 1 MILLION JOBS FROM BIG SCIENCE

The Human Genome Project cost \$5.6 billion US in today's dollars. A 2021 evaluation on the impact on the US economy found that it had:

- supported the creation of 1 million direct and indirect jobs
- delivered a return on investment of \$4.75 for every \$1 invested.

The Economic Impact and Functional Applications of Human Genetics and Genomics, May 2021



## RECOMMENDATIONS

### THE ACADEMY RECOMMENDS THAT THE NEXT AUSTRALIAN GOVERNMENT:

#### Secure the scientific base through a long-term investment strategy for science.

- Develop a long-term investment strategy for science that includes whole-of-government alignment of science and innovation priorities and has a focus on underlying support for fundamental research. The strategy should include:
  - a plan to **grow real funding for science**, including increasing investment in R&D competitive with our peer nations
  - continuity and long-term funding to national **research infrastructure** facilities, including growth in funding levels beyond 2028–29, workforce development and advisory mechanisms
  - a **new international science engagement and diplomacy strategy** to enhance our international research collaboration and secure Australia's ability to participate and benefit from global science.
- Ensure that the long-term investment strategy **secures the scientific knowledge and discovery** needed to underpin future technologies and commercial opportunities.

### Advance a cohesive, national approach to secure jobs through the translation of science to industry.

- Establish a **science translation fund** for university and science agency research in the physical sciences and technology (e.g. materials science, mathematical sciences, physics, quantum technologies, emissions reduction technology). This fund should operate according to best practice governance, including transparency, peer review and clear priorities, and be managed at arm's length from government. The fund should build on the model of the MRFF and support interdependencies between and across disciplines, which is where most new discoveries are expected to emerge.
- Develop a **national science, technology, engineering and mathematics (STEM) skills strategy**, covering the development of STEM from early education through to vocational education and training (VET) and university, as well as workforce needs for both the science sector and the broader economy. Such a strategy should:
  - deliver initiatives to improve science literacy from the early years onwards
  - establish a secure funding base for VET and university science
  - provide for the training of the research workforce and career pathways in the industries that will require a science literate workforce.

### Establish robust and permanent mechanisms for independent science advice to inform policy across all of government

- Establish a **Parliamentary Science and Technology Office** to provide independent scientific advice to parliament and conduct evidence reviews of prospective legislation, modelled on the successful Parliamentary Budget Office.
- Strengthen the ongoing provision of science advice to inform policy, including rapid independent evidence-based advice for emerging issues to government, building on the **Rapid Research Information Report** process and the Rapid Research Information Forum before it. Such advice should, to the extent possible, be public, expert led and transparent.

### Undertake a national whole-of-government review of the science and research system

- Conduct a **whole-of-government review** to identify the optimal operation, funding arrangements and architecture of the Australian science and research system to provide for a secure foundation for the next 20 years that is fit for purpose for the Australian context and supports our technological and economic ambitions.