

# Senate Inquiry on CSIRO Funding and Resourcing

## Response to Questions on Notice taken by Science & Technology Australia

### Balance of government funding for discovery, applied and translational research

**Senator DARMANIN:** *What balanced mix do you think best sustains a research translation pipeline from CSIRO and other institutions without starving discovery research?*

*[various points raised by witnesses]*

**Mr Winn:** *... we can come back with some data that we provided to the Strategic Examination of Research and Development panel process, which provides an understanding about where the different programs across government are and where they sit across that discovery through the translational piece. That might give you at least a balance across government of where the balance of discovery versus plight is across the TRL levels.*

**Senator DARMANIN:** *That would be great*

#### **Response:**

Science & Technology Australia's submission to the Strategic Examination of R&D included an analysis of the various R&D funding programs supported by the Commonwealth Government. This illustrates how funding is indicatively allocated across the TRL levels, at a whole-of-government level:

The idea of 'balance' between funding for discovery research vs applied and later-stage research is a complex one – while it may appear that Commonwealth Government support is 'skewed' towards the early stage TRLS, this support for early stage discovery research is essential (see highlighted text in the excerpt below).

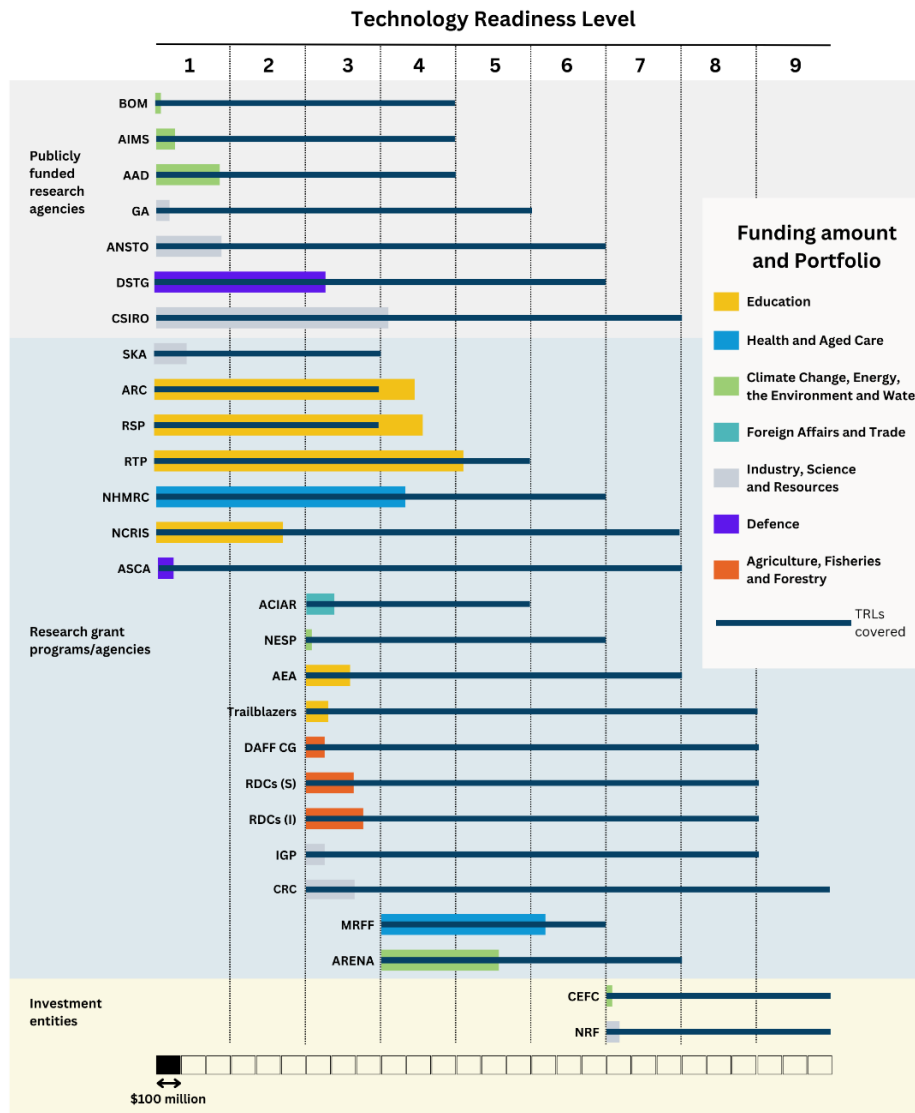
*We note the Australian Government's significant investment in the nation's R&D system – [\\$14.4 billion in the 2024–25 Budget](#). This is illustrated in Figure 1 (excluding the indirect support delivered via the R&D Tax Incentive (RDTI)).*

*This figure maps the nature (agencies and programs) of Australian Government direct support for R&D, spread across technology readiness levels (TRLs), and the magnitude of funding (as per the [2024–25 Budget SRI Tables](#)). **This highlights that the majority of Commonwealth Government support is focussed in the early TRL stages. This is entirely appropriate, as it is early-stage discovery, risk, and Australian IP development and ownership that Government must support. As risk is mitigated and concepts become commercially viable, business and industry need to increase their involvement and investment.***

*Superficially, this figure also depicts a solid progression of funding across all the TRL levels – indicating a system where ideas and innovation can progress from the early discovery stage, all the way through the system to translation and commercialisation – and economic benefit.*

*However, this belies a significant lack of connectivity in Australia's R&D system – each funding type in the figure is coloured according to the Government department in which it is administered, of which there are seven. Each department acts independently and there is seldom a pathway to iterate successful projects from one funding stream to the next.*

*The portfolio-aligned eligibility criteria for many funding schemes can result in projects that span disciplines or broad research areas can fall through the gaps. Just one example is research that spans the disciplines of engineering and medical research – a critical combination for nearly all med-tech device development. The Australian Research Council will fund engineering research, but does not fund discovery research in the medical field – that is the purview of the National Health and Medical Research Council. However, the NHMRC does not cover the engineering aspects of the work, and the Medical Research Future Fund (MRFF) does not fund early-stage research. This can leave potentially transformative projects in an R&D funding limbo – with no choice but to give up on the work or head overseas to pursue it. This results in a loss of ideas, talent and future opportunities for Australia, not to mention the loss of return on the nation's original investment in the discovery research.*



- BOM – Bureau of Meteorology
- AIMS – Australian Institute of Marine Science
- AAD – Australian Antarctic Division
- GA – Geoscience Australia
- ANSTO – Australian Nuclear Science and Technology Organisation
- DSTG – Defence Science and Technology Group
- CSIRO – Commonwealth Scientific and Industrial Research Organisation
- SKA – Square Kilometre Array
- ARC – Australian Research Council
- RSP – Research Support Program
- RTP – Research Training Program
- NHMRC – National Health and Medical Research Council
- NCRIS – National Collaborative Research Infrastructure Strategy
- ASCA – Advanced Strategic Capabilities Accelerator
- ACIAR – Australian Centre for International Agricultural Research
- NESP – National Environmental Science Program
- AEA – Australia’s Economic Accelerator
- Trailblazers – Trailblazer Universities Program
- DAFF CG – DAFF Competitive Grants
- RDCs (S) – Statutory R&D Corporations
- RDCs (I) – Industry owned R&D Corporations
- IGP – Industry Growth Program
- CRC – Cooperative Research Centres
- MRFF – Medical Research Future Fund
- ARENA – Australian Renewable Energy Agency
- CEFC – Clean Energy Finance Corporation
- NRF – National Reconstruction Fund

Figure 1: Commonwealth Government support for R&D, through funding for publicly funded research agencies, research grants, and industry development. Horizontal navy blue lines indicate the TRL extent covered by schemes, coloured rectangles indicate the quantum of funding allocated in the 2024–25 Federal Budget.

## Examples of cost pressures within research infrastructure

**CHAIR:** ...If you take a blanket view of the need to cut spending by the government, why is research different? You mentioned before the cost of equipment and the cost of technology these days. Can you give me an indication why proportionately science is different to other areas because of the cost of technology and things that are not discretionary costs. People will often go straight to people, but there are some things you cannot simply cut because it's not possible. There are regulations that sit around them. An item becomes obsolete if it doesn't attach to something else. Can you give me an explanation of that.

**Mr Winn:**...I'm happy to provide those.

**CHAIR:** Thank you. You are able to provide that to the committee.

### **Response:**

In addition to the examples provided during the hearing, STA has collected data from several national research infrastructure facilities supported through the National Collaborative Research Infrastructure Strategy (NCRIS), highlighting increases in non-discretionary cost underpinning research. These facilities are at the front line of rising costs associated with maintaining research infrastructure and ensuring researchers have access to essential equipment. These facilities, which support a broad range of National Science and Research priorities, are a useful analogy for the cost challenges faced by CSIRO, which operates a number of similar facilities and capabilities for CSIRO researchers.

- NCRIS is a grants program administered through the Department of Education that supports a collaborative network of very different, but complementary, research infrastructure facilities and projects that are essential for Australian universities, industry and government operations.
- An acronym list and description of the select NCRIS projects referenced in this paper are at the end of this document.

## Instruments and equipment

In 2006, nationally significant microscopes cost between \$3–6m. In 2026, these microscopes cost between \$7–13m. (MA)

The costs of key industrial systems for heavy ion accelerators have risen sharply since 2022, reflecting broader inflationary and supply chain pressures. These systems can often only be sourced from US suppliers with the specialised industrial expertise to build systems that are rare or non-existent in Australia. For example, a planned end-to-end upgrade to the insulating gas system that permits accelerators to operate at high voltages has risen from a 2022 estimate of \$4.0m to \$9.5m by the start of 2025, i.e. a more than 200% increase. (HIA)

60% increase in telescope detector costs based on global pricing. (AAL)

## Operations, service and maintenance

Instrument service contracts that are essential to ensure aging instruments maximise their operational 'up-time' (and ensure maximum value is obtained for the significant cost of the machines) cost \$100–150k/year in 2006. In 2026, these contracts cost \$250–350k/year. (MA)

Costs of clean room maintenance, fit-out and certification have increased markedly over the past decade. For example:

- Total operating costs: ~60% rise over the decade (varies by ISO class and climate)
- Energy (mostly HVAC): ~100% rise
- Lower latitude locations require an additional 30% for cooling/dehumidification
- Maintenance & servicing: ~50% rise (TIA)
- Instrument maintenance service contract costs are rising at least 5% pa. (PA)

## Consumables

Many facilities require a range of consumable products to conduct their work, many of which are rising between 5 and 20% pa, with some fluctuations due to international currency exchange rates as some essential materials are not available domestically. (PA) Some examples of cost increases in these products include:

- 50% increases in gases (ethylene oxide) and other essential chemicals such as liquid nitrogen since 2021 (ANFF)
- 43% increase in costs for additive fabrication materials due to changes in supplier policies (reassessment of education discounts) (ANFF)
- 19% increase in costs for shoe covers used in clean labs since 2024 (ANFF)
- 25% increase in costs for tri-blend gloves since 2024 (ANFF)
- Filter cleaning: ~40% rise (TIA)

Volatility in global supply chains and price fluctuations can also have a significant impact on research operations. For example:

- KrF (krypton fluoride) gas has increased ~400% from \$4,000 per cylinder in 2020 to more than \$7,000 currently – a 75% increase, with a post-COVID price spike of ~\$16,000 (ANFF)
- high purity gold is used in various experiments, and 100g has increased ~110% from ~\$10,000 two years ago to more than \$21,000 in 2025 (ANFF)

## Wages and labour

In addition to wages rising at least 5% pa (PA), new roles are also required that call for higher levels of training (with long training lead times) and expertise to match research complexity, especially in areas such as biological production systems. While aggregate wage growth across the economy has been modest, translational research relies on a narrow cohort of highly skilled scientific, technical, quality, and regulatory staff whose roles have become more complex and market-exposed over time. Increased regulatory expectations, expanded quality and compliance requirements have driven up remuneration, contract security and professional development costs. (TIA)

## High-performance computing

High performance compute (HPC) system – Including for research – consists of CPUs, GPUs, memory, networking, cooling/heat transfer systems and data storage, all housed within purpose-built buildings.

Complexity and capability of HPC have increased significantly over the past 3 years due to the explosion in AI capability, which is primarily powered by GPUs. GPU chips cost tens of thousands of dollars each, with a bare minimum machine requiring ~2000 GPUS – i.e. \$90 million.

In October 2025, the AI revolution started impacting the cost of memory in addition to GPUs with a price rise as between 300% and 500% over 6 months. This in turn has increased the cost of SSD disk storage by a similar amount, leading to the cost of a complete HPC system rising to ~\$200 million. (NCI)

Pawsey's Setonix HPC system was delivered in 2022/23 as part of a broader infrastructure investment of approximately \$70 million - encompassing compute hardware, storage upgrades, networking, facility works, and supporting data centre infrastructure. These interdependencies are integral to HPC delivery and the full cost cannot be understood by looking at any single element in isolation. Given price increases, a like-for-like replacement of Setonix today would cost well in excess of \$200 million.

Recent global market analysis confirms that computing infrastructure cost more than doubled year-on-year in 2024, driven by hyperscale AI and sovereign data centre programs competing for the same components as research HPC facilities. The shift to GPU-dense architectures has fundamentally changed facility requirements, requiring direct liquid cooling at rack densities several times higher than earlier generations, and facilities supporting security-critical or export-controlled workloads face additional

infrastructure costs beyond the headline compute figures. Key operational cost pressures compound the capital challenge:

- **Electricity:** Global data centre power demand is projected to reach approximately 4% of total world power consumption by 2030. GPU-dense systems are power-hungry by design, making electricity a major and growing operational cost.
- **Staffing:** Hyperscalers and AI companies are competing aggressively for the same specialist HPC talent, with salary benchmarks increasingly set by a commercial market operating at a fundamentally different scale to publicly funded research infrastructure.
- **Supply chain:** New tariffs, export controls, and geopolitical pressures impacts on critical resources and energy are adding cost volatility and extending lead times for critical equipment. For a facility operating on multi-year procurement cycles, this instability is without precedent.

## Regulatory and compliance

Regulatory and quality assurance costs are a significant cost to research organisations, particularly those working in more applied and translational research. Meeting the requirements of industry partners, or global standards for product quality and/or government licensing requirements can incur stringent and expensive testing, accreditation and inspection costs – and the cost of time. Detailed and time-consuming regulatory processes can add months or even years to research projects – time that research budgets often simply cannot stretch to.

A selection of NCRIS project / facility descriptions

Project/facility	Description and impact
<b>Microscopy Australia (MA)</b>	MA ensures Australian researchers have access to electron microscopes that can illustrate how the world works at incredibly tiny scales, down to individual atoms and proteins. This is essential for: <ul style="list-style-type: none"> <li>• Improving processing of critical minerals for 'green steel' market</li> <li>• Testing semiconductors and chips in phones and computers</li> <li>• Additive manufacturing for aeroplane wings and satellites</li> <li>• Improving chemical reactions in next generation batteries and solar cells</li> <li>• Developing new vaccines like the Molecular Clamp which relied on Microscopy Australia (and TIA) in particular (leading to the ViceBio/Sanofi deal).</li> </ul>
<b>Australian National Fabrication Facility (ANFF)</b>	ANFF enables users to process, transform and manufacture materials. This includes hard materials such as metals and ceramics, and soft materials such as polymers. These materials have a wide range of uses across many fields of research and industry. ANFF helps researchers access these tools and trains researchers in how to use them.
<b>Heavy Ion Accelerators (HIA)</b>	HIA upgrades Australia's heavy ion accelerators to be the best in the world, and helps researchers and industry access them. These helps us to understand the world at a very detailed level, which is important for research in many areas, such as mining exploration. It also lets us create useful new materials and technology.
<b>Astronomy Australia Limited (AAL)</b>	AAL supports Australian astronomers to access the best observatories in the world, as well as the high-performance computers needed to analyse their data. AAL supports several different facilities in Australia that boost astronomy research. AAL also supports researchers to work with astronomy facilities overseas.
<b>National Computational</b>	NCI provides high performance computing (HPC) to Australian researchers, government and industry. They also provide storage and data services.

<b>Infrastructure (NCi)</b>	<p>NCI's services and expertise support many important research outcomes. Many research areas need large amounts of computing time and data, including environment, climate change, energy and medicine.</p>
<b>Pawsey Supercomputing Research Centre</b>	<p>Pawsey provides HPC to researchers across Australia, including store and visualise their data.</p> <p>Many research fields have large amounts of data to store and analyse. This includes astronomy, life sciences, medicine, energy, resources and artificial intelligence.</p>
<b>Phenomics Australia (PA)</b>	<p>PA provides Australian and international researchers with cell, tissue and animal pre-models to study disease, underpinning what is widely known as 'precision medicine'. PA also has experts to help researchers study their models and manage their research projects. This helps us to better understand what genes do, find genetic causes of diseases, and create better health treatments.</p>
<b>Therapeutic Innovation Australia (TIA)</b>	<p>TIA helps researchers turn their medical research discoveries into potential new therapeutics and helps Australian companies move projects down the translational research pipeline. TIA also looks for areas where there are gaps in the tools, services and expertise needed for medical research and helps to fill those gaps.</p>