

SCIENCE & TECHNOLOGY AUSTRALIA

POLICY SUBMISSION

3 FEBRUARY 2023

NATIONAL RECONSTRUCTION FUND

Science & Technology Australia thanks the Department of Industry, Science and Resources for the opportunity to offer input on priorities for the National Reconstruction Fund design and implementation.

Science & Technology Australia is the peak body for the nation's science and technology sectors, representing 139 member organisations and more than 110,000 scientists and technologists. We connect science and technology with governments, business and the community to advance science's role in solving some of humanity's greatest challenges.

The Australian Government's \$15 billion National Reconstruction Fund has a bold ambition: to support growth, jobs and productivity across the Australian economy.

Implemented with a strategic, clear-eyed, long-term approach, the fund could transform Australia's sovereign capability and economic complexity.

Research and development are the fundamental drivers of economic growth.

Fundamental discovery research generates the bold breakthroughs that lead to new products, medical treatments, agricultural techniques, manufacturing techniques – new ideas and innovation across the whole economy.

While the NRF is not intended to support discovery research, it can help to more fully capitalise on the nation's investment in such research. It can support the commercialisation and business opportunities generated by our world-class research sector. A strong discovery research system in Australia is essential to generate the early stage development to feed the business opportunities the NRF will support.

Science & Technology Australia welcomes clarity in the fund's mission that "the NRF will complement (and not duplicate) existing Government initiatives that support innovation, early-stage research and development, and commercialisation."

To be most effective, the NRF strategy must from the outset clearly define how it will interact with other government funding streams and productivity-boosting initiatives. These include:

- Australia's Economic Accelerator
- The National Collaborative Research Infrastructure Strategy
- Clean Energy Finance Corporation
- ARENA
- The R&D Tax Incentive
- The new Patent Box tax concession initiatives

The seven NRF priority areas have been chosen as areas that ‘reflect Australia’s current and emerging advantages’ – areas essential for our future prosperity, sustainability and sovereign capability:

- Renewables and low-emission technologies: Pursue commercial opportunities including from:
 - components for wind turbines
 - production of batteries and solar panels
 - new livestock feed to reduce methane emissions
 - modernising steel and aluminium
 - hydrogen electrolyzers
 - innovative packaging solutions to reduce waste
- Medical science: Leverage Australia’s world-leading research to provide essential supplies such as medical devices, personal protective equipment, medicines and vaccines.
- Transport: Develop capabilities in transport manufacturing and supply chains including for cars, trains and shipbuilding.
- Value-add in the agriculture, forestry and fisheries sectors: Unlock potential and value add to raw materials in sectors like food processing, textiles, clothing and footwear manufacturing.
- Value-add in resources: Expand Australia’s mining science technology, and ensure a greater share of raw materials extracted are processed domestically. For example, high-purity alumina from red mud in bauxite processing or lithium processing for batteries.
- Defence capability: Maximise sourcing of requirements from Australian suppliers employing Australian workers, whether they be technology, infrastructure or skills.
- Enabling capabilities: Support key enabling capabilities across engineering, data science, software development – including in areas such as fintech, edtech, artificial intelligence, robotics and quantum.

The Government has also announced specific investment targets for some areas:

- Up to \$3 billion for renewables and low emissions technologies
- \$1.5 billion for medical manufacturing
- \$1 billion for value-adding in resources
- \$1 billion for critical technologies
- \$1 billion for advanced manufacturing
- \$500 million for value-adding in:
 - agriculture
 - forestry
 - fisheries
 - food
 - fibre

Both the broad priority areas, and those earmarked for targeted investment encompass Australia’s research strengths. **When making investment decisions, the NRF Board should seek to capitalise on Australia’s research strengths. It should ‘forward scout’ projects emerging from the Australia’s Economic Accelerator program, Cooperative Research Centres, Australian Research Council Centres of Excellence and innovations developed using National Research Infrastructure facilities.** The NRF would be a complementary stage in the pipeline of investment and development for these critical capabilities – investment to fully realise the ultimate economic benefits of our nation’s research.

To ensure a consistent pipeline of opportunities for NRF investment, and a holistic and comprehensive approach to Australia’s development across the priority areas, the NRF support should be coupled with targeted and strategic investment in our research capability. This would ensure a consistent scaffold of support for these critical capabilities, from the R&D stage through to translation, commercialisation and economic benefit for Australia.



The Board should keep its finger on the pulse of current reviews across the higher education and research sector – the [Refresh of Australia's Science and Research Priorities](#), the [Review of the Australian Research Council](#) and the [Universities Accord](#) process in particular. These reviews will powerfully shape Australia's higher education research capability in coming years, and the initial pipeline of innovation and ideas the NRF seeks to capitalise. Education and research investments power innovation and the subsequent economic opportunities.

The Board must make astute assessments when considering the priority areas as entire sectors, and consider where and how the NRF could best support economic development. For some sectors, such as agriculture and food security, all stages of food production should be considered, not just a value-add at the raw materials stage. This spans from innovations in fundamental plant genetics and genomics technologies, from bio-based solutions to improving soil conditions and feedstocks, crop and animal growth through to food manufacturing and preservation.

There are vast potential opportunities for Australia in developing a 'bio-based economy' – creating value from biological feedstocks that can be made into food, fibre, fuel, materials and energy.

It's time for Australia to pick winners – and double down on our strengths.

The NRF offers a prime opportunity to build economic value – but it will not and can not be an unlimited source of investment capital that can be stretched to cover every single promising opportunity. The Board will need to make prudent strategic decisions, recognising that not every worthy project or venture can or should be supported. Australia must decide which capabilities are most critical for our sovereign capability into the future. Australia's unique geography, environment and social landscape will in part dictate some of these priorities – there are some areas of research and development that we can not rely on the rest of the world to do.

It is also in Australia's interests to bolster sovereign capabilities in data storage, data security and high-performance computing. These will be essential for us to develop technologies including AI, quantum, cybersecurity. **We cannot afford to rely on other countries in these critical areas.**

The Board could identify specific objectives in each priority area and allocate 80–90 per cent of funding accordingly. This would allow a small proportion – 10–20 per cent of funds – to support emerging technologies. This would enable the NRF to set a sensible balance between clearly articulated priorities and the agility needed to avoid missed opportunities. **This slice of the portfolio could be a 'high risk, high potential return' stream of capital.**

Alongside critical sovereign capability, there will be other opportunities to partner with global allies and collaborators for mutual economic benefit. There may be specific components of supply chains in which Australia could manufacture some elements locally – and partner with other countries to complete the supply chain and grow new export markets.

The NRF Board will be obligated to generate a rate of positive return on investment over the medium to long-term. This is a sensible and sustainable approach. While the range of investments the fund will support will likely have very different maturity rates, patient investment will be required for many ventures, and a focus only on 'quick wins' will not be beneficial in the long-term. **The expectations on the terms of investment and expected returns must be realistic and clear.**

The Board should decide what stage of business development the NRF will support – and this needs to be telegraphed clearly to potential applicants. Burgeoning companies and businesses require support at many different stages, each with their own risk level and maturity.

Across all the proposed priority areas, there are currently significant gaps in Australian private sector venture capital funding. In manufacturing, many start-ups and scale-ups won't be able to deliver the level of expected returns required by most commercial venture capital investors. This is a gap where the NRF can step in to support potentially highly-profitable manufacturing businesses through their early stages and scale-up – ultimately generating strong returns for the fund.



Science & Technology Australia strongly supports the Board taking an ethical and environmentally responsible approach to investment, and with a strong commitment to diversity and inclusion. The Board could consider setting reportable targets for investments in initiatives led by underrepresented groups such as women, Aboriginal and Torres Strait Islander people, and people from culturally and linguistically diverse backgrounds.

Investment decisions should also take into account the business' or project's potential environmental impact. Given the country's newly legislated carbon emissions reduction targets, and the pressing need to transition to a low- or zero-carbon economy, responsible investments will consider not only the business model, but also environmental sustainability.

Manufacturing opportunities will vary in both scale and feasibility according to the different priority areas. Ultimately, manufacturing investment should come from industry – the companies that will draw revenue and profit from products. The role of the Government, and the NRF, should be to support prototype development and validation of manufacturing techniques. This will give industry the increased certainty it needs to invest.

Australia has an opportunity to establish exemplar prototyping facilities to develop and validate manufacturing techniques – key partnerships between universities, manufacturers, and industry (encompassing large, SMEs, and start-ups). Two trailblazing examples are the [Battery Hub](#) at Deakin University and the [Discovery to Device Facility](#) at RMIT University. This is where connecting the NRF with other funding streams, particularly Australia's Economic Accelerator, is key – ensuring consistent support at each stage of the research, translation, commercialisation and innovation pipeline.

Building strategic manufacturing prototyping facilities, with ISO accreditation, could create manufacturing hubs for the region and position Australia as a key leader/partner for value-added manufacturing solutions.

These manufacturing prototyping facilities, if structured with ISO accreditation, can become hubs for manufacturing innovation for the region – positioning Australia as a key partner for value-added manufacturing. These capabilities should ideally be able to be shared across different sectors and priority areas to enable economies of scale for businesses looking to develop their capabilities and test early stage products.

When setting funding conditions for NRF support, the Board should consider business viability and how likely the business is to stay in Australia (this could potentially be a condition of funding).

Concessional interest rates on loan repayments would be a positive aspect to NRF funding conditions – this would help avoid loan repayments creating a burden for businesses still working to consolidate their operations.

Complementary reforms to enhance the NRF's effectiveness

To support the NRF goals and the businesses or enterprises it would back, wider education on IP and how best to navigate the complexities of shared IP, patents and other aspects of IP would be helpful.

Further work is also needed to bridge the gap between industry and the highly specialised expertise and capabilities in higher education and government research institutions. This would strengthen an innovation system that can generate more of the types of initiatives that the NRF seeks to support. The CRC-P program has been powerfully effective in building such partnerships.

Science & Technology Australia's proposed 'Bench-to-Boardroom' program would significantly boost Australia's capacity to commercialise research. It is a bold and transformative idea: to create a new generation of scientist entrepreneurs, equipped with the skills to take more of their ideas from the lab or field into industry – and turn them into products and businesses to support Australia's economy. The Board could consider allocating a modest portion of NRF funding to support training and professional development initiatives to up-skill this powerful source of innovation.



Areas including product accreditation, through bodies such as the Therapeutic Goods Association, can be challenging for early ventures and start-ups to navigate. A resourcing boost to accreditation bodies to support entrepreneurs through the accreditation process would be beneficial.

Similarly, regulatory regimes must be structured so they deliver needed protections and safeguards – but do not become burdensome or prohibitive to new businesses. Ensuring consistent approaches in overlapping government regulations, and communicating them in clear and helpful guidance, will help address these challenges.

