SUBMISSION

Submission to the Department of Industry, Science and Resources

Submission to the National Reconstruction Fund (NRF) Consultation

3 February 2023

The Australian Academy of Technological Sciences and Engineering (ATSE) is a Learned Academy of independent, non-political experts helping Australians understand and use technology to solve complex problems. Bringing together Australia's leading thinkers in applied science, technology, and engineering, ATSE provides impartial, practical, and evidence-based advice on how to achieve sustainable solutions and advance prosperity.

ATSE welcomes the opportunity to provide a submission to the National Reconstruction Fund (NRF) consultation. This submission makes the following recommendations regarding the implementation of the NRF:

Recommendation 1: That the NRF prioritises investments in regional Australia.

Recommendation 2: That the NRF invests in projects that facilitate the establishment of a circular economy for renewable energy products.

Recommendation 3: That the NRF provides funding for both early-stage research and commercialisation of negative emissions technologies.

Recommendation 4: That the NRF provides funding for agricultural and agrifood-based research and commercialisation, with an emphasis on sustainable practices, public-private partnerships, and international engagement.

Recommendation 5: That the NRF provides funding to assist early-stage entrepreneurs and small and medium enterprises in medical manufacturing as they progress through the regulatory process.

Recommendation 6: That the NRF provides funding for the promotion and translation of new medical technology innovations.

Supporting growth in regional communities and economies

The NRF provides an opportunity to strengthen regional communities and economies, while increasing Australia's capacity to value-add in the mineral resources, agriculture, forestry, and fisheries sectors. These primary production activities operate predominantly in regional areas. ATSE recommends that value-adding centres be co-located with primary activities, especially where these centres are regionally located. This will assist in the decentralisation of both populations and economic activities, reducing pressure for land and infrastructure in Australia's capital cities. It will also increase the efficiency of the value-adding process as shorter distribution channels are required before an output is generated.

Where the value-adding activities consume large amounts of power, it would be beneficial to locate such projects where surplus renewable energy is available in order to limit their impact on the environment and the energy grid. Such locations are often closer to regional areas than urban centres. This is particularly important when establishing facilities for the processing of mineral ores to metals and the transformation of those metals to products, as these facilities consume large amounts of power.

An example of where value-adding activities could be effectively co-located is the Upper Spencer Gulf Region of South Australia. This region has planned renewable energy and hydrogen generation while being close to important mineral resources and processing opportunities (Upper Spencer Gulf Common Purpose Group, 2018). The introduction of value-adding activities to such areas presents an opportunity to sustainably revitalise and grow regional economies.

Recommendation 1: That the NRF prioritises investments in regional Australia.

Level 2, 28 National Circuit
Forrest ACT 2603
Australia

PO Box 4776
Kingston ACT 2604
Australia

+61 2 6185 3240
info@atse.org.au
atse.org.au

ABN 58 008 520 394
ACN 008 520 394

Australian Academy of Technological Sciences & Engineering

Establishing a circular economy for renewable energy products

The need to establish circular economies is outlined in ATSE's report Towards a Waste Free Future. A significant hurdle to achieving global net zero greenhouse gas emissions by 2050 is the limited supply of the critical minerals required to produce renewable energy technologies, such as photovoltaic solar panels, wind turbines, and batteries (used both for electric vehicles and the stabilisation of the electricity grid). The management of these products as they reach end-of-life also presents a major global challenge, since recycling requires significant quantities of energy. However, there is opportunity in Australia for a new green-powered, regional industry focused on establishing a circular economy of renewable energy components through recycling and reprocessing. This industry would simultaneously decrease the impact of waste from renewable products while increasing the supply of critical minerals and reusable components. ATSE recommends that the NRF provides investment to create a circular economy for renewable energy technologies that is itself powered by renewable energy.

Recommendation 2: That the NRF invests in projects that facilitate the establishment of a circular economy for renewable energy products.

Increasing investment in negative emissions technologies

Renewable and low emissions technologies are essential for Australia, and the world, to achieve net zero greenhouse gas emissions. However, investment in negative emissions technologies, such as Direct Air Capture with Carbon Storage (DACCS), is also a crucial element in this challenge. Many industrial processes produce carbon dioxide not solely through the consumption of energy, but also through chemical reactions that cannot be readily replaced by renewable energy. Examples of such processes include the production of biofuels, plastics, cement, steel, and fertilisers. Clean energy-powered negative emissions technologies provide a path for production of these materials to continue in a decarbonising economy. Funding is required both for research into negative emissions technologies and their commercialisation. ATSE recommends that the provision of funding for renewables and low emissions technologies in the NRF be expanded to also include negative emissions technologies.

Recommendation 3: That the NRF provides funding for both early-stage research and commercialisation of negative emissions technologies.

Improving Australia's innovative capacity in agriculture

Population growth and wealth-driven changes to dietary preferences are expected to significantly increase global food demand in the coming decades, as explored in ATSE's report Food and Fibre: Australia's Opportunities. Australia has a strong reputation for producing safe and high-quality food through well-regulated production practices. There is significant potential for Australia to utilise this strength and capitalise on rising demand for food and fibre, particularly the emerging middle-class Asia-Pacific market. However, Australia's potential to expand the natural resources used for agricultural development are limited. In addition, expansion would likely have negative environmental impacts, both in terms of the protection of natural ecosystems and in achieving greenhouse gas emissions targets. Increases in Australia's capacity to sustainably export food and fibre therefore rely on technological developments to boost productivity and mitigate environmental impacts. This can be achieved by increased investment in research and innovation in the agriculture sector, with an emphasis on value-adding capabilities and sustainable practices. It is also crucial that international partnerships are fostered to ensure that Australia's agricultural research remains world-class. In addition to research funding, investment in government and industry advisory programs are necessary to ensure that new research is quickly and effectively commercialised. The growth of public-private partnerships in the sector will help to achieve this.

Level 2, 28 National Circuit
Forrest ACT 2603
Australia

PO Box 4776
Kingston ACT 2604
Australia

+61 2 6185 3240
info@atse.org.au
atse.org.au

ABN 58 008 520 394
ACN 008 520 394

ATSE Australian Academy of Technological Sciences & Engineering

Recommendation 4: That the NRF provides funding for agricultural and agrifood-based research and commercialisation, with an emphasis on sustainable practices, public-private partnerships, and international engagement.

Driving medical device innovation in Australia

The growth of medical manufacturing in Australia has consistently been hindered by a relatively complex regulatory approval processes, as compared with overseas economies. Regulation by the Therapeutic Goods Administration (TGA) is important and preserves Australia's reputation in medical manufacturing; however, it can be difficult for early-stage entrepreneurs and small and medium enterprises to navigate. This is discussed in ATSE's report Grow and Promote a Globally Competitive Medical Device Industry in Australia. Overseas products with a CE Mark (European regulatory approval) have a relatively short and straightforward approval process through the TGA, which is not available to Australian manufacturers. A streamlined process exists for certain classes of higher-risk and implantable medical devices; however, companies producing other types of medical device must navigate the full approval process (Emergo by UL, 2021). This incentivises Australian companies to move parts of the manufacturing process (or the entire company) overseas. The NRF could aid in the invigoration of onshore manufacturing (while maintaining high regulatory standards) by providing additional funding to support the progression of early-stage entrepreneurs and small and medium enterprises through the regulatory process, and providing financing opportunities for local manufacturing. ATSE also recommends that the NRF provides funds to promote new medical innovations and to assist in the translation of innovations from the laboratory to the market.

Recommendation 5: That the NRF provides funding to assist early-stage entrepreneurs and small and medium enterprises in medical manufacturing as they progress through the regulatory process.

Recommendation 6: That the NRF provides funding for the promotion and translation of new medical technology innovations.

Level 2, 28 National Circuit
Forrest ACT 2603
Australia

PO Box 4776
Kingston ACT 2604
Australia

+61 2 6185 3240
info@atse.org.au
atse.org.au

ABN 58 008 520 394
ACN 008 520 394

Australian Academy of Technological Sciences & Engineering

References

Australian Academy of Technological Sciences and Engineering (ATSE), 2014. Food and fibre: Australia's opportunities. Accessed from <https://www.atse.org.au/wp-content/uploads/2019/01/food-and-fibre-report.pdf>

Australian Academy of Technological Sciences and Engineering (ATSE), 2014. Grow and promote a globally competitive medical device industry in Australia. Accessed from <https://www.atse.org.au/wp-content/uploads/2019/01/grow-promote-competitive-medical-device-industry.pdf>

Upper Spencer Gulf Common Purpose Group, 2018. Regional Transport Infrastructure Plan. Accessed from <https://www.infrastructure.sa.gov.au/__data/assets/pdf_file/0004/112918/Upper-Spencer-Gulf-Common-Purpose-Group.pdf>

Australian Academy of Technological Sciences and Engineering (ATSE), 2020. Towards a Waste Free Future. Accessed from <https://www.atse.org.au/wp-content/uploads/2020/11/ATSE-Towards-a-Waste-Free-Future-REPORT-low-res.pdf>

Emergo by UL, 2021. Australian TGA to Accept CE Mark Conformity Assessments for Some High-Risk Medical Devices, IVDs. Accessed from <https://www.emergobyul.com/news/australia-tga-accept-ce-mark-conformity-assessments-some-high-risk-medical-devices-ivds>

Level 2, 28 National Circuit
Forrest ACT 2603
Australia

PO Box 4776
Kingston ACT 2604
Australia

+61 2 6185 3240
info@atse.org.au
atse.org.au

ABN 58 008 520 394
ACN 008 520 394

Australian Academy of Technological Sciences & Engineering