Please note: the substantive content of the 2026 NRI Roadmap Survey begins at Question 20 (with prior questions dealing with administrative and other information).

As such all submissions that are published include the responses submitted from Question 20 onwards only.

Q20.

Part 2: Research themes

2.1 NRI comprises the assets, facilities and associated expertise to support leading-edge research and innovation in Australia and is accessible to publicly and privately funded users across Australia and internationally. We are seeking your input on possible directions for future national-level investment - i.e., where the requirements are of such scale and importance that national-level collaboration and coordination are essential.

The 2021 Roadmap used a challenge framework to support NRI planning and investment. With this in mind, consider likely future research trends in the next 5 - 10 years, and with respect to one or more of the 8 challenge areas identified in the 2021 Roadmap as listed below:

- describe emerging research directions and the associated critical research infrastructure requirements that are either not currently available at all, or not at sufficient scale and
- describe current national infrastructure requirements that you anticipate will no longer fit the definition of NRI in 5-10 years.

Do not limit your commentary to NCRIS funded capabilities.

Q21.

Resources Technology and Critical Minerals Processing

Q22.

Food and Beverage

Q23.
Medical Products

The national integration of large-scale health datasets may become obsolete or insufficient within the next decade. As artificial intelligence (AI) and machine learning continue to evolve, the demand will shift from merely consolidating datasets to developing AI-driven, real-time health data analytics platforms. Future research will require advanced infrastructure capable of automated data processing, predictive analytics, and secure, decentralized data sharing to enhance medical diagnostics, personalized treatments, and public health strategies. The transition toward AI-enhanced health data ecosystems will also necessitate improvements in data interoperability, cybersecurity, and ethical AI governance to ensure responsible and effective utilization of healthcare information.

Q24.
Defence

Q25.
Recycling and Clean Energy

Q26.
Space

Q27.
Environment and Climate

Q28.

Frontier Technologies and Modern Manufacturing

Frontier technologies and modern manufacturing that rely on conventional testbeds may require substantial upgrades or repurposing as AI continues to evolve over the next decade. The rapid adoption of AI-driven fabrication is rendering traditional manufacturing infrastructure increasingly inefficient and, in some cases, obsolete. Future manufacturing will require adaptive, AI-powered testbeds capable of real-time optimization, predictive maintenance, and autonomous process control to enhance productivity and resilience. Furthermore, advancements in quantum computing and AI-enhanced materials research will drive next-generation fabrication techniques, necessitating flexible, modular, and intelligent manufacturing environments. To remain competitive, legacy infrastructure must evolve into smart manufacturing ecosystems, integrating robotics, digital twins, and advanced sensor networks to improve precision, scalability, and efficiency in production.

Q29.

2.2 The 2024 statement of National Science and Research Priorities (NSRPs) includes outcomes linked to each priority to assist in identifying critical research needed in the next 5 to 10 years.
Consider the priority statements and, with respect to one or more of the 5 priority areas as listed below:

- describe emerging research directions and the associated critical research infrastructure requirements that are either not currently available at all, or
- not at sufficient scale and describe current national infrastructure requirements that you anticipate will no longer fit the definition of NRI in 5-10 years.

Do not limit your commentary to NCRIS funded capabilities, and where relevant, refer to the underpinning outcomes and research identified in the NSRPs document.

Q30.

Transitioning to a net zero future

As Australia moves toward a net zero future, cutting-edge research is driving advancements in renewable energy, energy storage, efficiency, and carbon management. The development of advanced solar photovoltaics and next-generation wind energy systems is essential to expanding clean energy production, while innovations in energy storage—such as high-capacity batteries and hydrogen-based solutions—will ensure a stable and resilient energy supply. To further reduce emissions, research is also focusing on enhancing energy efficiency across industries and households, optimizing energy consumption while maintaining productivity. Additionally, the advancement of carbon capture, utilization, and storage (CCUS) technologies is critical to mitigating emissions from hard-to-abate sectors. Achieving these ambitious goals requires significant investment in research infrastructure. The establishment of large-scale testing facilities will be crucial for assessing the real-world performance of renewable energy technologies and their seamless integration into the national grid. Specialized laboratories must be developed to accelerate the discovery and refinement of advanced energy storage materials and systems, ensuring reliability and cost-effectiveness. Meanwhile, the implementation of comprehensive energy data analytics platforms will enable real-time monitoring and optimization of energy use, providing insights to maximize efficiency and sustainability. Lastly, the creation of pilot plants for CCUS technologies will allow researchers to evaluate their effectiveness at scale, paving the way for widespread deployment in industries where emissions are difficult to eliminate. By advancing these research directions and investing in the necessary infrastructure, Australia can solidify its leadership in clean energy innovation and accelerate the transition toward a sustainable, net zero future.

Q31.

Supporting healthy and thriving communities

Q32.

Elevating Aboriginal and Torres Strait Islanders knowledge systems

Q33.

Protecting and restoring Australia’s environment

Q34.

Building a secure and resilient nation

In an increasingly complex and interconnected world, ensuring national security and resilience is more critical than ever. As cyber threats evolve in sophistication, research is intensifying efforts to bolster cybersecurity measures that safeguard critical infrastructure and sensitive data. Beyond digital security, the ability to predict, prevent, and respond to disasters—whether natural or human-made—has become a vital priority, driving advancements in monitoring and response strategies. Secure communication forms another cornerstone of resilience, with quantum encryption and blockchain technologies emerging as the next frontier in defending sensitive information against cyber intrusions. Meanwhile, autonomous systems are transforming security and disaster response, with applications ranging from real-time surveillance to search-and-rescue missions and infrastructure monitoring. To support these emerging research directions, Australia must invest in advanced research infrastructure. One critical area is Quantum Translation, where limited access to dilution fridges and test and measurement kits continues to hinder progress. Overcoming this barrier will enable a significant leap in quantum testing throughput, accelerating device development and innovation across both academia and industry. Additionally, advancements in Advanced Packaging, particularly at the Advanced Manufacturing Readiness Facility (AMRF), are integral to bridging the gap from concept to prototype to manufacturing. By prioritizing these research efforts and investing in the necessary infrastructure, Australia can secure a future that is not only protected but also adaptive and resilient in the face of emerging challenges.

Q35.

2.3 The case for a new NRI capability, or enhancements to existing capabilities, typically emerges through advocacy from research communities clustering around rigorously identified needs and goals. Such a concept could respond to a requirement for novel or expanded capacity within a domain, or across domains, and must be such that it could only be made available with national-level investment.
If you have identified such a requirement, briefly describe the need, the proposed infrastructure capability, the medium-term goals, impacted research communities, and the timeframe over which you advocate its establishment. Your response can include links to relevant existing reports.

Q36.

Part 3: Industry perspectives

This section is seeking input specifically from industry-based respondents. Other respondents can skip this section.

Recommendation 6 of the 2021 Roadmap related to improvements in industry engagement with NRI. To complement work on this topic that has occurred since then, we are seeking additional advice on NRI requirements as perceived by current or potential industry-based users.

Q37.

3.1 Have you (or your organisation) interreacted with or used Australia's NRI?

- ○ Yes
- ◉ No

Q38.
3.2 If so, please briefly outline the NRI capabilities you (or your organisation) have interacted with or used. Do not limit your response to NCRIS capabilities.

This question was not displayed to the respondent.

Q39.
3.3 Please indicate your (one or more) primary reasons for interacting with NRI:

This question was not displayed to the respondent.

Q40.
3.4 If you answered no, please indicate your (one or more) primary reasons:

- [ ] I did not know about it
- [ ] Other facilities suit my needs better
- [ ] I would like to, but cannot get access due to geographical location
- [ ] I would like to, but believed that access was only available to academic researchers
- [ ] I am not aware of any capability that meets my needs
- [ ] Other (please specify)

Q41.
Part 4: Other comments
4.1 Please elaborate on any of your above responses or add any other comments relevant to the development of the 2026 Roadmap. Your response can include reference or links to existing reports that you recommend be considered during the 2026 Roadmap development process.

Q49.
4.2 Optional Document Attachment.
Note: Our strong preference is that answers are provided against the relevant questions in the survey. However, this file upload option is available for submissions in file format, where needed. Please ensure the document includes your name or organisation.