



Department of Industry, Science, and Resources
Industry House, 10 Binara Street, Canberra
By email: CTHub@industry.gov.au

30 September 2022

Dear Sir or Madam,

Re: 2022 List of Critical Technologies in the National Interest consultation

Engineers Australia is the peak body representing the engineering profession in Australia. We are the voice of over 117,000 individual members working in nearly every sector of the economy, with expertise across all disciplines and branches of engineering. We are a professional association constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community. Engineers Australia appreciates the opportunity to provide input to the Department of Industry, Science, and Resources (the Department) on the 2022 List of Critical Technologies in the National Interest (the List).

General Comments

Engineers Australia notes that the:

"List does not imply any prescribed or proscribed actions in relation to the listed technologies – inclusion of a technology on the List does not imply guaranteed prioritisation or that there is a real or perceived risk to national security from that technology. The List is intended to serve as a summary of identified critical technologies that stakeholders should be aware of when undertaking their activities."

A more detailed expansion of the purpose of the List and decisions behind the Action Plan for Critical Technologies would allow organisations to engage with it more purposefully. In particular:

- The relationship between this List and other lists that focus technology considerations is unclear. For instance, the Low Emissions Technology Statement (LETS) and this List both include hydrogen. At the same time, LETS includes technology not on the List such as soil carbon technologies. It would be beneficial for Engineers Australia to understand the relationship between these two lists and other government processes that focus attention on specific technologies.
- Greater clarification of the relationship between this List and funding decisions would also be beneficial. For instance, would a technology included in this list be more favourably considered for access to the \$1 billion investment in the Critical Technology Fund?
- What is the relationship between this List and the Modern Manufacturing strategy? The impact of COVID-19 and recent geopolitical events have illustrated that sovereign capability has to be seen as part of a larger economic and social state of readiness. Does the List of Critical Technologies in the National Interest inform the thinking behind our manufacturing strategies to make us more agile and resilient in safeguarding our future prosperity?
- We also note that "some areas considered critical infrastructure such as electricity networks were not included." Some expansion of this comment to inform understanding of what technologies are included under the heading of 'electricity networks' would be helpful.

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- Most importantly, what is the relationship to strategies for the engineering workforce? At a time when technology and systems are becoming more complex and our community is more reliant on the engineering profession, we have a critical shortage of engineers across most sectors. It is important to identify and support critical technologies, but our future prosperity is undermined without the engineering workforce to develop and deploy these technologies. Will the List inform government decisions to address the structural and systemic reasons for the shortage of engineers?

In response to the questions posed:

1. *Are there technologies that should be considered for inclusion or removal from the original List? What are your reasons for the suggestion?*

The statement in the paper, “Critical technologies are current and emerging technologies with the capacity to significantly enhance or pose risk to our national interest” is very broad in terms of providing focus. However, there are several technologies that our members have raised in terms of inclusion or removal from the List:

- As storage becomes more important to firm renewables, pumped hydro will be critical to the energy transition and energy security. This is a mature technology for which enabling funding models are being developed.
- Onshore and offshore wind are not included, yet wind technologies are critical to decarbonising our energy system.
- A technology that could be questioned as 'critical' in Australia is nuclear energy. Nuclear energy can be a divisive topic with a range of views. The CSIRO/AEMO GenCost reports are clear that renewables backed up by storage are currently the cheapest form of energy by quite a large margin. State and Commonwealth legislation prohibits the development of a civil nuclear industry, and significant community concerns exist. At the same time, Australia has excellent sunshine and wind to power renewables and a rich endowment of the minerals needed for electrification of existing and new low emissions industries. In that context, there is no clarity on the future role that nuclear may play and whether it should be seen as 'critical' for Australia at this time.
- However, if nuclear energy is included then fusion should be added. There have been significant developments in the field of fusion energy in the last few years. Some experts now see this as having realistic long-term potential for supplies of low-carbon, low-radiation energy.

2. *Do you have any comments on the individual technology definitions?*

The List should be expanded to include Cyber Engineering. Where Cyber Security focuses on malicious software, Cyber Engineering includes the analysis of cyber systems that include hardware, firmware and software.



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3. *Do you have a view on the frequency of updates to the List?*

Given the pace of change with many of these technologies, a biennial review seems reasonable. However, given the scope of the 63 technologies on the List, the Department may get deeper engagement through a rolling review either by the seven categories or by industry sector, ensuring all items are reviewed regularly to ensure currency.

4. *Do you have any feedback on the content of the Critical Technology Profiles?*

It is not immediately obvious why some critical technologies are included in the 29 Critical Technology Profiles while others are not.

5. *Has the List influenced decisions in your organisation about technology investment or adoption?*

Engineers Australia is a peak professional body and, as much as possible, we are technology neutral.

Please do not hesitate to contact us to discuss these matters further at policy@engineersaustralia.org.au.

Regards,

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