



ENGINEERS
AUSTRALIA

Budget Submission: Engineering National Resilience

“Big ideas are based on engineering & we’re here to deliver”

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1.0 Executive Summary

1.1 About Engineers Australia

Engineers Australia is the peak body for the engineering profession in Australia. With over 100,000 members across Australia, we represent individuals from a wide range of disciplines and branches of engineering. Engineers Australia is constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community.

1.2 The time is now

The significant uncertainty of the year ahead has created a unique opportunity to invest in big ideas that can make a difference for all Australians. Despite the array of challenges confronting Australia from COVID-19 and the associated disruption to regional instability and climate change, the solutions put engineers at the centre of change. Rather than accept the false dichotomy that solutions to these challenges have to cost Australians jobs, industries and opportunities, the recommendations outlined in this budget submission indicate the reverse. Engineers Australia sees creative solutions to many of Australia's challenges which encourage innovation and building future-ready industries. This is critical to keep Australia at the forefront of development as the global economy adapts to a post-covid or long-covid world and the ongoing disruption caused by digitisation. The time is now to make generational investment in a long-term vision which will see Australia positioned to capitalise on the jobs and economic growth of the future whilst solving some of our most pressing challenges.

1.3 Table of recommendations

Engineers Australia's recommendations concerning the 2022 budget are focused on *Building Sovereign Capability (2.0)*, *Beating Climate Change (3.0)* and *Investing in People (4.0)*. Whilst there are important additional areas not covered, we have identified these focus areas in collaboration with our 100,000+ members as critical to engineering national resilience at a time of uncertainty and engaging with the challenges facing Australia.

	Opportunity Area	Current Challenge	Recommendation
Build Sovereign Capability (2.0)	Battery and solar exports	Insufficient investment	Establish financial incentives to upskill the workforce and encourage capital investment.
	Innovation ecosystems	Uncompetitive grants for startups	Streamline and centralise application processes
	Infrastructure	Infrastructure deficit	Commit to targets [dedicated to innovation] and practice improvement
Beat Climate Change (3.0)	Complete the roadmap	Need a fully formed plan to support net zero by 2050	Publish a comprehensive national emissions strategy including a 2030 target
	Invest in technology	Increase the uptake of climate smart technology	Support households and companies purchase energy efficient products
	Clean up cars	Transport emissions one of the major drivers of climate change	Mandate fleet average emissions standards for new cars

Invest in People (4.0)	Graduate employment	High demand for STEM skilled workforce not being met	Incentivise commonwealth contractors to provide graduate and internship programs
	Migrant engineers	Skilled immigration program not fit for purpose	Further refine the migration program to target specific skills and experience

2.0 Build Sovereign Capability

The impact of COVID-19 illustrated that sovereign capability can no longer be viewed exclusively through the prism of defence, however important, but as part of a larger economic and social state of readiness. Critical to ensuring the long-term survivability of our industries and communities is a focus on innovation and resilient supply chains alongside defence industry and aerospace. Engineers Australia calls on the government to seize this unique opportunity in our nation's history to secure independent national resilience in safeguarding our future prosperity.

2.1 Our future export industry - battery & solar panels

There are significant opportunities in the domestic manufacture of both battery and solar panels. Australia has the technology and engineering expertise to develop a highly competitive manufacturing industry, critical to resilient supply chains. Accenture's Future Change Report estimates Australia has the opportunity go from an industry currently worth \$1.3 billion and 6,000 jobs to \$7.4 billion and 34,700 jobs. Similarly, Australia will need hundreds of millions of new solar panels. We currently have around 20GW of solar and it is estimated we will need another 280GW. Globally, growth is forecast at 20% annually until at least 2030 to meet demand. These significant benefits in jobs and supply chain resilience in the wake of COVID-19 is an opportunity where thought-through incentivisation could make a significant impact. The Australian Energy Market Commission expects a further 3 million households in the next decade to acquire solar panels, a strong future demand which can power our sovereign capability.

2.1.1 Recommendations:

- **Support tax incentives for Australian owned and operated manufacturers of battery and solar panels as well as those investing in these businesses to promote the development and export capability of this industry.**
- **Fund research for new technologies and innovative production processes alongside financial incentives for educational institutions to develop the manufacturing workforce.**
- **Facilitate collaboration through industry forums.**

2.2 Innovation ecosystems

Global industry is more connected and evolving faster than ever. Yet, Australia continues to lag behind the rest of the developed world when it comes to the commercialisation of innovation. There is a critical role for government in fostering the development of innovation and start-up hubs by creating incentives to invest in emerging engineering technology to become globally competitive.

2.2.1 Recommendations:

- **Engineers Australia supports efforts to streamline and centralise government grants for research and development including reducing the time between a grant being allocated to a start-up and funds being transferred to a 30 day maximum.**
- **Further investment by the Federal Government to create additional innovation hubs centred around start-ups and the commercialisation of Australian innovation.**

- **Implement a globally competitive tax regime for those investing in start-ups. The UK is a prime example with tax credits of 30% to 50% granted on capital gains tax as well as excepting profits if reinvested in a qualifying start-up.**

2.3 Infrastructure

Australia's infrastructure deficit remains a long-term drag on our economic prosperity and living standards.

Population growth, increasing access for regional Australia as well as planning for the future require creative ways to invest and build infrastructure. As the primary client for infrastructure, government has the opportunity to invest in Australian infrastructure innovation. Specifically, there is a need to be more inclusive of local small to medium sized (SME) Australian businesses and start-ups rather than exclusively relying on subcontractors to large transnational corporations. There is too much focus on de-risking, which pushes providers to do what they know works, rather than providing an incentive in taking strategic risks to reduce costs or deliver innovative solutions. A key part of including Australian SME's in the bidding process for government contracts is cutting red tape and reducing the administrative burden of applying.

2.3.1 Recommendations:

- **Support Australian SME's by requiring transnational corporates who have successfully bid for government contracts to partner with smaller domestic firms to increase Australian businesses' capability to grow and compete internationally.**
- **Commitment to increased targets for projects dedicated to innovation, practice improvement and development resulting in long-term benefits such as improved return on risk profile.**
- **Improved certainty of pipeline will encourage innovation and ultimately efficiency, as research and investment will be able to be undertaken in an environment of certainty.**

The time is now: building sovereign capability is about safeguarding our nation whilst creating opportunities for Australians. Whilst the current set of crises are challenging, it creates a mandate for government to invest in a long-term vision to make us safer and more prosperous. The confluence of risks posed by regional instability, climate change and COVID-19 require innovative policies to resolve these challenges.

3.0 Beat Climate Change

The last three years have seen Australians bear witness to the grave dangers the changing climate poses to lives, the built environment and natural world. Historic drought lit the fuse for a devastating and unprecedented fire season. This has been followed by a series of damaging floods. The government's recent commitment to reach net zero emissions by 2050 is a positive step, but its plans for the near-term are inconsistent with that goal. Current policy also fails to grasp the opportunities that net zero presents for business and consumers alike. Engineers Australia calls on the government to commit to three actions to help us beat climate change and bank the benefits.

3.1 Complete the roadmap

Australia needs a fully formed plan to support our net zero by 2050 commitment. The Glasgow Climate Summit also highlighted that deep emissions cuts by 2030 are vital to halting climate change. Emissions in key sectors are steady or rising, and our 2030 emissions reduction target is among the least ambitious in the developed world. A comprehensive strategy and ambitious 2030 target will guide our path towards net zero - supporting efficient and coordinated action by governments, businesses, and others in the next decade and beyond.

3.1.1 Recommendation:

- **Publish a comprehensive national emissions reduction strategy, including a 2030 abatement target to create certainty for business and industry**

3.2 Invest in technology solutions

Energy efficient technologies not only support reduced emissions - they improve business productivity and reduce costs for consumers. Existing plans provide a framework for increased uptake of efficient technologies but require much greater support. The government should provide generous new and increased incentives for businesses and households to invest in energy efficient technologies. These should focus on electric alternatives to technologies using other fuels. Emissions from electric devices will continue to decline as we roll out more renewable power.

3.2.1 Recommendation:

- **Supercharge support for households and companies to purchase energy efficient products.**

3.3 Clean up cars

The majority of Australia's transport emissions come from cars - our road fleet is one of the least efficient globally. Hybrid and electric vehicles can drive down transport emissions while providing greater reliability, lower running costs and a superior driving experience. Efficiency standards will support carmakers to bring more of these vehicles to Australia. They can be implemented on a 'fleet average' basis to accommodate higher-emitting models such as utes, with standards tightening as technologies improve. This simple, direct fix is already benefitting customers and the climate in most major vehicle markets.

3.3.1 Recommendation:

- **Mandate fleet average emissions standards for new vehicles.**

The time is now: The human and natural disasters of recent years have spelled out our situation as clearly as possible: the time to beat climate change is now. Many of the technologies to do so are ready for rollout. Engineers Australia calls on the government to commit to these three measures for ambitious, practical and coordinated climate action that leaves business and the community better off.

4.0 Invest In People

A chronic deficit in the supply of skilled engineers is at risk of becoming a structural reality in the Australian economy and innovation landscape. In addition to meeting the projected future demand, one of the ways Australia needs to respond to issues surrounding our supply chain is ensuring a healthy pool of experienced and qualified engineers to develop our advanced manufacturing capability. With many of the challenges facing Australia requiring an engineering solution, we need a re-think of our workforce to support engineers delivering on the big ideas and creating a more secure and resilient nation.

4.1 Graduate employment

To ensure adequacy of engineering skills supply over the long term, efforts should be made to increase utilisation of recent graduates to retain them in the profession. Investing in the domestic supply of engineers is critical to the long term sustainability of engineering skills. Engineers Australia analysis indicates no evidence of insufficient number of Commonwealth Supported Placements available for students who wish to study engineering at an undergraduate level. However, it is clear that there are many more engineering bachelor qualified engineers in Australia than there are people reporting working in a professional engineering role. This suggests a fundamental structural feature of the Australian employment market which indicates many engineering bachelor graduates will have to find employment outside of engineering. Investing in engineering graduate employment outcomes will lessen future skills shortages of engineers with 5-10 years' experience. There is a gap between university graduates and the needs of industry. This started with the withdrawal of public-sector employment of engineers, particularly graduate programs and cadetships, the underutilisation of engineering graduates has become a long term, structural feature of the profession. Graduate engineers are very employable in other sectors that pay more.

4.1.2 Recommendation:

- **Engineers Australia calls on the government to incentivise commonwealth contractors to provide graduate programs and internships through its procurement processes.**

4.2 Migrant engineers

With the Australian Government predicting an increase in engineering jobs being created over the next five years, the requirement for skilled engineering migrants will exist for some time. Currently overseas-born engineers make up 58.5 percent of the engineering labour force in Australia. However, overseas-born engineers are significantly more likely than their Australian-born counterparts to be unemployed. As government prepares for the opening of borders we need to ensure we are bringing in skills in demand, not just qualifications, so that we don't continue to contribute to the high unemployment rate of overseas engineers. In addition, some migrants face a visa condition of remaining in a particular region for two to four years. This requirement can further hinder a migrants ability to find employment, as if their experience or skills are not needed in the region, they are unable to work in the profession for the period they are required to remain there.

4.2.1 Recommendations:

- Refine Australia's migration program objectives to be more targeted, to attract migrants with the specific experience and skills required, increasing their employability.
- Review the regional sponsorship with a focus on freeing migrants with specific skills of their obligation to remain in a regional area if employment in their field is not possible.

4.3 STEM Education

Engineers have the skills to translate new ideas into products and services that are commercially attractive and useful. Engineering and its continuous development over recent decades effectively uses knowledge of mathematics and science to solve real world problems. The expected future growth in engineering occupations within the economy over the next five years is set to exceed population growth by a factor of 1.63. Australia's capability to produce engineers begins at school. For Australia to develop its own engineering workforce we need a sufficient flow of high school students who are interested in engineering and have studied the subjects that engineering relies upon, a firm grounding in science and mathematics.

4.3.1 Recommendations:

- Engineers Australia asks for the Commonwealth Government to work with the State and Territories to increase teacher capability in science, technology, engineering and maths subjects and providing a better understanding of all STEM careers and learning, not just 'discovery' science.
- Government should collaborate with industry, educational institutions and industry bodies to develop a detailed scope of future skills supply and demand. The danger of not providing relevant and effective training is a stagnating economy and reduced innovation which fails communities across Australia.

The time is now: the existing skills shortage will only become more severe and has wide reaching implications for industry across Australia. Engineers Australia calls for significant investment in STEM skills alongside a wholistic vision to avoid chronic labor shortages in areas that will hamper our national resilience and future growth opportunities.

5.0 Concluding Remarks

The Omicron variant has illustrated that the challenges facing Australians continues unabated and the need for decisive reform to engineer resilient communities and supply chains is needed now more than ever. This budget is an opportunity to implement a long-term vision for a resilient and prosperous Australia, one which is capitalising on the opportunities of a disrupted world rather than falling victim to it. The recommendations outlined in this budget submission are readily achievable with minimum investment required on the part of government, whilst delivering a significant benefit to the engineering profession and communities everywhere. However, what is central to all of these recommendations is timely implementation, both to make the most of the opportunities currently presenting themselves and also to bolster our national recovery efforts.

Building Sovereign Capability (2.0) underpins our capacity to overcome the challenge of climate change (3.0) and turn it into a force driving domestic industry. This is the case not only through solar and battery production (2.1) but as a means to guide the development of our innovation ecosystems, particularly STEM related (2.2), and smart infrastructure (2.3). It is also critical to ensuring our supply chains are readily adaptable to change or we have the capacity to pivot domestic industry to meet urgent demand. A strong manufacturing base is fundamental to alleviating some of Australia's supply chain and logistics vulnerability. Australia's current STEM skills deficit (4.0) will increasingly act as an inhibitor across all industries and hamper the growth of industry and our capability to adapt. Engineering national resilience requires the skills imbalance to be addressed through a combination of increasing our capability to domestically train experienced professionals (4.1 and 4.3) coupled with a strategic skilled immigration scheme (4.2).

Engineers are on the frontlines of responding to COVID, developing solutions for business, government and the community at large. The big ideas in response to climate change are engineering-based, alongside developing technologies that create new industries, jobs and businesses. The recommendations as per this budget submission are practical reforms that will help engineer a better future.



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