Australian Government
Department of Industry, Science, Energy and Resources

Submitted via email: technologyroadmap@industry.gov.au.

24 June 2020

Australia's Technology Investment Roadmap: Discussion Paper

The Australian Energy Council ('AEC') welcomes the opportunity to make a submission to the Australian Government's *Technology Investment Roadmap: Discussion Paper* ('Roadmap' or 'Discussion Paper').

The AEC is the industry body representing 24 electricity and downstream natural gas businesses operating in the competitive wholesale and retail energy markets. These businesses collectively generate the overwhelming majority of electricity in Australia and sell gas and electricity to over 10 million homes and businesses.

The AEC supports the overall direction of the Roadmap. Technology has played a critical role to date in driving Australia's energy transition and will continue to do so. In this regard, the Roadmap lays out a sensible approach for identifying low emissions technologies and the AEC welcomes the focus on the immense abatement potential of increased electrification and hydrogen use. The Roadmap rightly recognises that solar and wind now represent the cheapest form of new energy generation but require firm capacity, such as gas and storage, to manage their variability. The Roadmap could be improved by providing sharper guidance on how the selected technologies will be deployed and the manner in which private investment will enable this.

A solid foundation for future investment

The Roadmap has laid the groundwork for future technological investment through its identification of 140 technologies for initial consideration. In doing so, it has provided a nationally consistent information set and framework that can be built upon. The principles of technological neutrality and evidence-based analysis that appear to have guided this process are strongly supported and should be maintained when deciding priority technologies. The AEC also welcomes the two metrics to measure the impact of the Government's investments, being the economic stretch goals and extent to which private sector capital is leveraged. We recommend the inclusion of two additional metrics:

- For energy-related technologies, how it integrates into the energy system. This should involve asking whether the technology fulfils a specific need, such as contributing to the security and/or reliability of the electricity system.
- Whether the technology remains truly immature, and as such government involvement is unlikely to crowd out unsupported private investments.

Underpinning this framework is a fair and transparent consultative process for selecting low emission technologies. The formation of a Ministerial Reference Panel that provides advice on technological priorities should give industry and investors confidence that the selection process is merit-based. Furthermore, an annual review of the selected technologies should ensure that investments remain efficient and can adapt to new opportunities and setbacks, which is critical given the long-term characteristics of emissions reduction. The AEC would welcome these formal processes being extended to other programs, such as the Underwriting New Generation Investment ('UNGI') scheme.

Level 14, 50 Market Street
Melbourne 3000
GPO Box 1823 Melbourne Victoria 3001

P +61 3 9205 3100
E info@energycouncil.com.au
W energycouncil.com.au

ABN 926 084 953 07

Leveraging private sector investment

As alluded to above, the Roadmap has stated that one measure of success is the 'extent to which private sector capital and other investment follows the Government's commitments'.[1] Leveraging private investment is critical to ensuring that the path to net-zero carbon is done at the lowest cost to households and the economy. The AEC therefore welcomes this intent but cautions that it needs to be backed by appropriate policy signals if the private sector is to have the confidence to invest in long-term assets. In this respect, the AEC notes that the Discussion Paper confirms that the Clean Energy Finance Corporation and ARENA have provided funding to technologies that are already mature and commercially viable. This is of concern to the AEC as development of mature technologies should be left entirely to the private sector. In that regard, the AEC has raised concerns previously that government intervention through the UNGI program risks distorting the market and chilling private investment in the process.[2]

This is not to suggest that there is no role for Government in promoting low emission technologies. Rather, Government funding should be directed to piloting technologies that are not yet commercially deployable but hold mass potential to accelerate, and also smoothen, Australia's transition. For that reason, the AEC supports providing long-term certainty with respect to ARENA's role.

Government support should extend to research into how technologies can best be integrated into the electricity system. Such research may not directly reduce emissions, but in the long run will enable low emissions technologies to be more readily integrated into the system without risking security or reliability.

Once a technology has reached the stage of commercial viability, its deployment should be left to the private sector. To do otherwise will be counter-productive because private investment will chill in fear of being undermined by government. The Discussion Paper does acknowledge this but does not go into detail about how mass deployment will occur other than to say that private investment should follow. As stated above, there will need to be appropriate long-term policy signals in place for this to happen. The development of a policy framework that integrates the Government's Low Emissions Technology Statements with other climate-related initiatives (such as the Emissions Reduction Fund) may help leverage private investment in the deployment of low emission technologies.

Governments should also be aware of the differences between competitive and regulated markets, notwithstanding them being funded by private capital. Some technologies (such as battery storage) can be developed by either the regulated or competitive sector. The crowding out of potentially more efficient service providers from the markets envisaged in the Roadmap in the short-term through the appeal of safer returns from regulated assets could diminish productive efficiency. It may also have a chilling effect on competition and technological development in the non-network alternatives market in the long-term, diminishing dynamic efficiency.

Identifying priority low emission technologies

The AEC is supportive overall of the proposed approach and criteria for selecting priority low emission technologies. The Roadmap makes clear that the electricity sector will be a key area for abatement and

[1] Australian Government, 'Technology Investment Roadmap Discussion Paper', Department of Industry, Science, Energy and Resources, May 2020, p39.

[2] Australian Energy Council, 'Submission to Underwriting New Generation Investment', November 2018, https://www.energycouncil.com.au/media/14522/20181109-aec-underwriting-investments-final.pdf.

Level 14, 50 Market Street
Melbourne 3000
GPO Box 1823 Melbourne Victoria 3001

P +61 3 9205 3100
E info@energycouncil.com.au
W energycouncil.com.au

ABN 926 084 953 07

technologies that 'firm variable supply and maintain grid stability' to support new renewable generation are a 'priority'.[3] In this regard, the AEC sees merit in the Roadmap focusing on:

- **Electrification:** this should be a big focus for Australian energy transformation, particularly in light transport and as an efficient heat source domestically and industrially. As Australia currently spends $57 billion on liquid fuels each year,[4] transport electrification can have immediate economic benefits and enable large abatement opportunities. This will require increased renewable generation to be smoothly integrated into the electricity system. Research into integration technologies and demand-side initiatives to manage load will therefore prove critical.
- **Hydrogen:** the AEC supports the Roadmap's emphasis on the potential of hydrogen as a green, firming generation with immense export value, subject to it being able to prove its commercial viability. In the long-term, it may be used as a peaking fuel for electricity.
- **Energy storage technologies:** battery storage and pumped hydro technologies will play an increasingly important role in firming intermittent renewable generation and providing load-shifting potential. While the Roadmap has identified the potential of 8-hour batteries, we note that other energy storage applications including intraday batteries are also important and can facilitate more investment in renewables (something in which Australia has a comparative advantage). These technologies are best leveraged through the competitive rather than regulated monopoly sector.
- **CCS for gas production**: gas production is a very large part of Australia's economy and has a role to play in the decarbonisation of Australia's electricity supply. The Roadmap is rightfully focused on how carbon capture and storage technology can be developed to capture carbon dioxide associated with gas production. Whilst other applications have proved challenging for this technology, this application holds genuine promise in materially reducing emissions.

The AEC supports extending funding for ARENA to enable the trialling of these priority technologies. It is important that access to this funding is predictable so prospective developers have confidence their new technologies can be piloted.

Maximising abatement opportunities in other sectors

The electricity sector has long recognised its key role in leading efforts to decarbonise Australia's economy. The proliferation of renewable generation, facilitated by ongoing structural changes to the way the NEM operates, has seen emissions in the electricity sector steadily decline. Other sectors, like transport, agriculture and industrial processes, are now responsible for about two thirds of Australia's overall emissions and the abatement opportunities in these sectors have, to date, been relatively untapped.

Some of these other sectors are often described as 'hard to abate' due to the technological and commercial challenges they face, but these challenges are not insurmountable. For light transport and heat sources, electricity already represents a direct and viable substitute, while hydrogen should be able to fuel heavy transport and industrial processes in time. The Roadmap's emphasis then on increasing research investment in electrification and hydrogen is timely and welcomed by the AEC. The readiness of these low to no carbon substitutes can be fast tracked further through policy signals to private investors.

[3] Australian Government, 'Technology Investment Roadmap Discussion Paper', Department of Industry, Science, Energy and Resources, May 2020, p24.

[4] Australian Government, 'Liquid Fuel Security Review: Interim Report', Department of the Environment and Energy, April 2019, p8.

Level 14, 50 Market Street
Melbourne 3000
GPO Box 1823 Melbourne Victoria 3001

P +61 3 9205 3100
E info@energycouncil.com.au
W energycouncil.com.au

ABN 926 084 953 07

In addition, the Discussion Paper mentions its intent to eliminate emissions from cement production, described as a 'difficult challenge even over the longer term'.[5] While carbon capture may become viable in the future, other abatement opportunities in this space already exist and should be considered. Emissions from cement production mainly come from limestone releasing carbon dioxide when it is heated. Geopolymer cement, made out of fly ash, is a zero-carbon substitute that is as technically sound and commercially viable. Its uptake has been recommended by government inquiries,[6] industry bodies and environment groups.[7] Unlike other technologies, its uptake is not hindered by commercial viability but rather its status as untested, which creates a reluctance to "move first". Government-backed trials of geopolymer concrete, as well as putting regulatory incentives in place to use fly ash, can increase market confidence and ensure Australia is more in line with countries like the United Kingdom and Japan, which already take full advantage of the beneficial re-use capabilities of fly ash.

The AEC looks forward to continuing working with the Australian Government to ensure Australia's smooth transition to a low carbon future.

Any questions about this submission should be addressed to Rhys Thomas, by email to Rhys.Thomas@energycouncil.com.au or by telephone on (03) 9205 3111.

Yours sincerely,

Ben Skinner
General Manager, Policy & Research
Australian Energy Council

[5] Australian Government, 'Technology Investment Roadmap Discussion Paper', Department of Industry, Science, Energy and Resources, May 2020, p16-17.
[6] Senate Environment and Communications References Committee, 'Rehabilitation of mining and resources projects and power station ash dams as it relates to Commonwealth responsibilities', Commonwealth of Australia, March 2019, p131-132.
[7] For example, *Beyond Zero Emissions* identifies geopolymer concrete as a key step in the cement sector reaching zero carbon: Beyond Zero Emissions, 'Zero Carbon Industry Plan: Rethinking Cement', August 2017, p24, https://bze.org.au/wp-content/uploads/rethinking-cement-bze-report-2017.pdf.

Level 14, 50 Market Street
Melbourne 3000
GPO Box 1823 Melbourne Victoria 3001

P +61 3 9205 3100
E info@energycouncil.com.au
W energycouncil.com.au

ABN 926 084 953 07