Putting people at the center of the Technology Investment Roadmap

A joint submission from leading Australian energy social science researchers

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We welcome the Australian government's *Technology investment roadmap discussion paper*, and its compilation of the range of potential technologies for consideration by the Australian community. We also welcome the current consultation process, which is important for building confidence between the energy sector, government and publics around a fair process for public investment to accelerate low and zero emissions technologies.

Key points:

- Technology investment must give greater consideration to public acceptability of technologies.

- Future engagement on *deployment of* low and zero emissions technologies must involve effective participatory processes.

- Leveraging private investment should prioritise local content and help bolster economic organisations that benefit the many, rather than the few.

- Better integration of social metrics for prioritising technology investment are needed throughout the pipeline from research, to construction and site remediation.

- Limited investment in social research means we don't have a good understanding of how people relate to different technologies, but we outline critical points for key technologies.

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1. Putting people at the centre of the Roadmap

We urge the Taskforce to consider further investment in a range of existing or emerging technologies that already enjoy strong public support. A key aspect of any societal transition is trust. When COVID unfolded in Australia, public health and state government experts who were seen as independent were critical in compliance with public health directives. We also know that Australians strongly support renewable technologies over fossil fuel and nuclear alternatives. Because there are low levels of trust in the energy sector, there is a strong risk that investment in non-renewable energy technologies, without clearly showing its support for the decarbonisation effort that is urgently required, will encounter strong public opposition and may hamper effective investment, delaying the transition and increasing costs for all.

Public engagement is critical in technological transitions. Public ownership and approval of technologies like household PV mean we now have the highest per capita PV penetration in the world. The short pay-back period plays a role in this, but our research shows a significant motivation for PV purchase is reducing Australia's GHG emissions, ***in light of*** a lack of sector

leadership. In other words, many people are buying PV because they urgently desire an energy transition but do not believe governments and energy retailers are moving fast enough.

In light of this, the following technologies may be more likely to be in line with public visions of a positive energy future:

- Electrification of the energy system to allow more energy sourced from renewables
- Electrification of mass transport and EVs
- Grid storage and integration of distributed energy resources sourced from renewables

Of course, our research also shows that **ownership and operation of these technologies** are key to uptake but note that the Taskforce is unfortunately not focused on questions of regulation and ownership. This is unfortunate as such considerations are pivotal to public enthusiasm for technologies. We also stress that public acceptance is not something to be considered for technology after it has been identified as a priority, or developed for commercialisation. Rather, it is foundational to the outlook for these technologies. Strong opposition to the smart meter roll-out in Victoria demonstrates the importance of carefully deploying anticipatory and deliberative approaches to technology policy.

Responses to emerging technologies like Virtual Power Plants are shaped by the conditions of people's participation, including factors such as:
- Adequate compensation, control over the technology and convenience
- Whether scheme design is in line with their values and aspirations
- A good understanding of the rationale for the technology and a sense of how it relates to the broader energy transition towards decarbonisation.

Energy social scientists have a good understanding of experiences and perceptions of most established technologies and can provide guidance on these questions. While there are always gaps between expert and public understanding of emerging technologies, our research has shown that attempts merely to fill this 'deficit' can lead to blindspots in technology development by failing to account for public knowledge, which includes *inter alia* knowledge of institutional capacities.

2. Public participation in technology prioritisation is critical: Here's how

To understand what technologies we should prioritise for investment during the technology transition in Australia, and why, requires significant consultation (interaction) with the Australian public, not just technical experts.

While submissions and roundables with technical experts, consumer groups and investors are important, they are not a proxy for research-led insight into the public's views and experiences of emerging technologies. This insight is behind the EU's

Responsible Innovation program which attempts to bring public engagement with technology **upstream** in its development. Much like what has been kickstarted in the Roadmap process, Responsible Research and Innovation (RRI) is a dynamic process. But RRI also intends for all stakeholders in research and innovation to be mutually responsive and share responsibility for both the process and its outcomes.

Historically we can see that the public will communicate and act when they like or dislike a technology and as a group they have the power to undermine technology implementation. Recent history of Australia's decarbonisation efforts and the political pushback is a case in point. For example, in coal and gas mining communities which felt threatened by decarbonisation regional communities facing development and expansion of the gas industry and in communities experiencing smart grid meter rollouts and wind energy developments.

The Roadmap does note some consultations will occur, but not the extent or the audiences for these consultations. **The methods with which the public, technology users and those affected by technologies are engaged matter**. Engagement and the synthesis of learnings needs to be undertaken by people who are skilled in engagement and know how to engage with people in a methodical, constructive, respectful and ethical way.

Future engagement for the Taskforce to consider could include:

- Ensuring a diversity of voices is heard and included, such as those from socio-economically disadvantaged groups, culturally and linguistically diverse communities, different housing/ community/ business types, mix of genders etc.
- Identifying people's own visions for energy technology, to see how these intersect with or undermine the technical vision presented by the Roadmap.
- Developing an engagement and communications plan around the vision itself to build understanding, trust and consensus; particularly through opportunities for engagement of publics designed to bypass adoption of simplistic pro/anti stances.
- Understanding how other technology visions developing outside the energy industry, and people's expectations for them in their businesses and lives, are likely to intersect with or undermine the Roadmap (e.g. AI, Internet of Things, Blockchain, smart homes, virtual reality).
- Monitoring and understanding how people's engagement with new technologies (e.g. electric vehicles) can change their routines, habits and expectations.
- Providing tailored and differentiated programs that support understanding and build capacity with new technologies, to suit people's everyday lives and businesses.
- Involving people intended to benefit from or use technologies in their design, functionality and purpose.
- Developing and providing a clear and transparent process to listen and respond to people's concerns with using or accessing new technologies.

3. A Fair Go: Prioritise technologies that distribute wealth to all Australians

Because of the low operation costs of renewable technologies, they lend themselves very well to community co-ownership and sharing models. Even sophisticated optimisation and control technologies can be open source. This is in contrast with centralised large-scale infrastructure technologies, which need significant organisational capacity to manage.

When embedded in good practice community engagement, the adoption of benefit-sharing mechanisms enhance local support for renewable technology developments. Benefit-sharing involves giving the local community a financial stake in the development, thereby locally distributing some benefits of the development. Such approaches have been demonstrated to be successful as they bring developments closer to being in line with social expectations for a fair distribution of benefits.

Community ownership is another model for aligning renewable technology development with social expectations. Going beyond benefit-sharing, community ownership is development in which communities lead the processes of development and benefit from the outcomes created and which (in the case of renewable energy) generally seek to decentralise, democratise and decarbonise electricity while also demonstrating the value of both renewable energy and community involvement). The potential benefits of community ownership extend beyond the immediate renewable technology development and its local economic and social benefits, and also include local capacity building, for example in terms of planning, decision-making, participatory governance, and local leadership.

Coordinated consultation with regional communities' must shape technology policy. Such policy requires deliberation about futures envisioned and their consequences, especially for the workforce impacts of emerging technologies. Such considerations should include how such technologies change existing expectations and demands for secure and meaningful work, shift workforce demand from regions to urban centers, alter needed skills, and change existing workforce gender distributions.

Furthermore, two authors to this statement (Kuch and Adams) are currently leading an Annex in the only social science focused IEA Technology Collaboration Program, namely the User-Centred Energy Systems TCP. This work takes as its point of departure the social nature of key demand-side management technologies which are becoming increasingly salient in the transition to a renewable-powered grid. The USERS-TCP is a platform for knowledge-sharing between IEA member countries around critical issues such as how social acceptability for automated demand-response programs is built and maintained by project proponents; the potential for EVs to contribute to grid stability; elasticity of social practices around thermal comfort.

Finally, a common concern amongst authors is that Australian energy policy has historically been overly focused on price-based mechanisms for managing energy systems. This has had

deleterious impacts on disadvantaged and vulnerable groups. As load-shifting and demand-response programs are rolled out using market-based frameworks, policy-makers should ensure equity issues are attended to thoroughly.

3a. Land Tenure Considerations for Mega-projects

Prospective sites for many projects under consideration in the roadmap are in regions with very high rates of Indigenous land tenure. Projects will likely raise unique issues for Aboriginal communities and Traditional Owners considering development on their Country. Positive impacts will depend upon effective consultation not only on how, but if, developments proposed for their land should progress. Economic and social benefits are more likely if communities are well informed, engaged meaningfully in development processes, and projects are progressed in accordance with community priorities including provision for skills and knowledge transfer, employment and community equity and/or ownership.

The success of such considerations and consultations are centrally relevant to issues in Indigenous self-determination. The Uluru Statement from the Heart, for example, emphasises the need for "constitutional reforms to empower our people and take a rightful place in our own country."

4. Social science metrics for technology prioritisation

Technological investment creates opportunities for different groups in society at different scales. Any technology investment initiative should be evaluated on a range of criteria. For example, the nature of benefits (direct/indirect; economic vs social vs environmental vs cultural); the distribution of benefits (national to regional to local, upstream to downstream); and the temporality of those benefits (short vs long term). The disbenefits of technologies should also be considered along these lines. We strongly support a more holistic evaluation of benefits.

Metrics to consider include:

- Do we know what people think about this technology?
- Public perception of the risk/benefits from the technology (noting that these often differ from experts).
- The distribution of financial benefits emerging from the technology between public, private and community, between urban and regional centres, and between men and women (noting that many technologies have workforces that are dominated by one gender).
- Whether or not the technology lends itself to a wide range of business models (including local government or cooperative ownership and operation).

Social science research can facilitate integration of user perspectives over the life of trials or technology development. Further social research is required to understand the social and contextual implications of technology integration and change at a scale relevant to many key ambitions of the roadmap. Nevertheless, our research findings are relevant to specific technologies considered in the roadmap and we are happy to elaborate these findings with the Roadmap secretariat.

Comments on specific technologies

Carbon Capture and Storage and the Coal and Gas Industries

- The limited social science research conducted on CCS in Australia demonstrates the importance of its integration with a wider vision for a rapid transition to a fully renewable-powered economy. Support for prospective CCS projects has historically (from research conducted in 2011-12) correlated with scientific literacy and understanding of environmental issues.
- Any future development of CCS in Australia will inevitably be controversial. This is due, at least in part, to widespread perceptions that CCS has in the past been used as a tactic to delay decarbonisation. Social science expertise is essential in developing understanding of this legacy of past controversy, and to advise on the prospects for a socially acceptable future for CCS in Australia.
- Considering the exceptionally poor record of CCS pilot projects in scaling up in Australia, we stress the high likelihood of public opposition to further public funding. These will likely be seen as entrenching incumbent power of fossil fuels and inconsistent with Australian and global emission reduction efforts.

Electric Vehicle Roadmap
- We look forward to the government's forthcoming electric vehicle strategy. There are significant economic, social and environmental benefits of greater EV uptake in Australia, including job creation in new industries and significant health co-benefits from reducing transport emissions. However, Australia is currently lagging behind comparable advanced economies and so risks missing out on many of these benefits.
- Many key user groups are currently shut out of EV ownership, so we encourage consideration of network design beyond early adopters.
- Electric bikes, other electric, 'last mile' personal mobility devices, and other active transport like cycling and walking should have investment support as car alternatives, given the evidence these will support significant wider public health benefits. This is particularly urgent in the COVID recovery phase given public transport usage rates are likely to remain low for some time.
- Integration with wider transport planning is crucial but under-researched.

DER /VPP development
- Social research components of DER projects, while they have been small components have raised significant issues that need resolution for scaling up.
- Despite the social research undertaken in this area Australia is still unclear of the equity implications of the DER transition. Understanding who will benefit and who will be challenged is not just an economic question, but also a vital social science and social policy question that will be instrumental in shaping public support for future DER initiatives.

Further reading:

Websites:
Coalition for Community Energy https://c4ce.net.au/

Responsible Research and Innovation Tools homepage https://www.rri-tools.eu/

User-Centred Energy Systems Technology Collaboration Program https://userstcp.org/

Books and Peer-reviewed Journal Articles:
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