



National Hydrogen Strategy Discussion Paper Comment

In response to the invitation to respond to the COAG energy Council National Hydrogen Strategy Discussion Paper, the Institute for Integrated Economic Research Australia¹ offers the following comments.

The discussion paper has a strong focus for hydrogen that is outward looking with a view to the economic potential of the export markets of North Asia. This is clearly an excellent opportunity for Australia that will in some ways mitigate our current emissions-heavy export trade. The secondary considerations are domestically focused with hydrogen proposed for utilisation within transport, electricity and gas networks as an alternative energy source. These are all laudable proposals which will benefit the Australian economy, the global environment, and enable the transition to a low(er)-carbon future.

What is missing? - *The role of Hydrogen in Australia's National Security*

The principles underpinning the National Hydrogen Strategy and the key policy questions are logical, thought-provoking and certainly need addressing. However, the discussion paper does not seem to present an over-arching 'reason' for the strategy beyond the economic and market-based outcomes and benefits. At a national level, one of the factors that should be considered in any energy strategy, is the impact of that strategy on Australia's national security. Energy security is a sub-set of national security and diverse sources of clean energy will ensure Australia's national resilience in the event of global energy shocks or shortages.

When the current Australian Government talks about energy security it defines it as the adequate, reliable and competitive supply of energy across the electricity, gas and liquid fuel sectors, where reliability is the provision of energy with minimal disruptions to supply. The conditions under which this is assessed are not clear. In effect, the Government has articulated energy security through a "market lens." This is also evident when the Government states that energy security is a "shared responsibility between governments, market institutions and energy businesses." We are of the view that energy security is a prerequisite for protecting our way of life and therefore the markets cannot be held *responsible* for energy security which is a component of national security. Energy security is a vital component of national security and an increased level of Government control / leadership with respect to energy security is warranted.

The interconnectedness of our society, and the reliance on the once-limitless fossil energy that helped us prosper as a nation, means that any interruption to the energy chain will be devastating. The International Energy Agency (IEA) 2018 Review of Australia's Energy Policies² highlighted some significant problems with our energy security. The IEA concluded that, whilst Australia is endowed with natural resources, there are energy security risks across several sectors that have increased. They noted indicators of stress in the Australian energy system and highlighted that energy policy governance in Australia is very complex and fragmented.

The lack of an integrated, systems design of Australia's energy system is also a major vulnerability. Australia's energy infrastructure was not designed as an integrated system; it evolved over many decades as it changed from public owned to privately owned infrastructure components, with little Government regulation and little apparent thought about how secure and resilient energy systems can be developed. The evolution of the piece parts has, in effect, been left to the market. The 2018 IEA review of Australia's energy policies also alluded to the lack of a

¹ <https://www.jbcs.co/#!/iieraust/>

² <https://www.iea.org/publications/freepublications/publication/EnergyPoliciesofIEACountriesAustralia2018Review.pdf>

systems view when it recommended that the Government needs to “design an energy and climate policy framework for 2030” and highlighted that “as the energy system transformation is underway, Government action to ensure an orderly energy transition becomes vital.”

There is some positive news with respect to system design. The Australian Energy Market Operator (AEMO) recently stated that Australia does not have the energy reserves it once had to lean on in times of need and that there is still a need to ensure adequate resources are available to manage the system. It recently published an Integrated System Plan that recognises that the challenges in the system will become even more complex as more of our aging coal units retire and the costs of renewable resources both on and off the grid continue to drop. The plan addresses some of the system design issues related to the electricity supply and is a good start. The plan discusses maintaining “reliability and security” but does not address the wider security dimensions that are raised in this submission. Like the National Energy Guarantee, it appears focused on power *reliability* and not energy *security*. There is still a pressing need for an overall energy system design that acknowledges the national security dimension of energy. That is a task for the Government to lead as it extends far beyond the AEMO’s remit.

Energy System Transformation – *the case for Hydrogen*

We are undergoing a major transformation in how our societies work in areas such as the economy, energy and the environment. These areas are closely interlinked, but largely managed as separate competing issues and usually in a fragmented manner as a result of near-term political goals.

Australia’s energy systems are being shaped by the opportunities afforded by technology changes, by economic pressures and by our emissions reductions commitments under the Paris Agreement. However, “current generation” energy systems are being acquired in component pieces, not as a part of an integrated system. This has led, as in the case of the South Australian Electricity blackouts, to systems failures. So, the question is, can we think about a model for a “Next Generation” (NextGen) integrated energy system? ³

The technologies necessary to implement a NextGen energy system exist today. We just lack the integrated design approach. In the case of an integrated system, there is a need to identify energy systems that could also be “system integrators” in themselves. A great example of such an “integrator” is Hydrogen. There are excellent examples of small scale, regionally-based renewable energy storage systems utilising Hydrogen, which can also be used to produce a range of energy products. As has been noted in the draft strategy and numerous other papers, Hydrogen could be used for power generation, for fuel cells in vehicles and trains, to produce ammonia, to supplement gas supplies and to produce gas.

Our sources of liquid fuel supply have shifted over recent decades from reliance on Australian sources (Bass Strait) to global supply chains. Reliance on supply chains is an inherent vulnerability, and an Australian hydrogen industry would mitigate some of the risk of liquid fuel insecurity in the future. The key issue that we wish to raise is that Hydrogen, in this case, is the medium to produce both a time and mode shift of renewable energy as a part of a designed, integrated energy system.

Whilst not the panacea for Australia’s energy needs, Hydrogen, as but one example, could be an important component of an *integrated* energy system, particularly as it could employ excess renewable energy capacity. The production and transformation of energy in regional or sub-regional networks using such “energy integrators” could exploit an energy resource that is not utilised to maximum effect today. It is about integration, resilience, economics, energy security and scalability. *It is about integrated design.*

³ Further discussion of this proposal can be found at <http://www.australiandefence.com.au/budget-policy/energy-security-is-there-a-problem> and in the Energy Security presentation by the Chair of the IIER Australia <https://www.jbcs.co/#/reports/>

As a final comment, there has been substantial argument across both sides of politics for Australia to improve its innovation capacity. Hydrogen could also be an important component of innovation, further demonstrating Government leadership. This would necessitate the Australian Government signaling that Australia is prepared to incubate and support a Hydrogen industry through direct funding of world leading research and development, thereby attracting entrepreneurial investment. Specifically, direct investment in engineering departments at Universities by the government, partnered with Industry, would be needed.

Any technological investment must be complemented by investment in a culture of innovation supporting the Hydrogen industry, involving integrated policy development, including research and development, across all tiers of government (Federal, State, Local). Investors must be able to see certainty across decades with active Government intervention supporting a mature industry and not merely fostering a number of 'start up' companies.

Conclusions

The issues highlighted above are all about our national security. No longer can Australian Governments focus on the military and military hardware when they talk about national security. There needs to be a realization that national security is a multi-faceted responsibility. The economy, the environment and energy are all interlinked components that underpin national security.

Hydrogen *can* contribute to Australia's national security by providing an alternative energy source that is domestically generated, Australian-owned, economically beneficial, environmentally sound and supported by policy that takes energy security seriously. Developing the policies to deliver the National Hydrogen Strategy must occur within the framework of national security and be implemented under an integrated system level design.



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25 March 2019