

Submission

to the

Tasmania Parliamentary Standing Committee on Public Accounts inquiry into the financial position and performance of Government owned energy entities

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AUSTRALIA

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About Engineers Australia

Engineers Australia is the peak body for engineering practitioners in Australia, representing all disciplines and branches of engineering. With membership of over 100,000 Australia wide, Engineers Australia is the largest and most diverse professional engineering body in Australia. Founded in 1919 Engineers Australia is bound by Royal Charter to advance the science and practice of engineering for the benefit of the community.

Members of Engineers Australia are bound by a code of ethics as engineering practitioners to use their knowledge and skills for the benefit of the community to create engineering solutions for a sustainable future. In doing so, our members strive to serve their community ahead of other personal or sectional interests. Members of Engineers Australia are expected to demonstrate integrity, practise competently, exercise leadership and promote sustainability.

Engineers Australia maintains representation in every state and territory.

Introduction and Context

This submission addresses matters relating to energy security policies and infrastructure investment and their management.

In its recent *The State of the Engineering Profession* report,¹ Engineers Australia states that it believes Australia will need to seriously address the main sources of its emission, including its domestic electricity generation system, to be able to achieve its substantial greenhouse gas emission targets committed of 26 to 28 percent below 2005 levels by 2030 at the COP 21, Paris, meeting. As one of the Australia's largest generator of renewable energy, Tasmania has an opportunity to contribute significantly and will benefit from changes to the Australian mix of generation options. However, energy security underpins our future reliance on affordable and readily available energy.

In its *Energy Security for Australia* Report,² Engineers Australia has urged governments, policy makers and energy consumers to rethink the way we view and discuss Australia's energy security and to consider medium and long term timeframes in their strategies.

The report states that Australia needs a much broader definition for energy security than that which is currently adopted. It also makes a series of recommendations aimed at implementing a comprehensive approach to energy security policy through the following initiatives:

- Adopting a comprehensive energy security definition relevant to Australia
- Treating energy security as a “wicked problem”
- Broadening the understanding of threats to energy security
- Reducing energy consumption
- Securing the energy wealth for future Australians
- Integrating energy security and defence policy
- Integrating energy security and foreign diplomacy
- Addressing liquid fuel insecurity
- Addressing energy poverty
- Moving beyond energy infrastructure protection
- Engaging the community

In 2015, Engineers Australia commended the Tasmanian Government for developing a 20-year energy strategy, stating that it went some way to addressing many of these points.

¹ Engineers Australia, *The State of the Engineering Profession – Engineering in Australia*, 2016.
<http://newsroom.engineersaustralia.org.au/news/explainer/the-state-of-the-engineering-profession-2016-report>.

² A Yates and N Greet, *Energy security for Australia: Crafting a comprehensive energy security policy*, Engineers Australia, 2014.
https://www.engineersaustralia.org.au/sites/default/files/shado/Resources/engineers_australia_energy_security_for_australia_policy_dec_14.pdf

Energy policy needs to focus on energy use

Tasmania, like Australia, has an abundance of natural energy resources. For example, hydro-electric power generation has underpinned the state's prosperity for 100 years. Energy is an essential input for all Australian industries with transport, electricity supply, manufacturing and mining the largest users, accounting for about 84 percent of domestic consumption.

Rather than focussing on the economic harm arising from a loss of supply, a comprehensive understanding of energy security that explicitly recognises both sides of the demand-supply relationship is required.

Historically, energy security policies have only been focussed on the economic harm arising from a loss of supply, which has led to a non-coordinated stove pipe solution approach. This approach, however, severely limits the ability to see emerging risks. In reality, it is more complex, with energy security being intertwined with issues across the social, economic, political and environmental spectrum.

Any strategy should also recognise that energy insecurities arise across the four key domains of 1) national economic and national security, 2) food and water security, 3) sustainable development and environmental security, and 4) social stability and energy stress.

Tasmania's current energy sector reflects the importance of taking such a broad definition. The TasNetwork 2015-16 Corporate Plan³ mentions changes in demand due to increased market pressures on energy intensive customers, such as minerals and smelting industries, and increased uptake of solar PV by residential and small business customers. The customer base has also changed with an increased demand from Tasmanian irrigators, attributed, no doubt, to the significant irrigation infrastructure investment over the past few years. This development will consequently lead to new opportunities in the agriculture sector and even greater energy demand. As Tasmania is currently experiencing, climate change induced environmental events have a significant impact on the state's energy security. This was also observed in the *Tasmania Infrastructure Report Card 2010*⁴ where the period between October 2007 and May 2008 was the driest in terms of hydro storage for 75 years at 18 percent.

These examples also demonstrate that treating energy security as a wicked problem involves recognising the interdependency of energy security with other government strategies, for example environment, population and economic policies. This not only helps drive energy productivity with a much better understanding of the long term demands, but it also allows for the broader threats to energy security.

For example, the Tasmanian economy and population is expected to grow over the next 15 years, with a projection to reach 560,000 people in 2031,⁵ with the Tasmanian Government has a target of 650,000 by 2050.⁶ Energy quantum and distribution needs not only associated with increased population, but also economic growth (including increased workforce and services such as schools) need to be modelled to identify risks to energy security. Engineers Australia referred to the interdependence of the Tasmanian Energy Strategy with other policies in its submission in 2015⁷ as there is little recognition of this in the draft Strategy document. Engineers Australia does, however, recognise that TasNetworks is contributing to the development of an Energy Use Data Model with industry, CSIRO and AEMO, which will help to improve forecasts.

³ TasNetworks, *Corporate Plan – Planning period: 2015/16 – 2019/20*, 2015. <http://www.tasnetworks.com.au/about-us/corporate-profile/our-strategy>

⁴ Engineers Australia, *Tasmania Infrastructure Report Card 2010*, 2010. <http://www.engineersaustralia.org.au/infrastructure-report-card/tasmania>

⁵ Infrastructure Australia, *Infrastructure Australia Audit*, 2015. <http://www.infrastructureaustralia.gov.au>

⁶ Tasmania Department of State Growth, *Population Growth Strategy*, 2015. <http://stategrowth.tas.gov.au/populationstrategy>

⁷ Engineers Australia, *Submission to draft Tasmanian Energy Strategy*, 2015.

http://www.stategrowth.tas.gov.au/__data/assets/pdf_file/0009/99054/Engineers_Australia_Submission.pdf

Energy policy should be comprehensive and cover all sources of energy supply and demand. Too often, discussion of energy consumption focuses on electricity use to the exclusion of other sectors. Australia's liquid fuel stocks have been reported to be as low as 60 days⁸ – well under the 90 days required as a member of the International Energy Agency. Approximately 90 percent of Australia's transport fuel is imported. With very limited storage capacity within Tasmania, there are low levels of fuel-stock that can be accessed in the event of issues in supply. Engineers Australia applauds the discussion, and recognition of electric transport options in the TasNetworks *Corporate Plan*, and encourages the Government to lead the way in this area.

Tasmania's energy productivity and efficiency plan

Energy efficiency offers dual benefits: it is an effective way for Australia to reduce its emissions, and it avoids the opportunity cost associated with unnecessary expenditure on energy. We believe the political attention given to higher energy bills tells Australians, and Tasmanians, only half the story. It neglects the potential of energy efficiency to reduce those bills.

The National Energy Productivity Plan⁹ has set a notional target of 40 percent improvement in energy productivity between 2015 and 2030. The plan states this will be achieved through encouraging more productive consumer choices and promoting more productive energy services.

Barriers for consumers to make effective choices include knowledge on the energy performance of buildings or limited access to individual consumers' energy use data and access to tools to compare how different energy tariffs might impact that consumer. In other words, consumer education is vital. TasNetwork has indicated that it will undertake a small-scale trial of smart meters. Engineers Australia encourages that Tasmania learns from Victoria where this technology has already been rolled out and strongly recommends looking at the Smart City, Smart Grid program¹⁰ which addresses the wider context in which the smart meters project should have been developed.

Increasing the energy literacy of users is a critical component to reducing energy stress and poverty. It can also assist in reducing the cost of energy delivery as transmission and distribution infrastructure can be planned for lower levels of maximum load.

As part of the Tasmania Energy Strategy, Engineers Australia recommends that the Tasmanian government embraces a pro-active approach to an effective energy efficiency policy to improve energy productivity, a key component of this being consumer education. We also encourage the investigation of cost reflective pricing. We reiterate our statement in the *Tasmania Infrastructure Report Card 2010* that demand management has significant potential to reduce peak demand, and that the structural and cultural reasons limiting the uptake of demand management needs to be addressed.

Electricity generation now and in the future

Old technologies and aging electricity generation plants have implications beyond the electricity supply industry and could become a drag on national productivity as a whole. A fresh approach is essential, beginning with the recognition that change is unavoidable due to the status of existing plants and because change is essential if Australia is to meet its Paris reduction commitment. Engineers Australia favours a market based approach, in which all options are considered and in which direct and indirect subsidies to fossil fuels are avoided. In some cases, it may be necessary to assist the commercialisation of new zero or low emission technologies to overcome barriers experienced by first movers and the costs of moving from prototypes to commercial models. All such assistance should be temporary, fully transparent to the community and governed by sunset arrangements.

⁸ J Blackburn, *Australia's Liquid Fuel Security Part 2*, NRMA Motoring & Services, 2014.

⁹ COAG Energy Council, *National Energy Productivity Plan 2015-2030*, 2015 <https://scer.govspace.gov.au/workstreams/energy-market-reform/national-energy-productivity-plan/>

¹⁰ Arup, Energeia, Frontier Economics and the Institute for Sustainable Futures, *Smart Grid, Smart City: Shaping Australia's Energy Future, National Cost Benefit Assessment*, 2014. <http://www.industry.gov.au>

Hydro Tasmania's recent decision to abandon the TasWind project on King Island due to economic factors is disappointing but its investment in developing hybrid off-grid solutions for remote areas is worth celebrating. The commercialisation of these, and other technologies such as microgrids, are examples of where initial assistance is necessary. Engineers Australia recommends that Australian governments adopt a portfolio of electricity generating options consistent with the most appropriate market-based fit for the locations to be serviced, and that they agree to the provision of temporary assistance for new zero or low emission technologies to overcome normal commercialisation barriers.

Long term planning of infrastructure

Even with Tasmania's lower than national growth averages in both population and economic growth, it will still require infrastructure that will meet the demand of this growth. It should also use the best available technology to manage existing infrastructure assets and to develop new ones.

The *Tasmanian Infrastructure Investment Update*¹¹ lists Engineers Australia's principles for the effective management and development of Australia's infrastructure:

- Infrastructure must be managed to advance socio-economic goals, not political goals
- Infrastructure planning without land use planning is not sensible
- Infrastructure planning is integral to governing – not an optional extra
- Infrastructure is not the exclusive preserve of government; the private sector is a key player
- Infrastructure must be managed sustainably over its full and expected life
- Infrastructure governance must be rigorous and must be de-politicised
- ICT enabled infrastructure delivers more value for money, especially in a coordinated system
- Short term acquisition practices should be discarded in favour of whole-of-life considerations.

The primary contributor to engineering construction on electricity generation, distribution and pipeline assets has alternated between sectors over the past 25 years, depending on the activities of the moment.

Figure 1 shows trends in private and public sector engineering construction in constant 2012/13 prices and includes:

Electricity facilities:

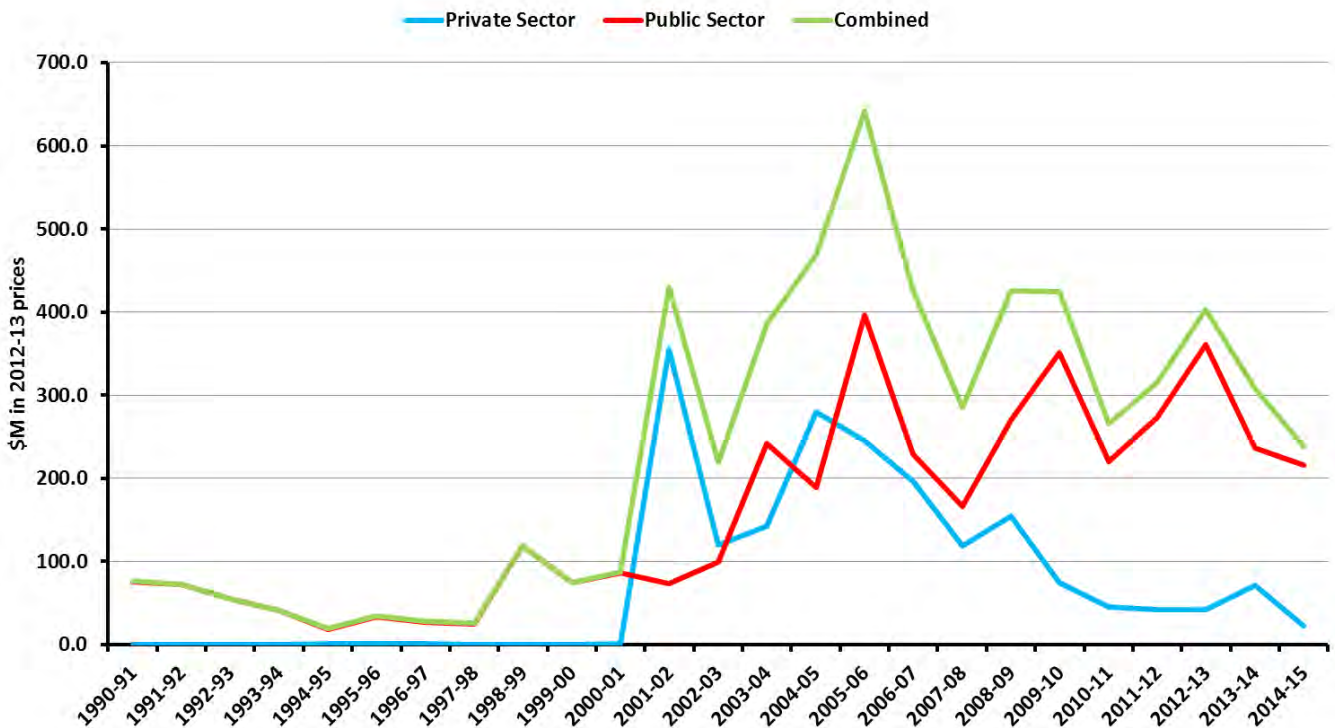
- Power stations
- Substations
- Hydro electric generation plants
- Associated work for towers
- Chimneys
- Transmission and distribution lines

Pipelines:

- Oil and gas pipelines
- Urban supply mains for gas
- Pipelines for refined petroleum products and foodstuffs

¹¹ Engineers Australia *Tasmania Infrastructure Investment Update*, 2016.
http://newsroom.engineersaustralia.org.au/sites/default/files/resources/infrastructure_investment_update_2016_-_tas.pdf

Figure 1: Trends in private and public sector engineering construction on electricity generation and distribution and pipelines in TAS, 1990/91 – 2014/15



The most prominent feature in this figure is the spikes in investment since 1998/99. ‘Boom/bust’ cycles of infrastructure procurement and delivery can create acute demand spikes across specific locations or engineering specialisations. In the context of engineering skills shortages witnessed in Australia over recent years, these fluctuations can have significant economic consequences. Across Australia as a whole the past three years have witnessed a significant downturn in engineering job vacancies with many engineers being lost to the profession.

As mentioned previously, the focus on securing supply has typically lead to a stove pipe approach to solutions, which together have not delivered the outcomes expected by the community, industry or government.

As an example, the *Tasmania Infrastructure Report Card 2010* highlighted the need to address the Basslink infrastructure vulnerabilities as the importance of this infrastructure grows, and the lack of redundancy was highlighted as a future challenge. This is reinforced by the current situation faced by the state and Engineers Australia is glad to see this now being addressed, but stresses that any solution needs to be included in the long-term plan of providing for Tasmania’s energy needs and consequent infrastructure as a whole, and not in isolation.

In reality, the vast majority of projects provide only incremental improvements and have lengthy procurement, design, construction and commissioning phases. A stand-alone project to build an isolated windmill for example, may deliver only some of the desired outcomes, but when combined within a broader remote area energy strategy, the cumulative effect can deliver significant change.

Taken together, several well planned integrated infrastructure projects provide for major improvement and could deliver the transformative outcomes sought. On top of this is the significant improvement in productivity when smart ICT solutions are incorporated. Intelligent electricity grids and the adoption of other ICT-enabled capability, manages infrastructure over its full and expected lifetime, and may even extend this. While Engineers Australia recognises that a significant single project, such as the Basslink Interconnector which accounted for the spike in investment between 2000 and 2006, has a large impact

on the level of short term investment, a well-considered long-term infrastructure investment and asset management plan is critical to delivering best value and outcomes.

Another consequence of the intermittency in project delivery often means that skilled engineers leave the engineering workforce. Research by Engineers Australia has shown that about 62 percent of Australians with engineering qualifications work in engineering.¹² Intermittency is an important contributor to this statistic because many engineers who resort to work in other fields do not return to engineering.

Infrastructure planning and procurement processes should take into account the detrimental impact that intermittency has on retaining a skilled capable engineering workforce and the potential future cost to infrastructure delivery.

Recommendations

Engineers Australia recommends the following principles:

- The Tasmanian energy strategy refines the definition of energy security to explicitly recognise both sides of the demand and supply relationship
- The need to treat energy security as a wicked problem which is interdependent on other government policies
- That the Tasmanian government embrace a pro-active approach to industry restructuring and an effective energy efficiency policy to improve energy productivity.
- That Australian governments integrate transport energy efficiency and energy security policies as a means of reducing Australia's dependence on imported fuels.
- That the Tasmanian energy entities are supported to adopt a portfolio of electricity generation options consistent with the most appropriate market-based fit for the locations to be serviced.
- That Tasmanian government agrees to the provision of temporary assistance for new zero or low emissions technologies to overcome normal commercialisation barriers.
- The need to have a long term vision and strategic plan infrastructure investment plan that incorporates smart ICT solutions for the future that moves Australia to a low carbon economy.
- That both Hydro Tasmania and TasNetworks consider extending their long-term plans to 20 years as to align with the Tasmanian Energy Strategy.

Conclusion

Energy security is a wicked problem and any strategy should consider both the supply and demand sides of the relationship.

The *Tasmania Infrastructure Report Card 2010* assessed Tasmania's electricity infrastructure as B-, that is between good and moderate, and that changes were required to enable infrastructure to be fit for its current and future purposes. The overall assessment in the 2016 *Tasmania Infrastructure Investment Update* believes this to still be the case. With recent pressures due to increased populations and annual GDP growth, albeit below the Australian averages, Tasmanian needs to improve infrastructure services to simply maintain the status quo. When productivity growth is low and infrastructure is just adequate, the preconditions for improved standards of living are no longer in place.

Engineers Australia commends the Tasmanian Government, Hydro Tasmania and TasNetworks in their mid- to long term visions. We also commend the commitment to asset management and the adoption of new technologies to extend their assets life and to be more productive.

Until now, looking through the lens of the adequacy of supply has only lead to stove pipe planning solutions, as we've seen in Tasmania, which leads to the inability to see new emerging risks.

¹² Engineers Australia *The engineering profession – a statistical overview*, 2015
http://www.engineersaustralia.org.au/sites/default/files/shado/Resources/statistical_overview_2015.pdf

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An integrated coherent energy strategy that takes into consideration the supply and demand relationship, that is based on a triple bottom line framework, will be enduring, protect the community, and drive economic growth.

Engineers Australia looks forward to seeing a broader focus on the state's definition of energy security and the interdependencies of whole of government policies. For example, as we've seen recently in what can only be described as a perfect storm, energy security is heavily dependent on environmental and infrastructure policies and, going forward, on population policy.

Finally, it is important that there is a long term vision and strategic plan for the future. The plan needs to address factors raised in the resilience discussion, such as diversity in supply, reducing energy consumption through efficiencies and reform of the energy sector and regulations. The introduction of smart ICT solutions, such as smart meters, and other initiatives will help remove barriers to consumers being able to make effective choices and look at how they can reduce their own demand and reduce costs without lowering their standard of living.

Whatever the solution is, it is going to be engineering intensive – even at the planning stages. As such, Engineers Australia advocates the need to recognise that without involving competent professionals at the start, and at the decision making table, the solution will have inherent risks.



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