

**ECONOMICS AND INDUSTRY STANDING COMMITTEE**

*Fifth Report — “Implications of a Distributed Energy Future: Interim Report” — Tabling*

**MS J.J. SHAW (Swan Hills)** [10.47 am]: I present for tabling the fifth report of the Economics and Industry Standing Committee titled “Implications of a Distributed Energy Future: Interim Report” and the tabled submissions.

[See papers 2370 and 2371.]

**Ms J.J. SHAW:** When the Economics and Industry Standing Committee sat down to talk about what our work program for 2018–19 would involve, we talked about microgrids as a potentially interesting topic. We try to approach the work program as collaboratively as we can. I was particularly interested to examine the topic because in my previous career in the energy sector I had often come across the term and was aware of the rapid uptake of photovoltaic solar panels across the state, and had heard that household and grid-scale batteries were gaining considerable momentum. I thought it would be useful to examine what seemed at the time to be a somewhat fringe energy sector topic: the emergence of distributed energy technologies and their applications in various sized power systems. I thank my colleagues on the committee for their support in initiating what has been an incredibly interesting inquiry.

Since the inquiry commenced in February 2018, it is fair to say that microgrids and distributed energy resources are now front and centre in our state and nation’s ongoing conversation about our energy future. Evidence to this inquiry has shown that Western Australia is home to some of the world’s most innovative, groundbreaking energy technologies that could radically change the way we produce and consume electricity, and contribute to a more secure, affordable, reliable and sustainable power supply.

Western Australians have embraced renewable energy, installing household-scale solar photovoltaic panels at an incredible rate. Household solar is now the single largest source of generation capacity in the state’s largest network, the south west interconnected system, and is three times larger than our single largest power station. As advances are made in information and communications technology and unit costs come down, there is also a growing level of interest in orchestrating these assets and combining them with household and grid-scale batteries because people see the value in storing the energy they produce. These technologies are appearing in microgrids—localised energy systems situated in larger networks that are capable of operating in conjunction with, or isolated from, the main grid. They are also being increasingly deployed to smaller islanded distribution networks that serve regional and remote communities and standalone power systems that supply individual facilities.

Microgrids and associated distributed energy resource technologies are changing the face of electricity production and system management across the globe, and Western Australia is exceptionally well-positioned to benefit. The move towards decentralised energy production and consumption is fundamentally changing the model upon which the electricity sector has traditionally been based. Whereas previously the industry operated on the one-way flow of electricity from centrally-controlled, large-scale, fossil-fuelled power stations to largely passive consumers, the sector’s dynamics are now fundamentally changing as the “prosumer” emerges—individuals who produce and consume their own energy from renewable sources from both within and at the fringes of the network. That is presenting operational, engineering and commercial challenges.

A range of innovators in the WA energy sector are facilitating these changes and developing large and small-scale renewable and distributed energy projects. The state-owned energy utilities are pleasingly leading the way and are particularly well positioned to facilitate the changes underway in the sector, given their line of sight from molecule conversion and electron production, right the way through to the sale and consumption of electricity to individual households and businesses. Government trading enterprises are partnering with the private sector and universities to deploy these assets across the state, demonstrating the operational feasibility and benefits of the technologies. Research projects are underway in both metropolitan and regional centres, trialling new forms of asset configuration and orchestration, developing new ICT applications and trialling different tariff arrangements. The intellectual property generated through these projects and the organisational capacity to deliver and manage microgrids are themselves very valuable assets, particularly as global demand for microgrid solutions and distributed energy technologies grows. The people of Western Australia, through government trading enterprises, own much of this intellectual property and corporate capability, and could gain significantly from its further commercialisation. This report describes the various types of microgrid projects and asset configurations that are being developed. The opportunities for the people of Western Australia to capitalise on their valuable IP and delivery capability through the commercialisation and potential further deployment of microgrids will be considered in further detail in the final report.

Microgrids and distributed energy resources have also prompted a number of companies and community organisations to explore local cooperatives and blockchain platforms for energy trading. Entire subdivisions and communities are aiming towards more sustainable energy solutions. They wish to combine local generation and

battery technologies with traditional grid-sourced power so that they can exchange locally produced energy amongst themselves. Virtual power plants also present a new innovative model for the rollout and coordination of DER. If deployed in a manner to target vulnerable households—as is under consideration in the Kalgoorlie VPP trial, described in this report—it could deliver considerable benefit right across our community. Again, this report outlines several alternative commercial model projects that have been proposed for WA. The final report will consider their benefits, enablers and barriers.

This report finds that new energy technologies are increasingly cost competitive with traditional energy sources and can operate to increase the efficiency of existing network infrastructure. As described in this report, where they have been deployed, in both the south west interconnected system and throughout regional and remote WA, there have been demonstrable benefits. Perhaps the most benefit is delivered into the outer reaches of the SWIS, in what is termed the “fringe of grid” or “distributed” parts of the network, which are typically located in regional areas of Western Australia. This report describes a number of projects in the distributed parts of the network where the replacement of traditional poles-and-wires supply with distributed energy solutions has delivered a more cost-efficient and reliable electricity supply. Microgrids and distributed energy technologies are also particularly relevant and beneficial in regional areas, where fire risk can be reduced by removing overhead poles and wires. Community recovery efforts are also improved when microgrids allow location-specific power restoration operating in standalone mode, and are not reliant on the reinstatement of entire portions of network supply. Within the meshed parts of the network, microgrids also provide a considerable amount of value in the metropolitan area, and distributed energy technologies can ease pressure at congested parts of the network and provide network support services.

Batteries, in particular, can play an important role in grid support whilst also providing consumers with the opportunity to store electricity at the household or grid scale. However, complex operational implications are associated with microgrids and distributed energy resources. The ability of system and network operators to plan for and orchestrate microgrids and DER are material issues. Incentives to efficiently deploy DER and utilise these asset types beyond the current range of trial and pilot projects need to be considered. Consideration must also be given to the role, value and utilisation of existing generation and network assets in supplying secure, reliable, affordable and sustainable supply.

As I outlined in my opening remarks, a lot has happened in the policy space since we initiated this inquiry. The state government has very recently acknowledged the challenges and announced an energy transformation strategy to deliver a cleaner and more resilient energy supply. Part of the strategy, announced by Minister Johnston, includes delivering a whole-of-system plan for the SWIS and a distributed energy resources road map. The ability to capture system-wide operational efficiencies, maximise economic value, and maintain secure and reliable electricity supply in both the SWIS and in regional and remote areas depends on the complex interplay between physics, technology, markets and regulation. The roles of and relationships between the various public, private and regulatory agencies operating in the electricity industry are complex, and reflect the industry model established at the beginning of the electricity industry reform project, begun by WA Labor in the 2000s.

The industry is rapidly changing, and our ability to capture value and operational efficiencies, whilst delivering secure energy supply and reducing carbon emissions, will be heavily dependent on the regulatory and market structures governing WA’s electricity industry. It is vital that we also consider how all Western Australians can benefit from these new technologies, including the most vulnerable members of our community. These various factors are important and go to the heart of this inquiry; they will be considered in more detail in the final report.

Beyond the immediate microgrid applications and distributed energy resource opportunities that we have identified in the report, the terms of reference for this inquiry also asked the committee to consider economic opportunities right along the value chain. As I have discussed, microgrid technologies are increasingly utilising battery technologies, and this report provides an overview of the significant opportunities for WA along the battery production value chain. It finds that our state has a distinct set of global competitive advantages: it is replete with the raw material inputs for battery manufacture; it has a mature and sophisticated mining industry; it has well-established transport links; and it has a politically stable environment in which to do business. Pursuit of value-chain opportunities in distributed energy resources could generate employment opportunities throughout the state and deliver significant economic growth.

It appears at this point in time that the world prefers lithium-ion batteries, and this report lists a number of projects now underway in WA for lithium production. The rapid development of lithium exports from Western Australia over the past five years places us in a position to supply about 60 per cent of the world’s annual consumption, but we also have various other raw material inputs required for batteries available in plentiful supply in WA, and research is underway into technologies based on other forms of battery configuration.

Western Australia's most obvious prospects lie in commodities production, but there are also opportunities in chemicals processing, component manufacturing and assembly. WA is arguably yet to acquire the scale required to move into the later stages of battery production, but a number of global battery industry participants are currently deploying capital into WA and considering further investment along the value chain. The state government has also sent bold signals into the global market through the announcement of its future battery industry strategy. Early on in our inquiry, the committee took evidence on the preparation of a bid to secure the Future Battery Industries Cooperative Research Centre. It was a really fascinating discussion and I encourage members to read the transcripts from those hearings.

It was fantastic to hear the announcement yesterday of the success of this bid, and I would like to congratulate all the parties involved. It just goes to show what can be achieved when entrepreneurial drive is coupled with research and innovation and backed by policy leadership. Much of the demand for the commodities required for battery production is driven by rising global demand for electric vehicles, and this report has found that electric vehicles also have the potential to fundamentally shape electricity network dynamics. Any consideration of the evolution of power systems must have an eye to the potential impact of an electrified car fleet, given that they can influence both the volume and profile of electricity demand. However, although microgrids and associated technologies are clearly on the march, it is less clear what impact microgrids will have, given the uncertainty around the rate of EV uptake. This has become quite a material, political issue in the last week.

The report considers the evolution of electric vehicles and observes that every major car manufacturer either already produces electric vehicles or has announced plans to produce electric vehicles in the near term. Countries around the world have observed that they will ban fossil fuel-fired vehicles over the medium term. The costs of electric vehicles are coming down and charging technologies are improving rapidly and being deployed across Australia to address range anxiety that some drivers may have about the ability of electric vehicles to undertake long journeys. The prospects for an increasingly electrified transport fleet are very exciting.

I would like to thank my committee colleagues for their collaboration and support throughout the course of this inquiry: the member for Churchlands, the member for Forrestfield, the member for Jandakot and particularly the member for Warren-Blackwood, who has ridden shotgun with me the whole way through this inquiry. I really appreciate his support. I would also like to thank the committee secretariat, Dr David Worth, Lachlan Gregory and Franchesca Walker, for their assistance and the absolutely incredible job they did in organising a particularly demanding trip for us to the United States, where we had the benefit of speaking to a range of regulatory and industry organisations about the challenges they face around microgrids and distributed energy resources. I would also like to thank the Hansard staff. On behalf of the committee, I would like to sincerely and particularly thank the numerous industry participants and stakeholders who participated so enthusiastically in this inquiry here in Western Australia, across Australia and overseas. The level of engagement, information provision and willingness to participate in open, frank conversations about the future direction of WA's energy industry was incredibly helpful to us.

There is much to be proud of in our energy industry. I hope that this first report provides an overview of the extent of the truly world-leading innovation, collaboration and opportunity right here in Western Australia, opportunity that can be captured if we continue to work constructively and positively together.

Debate interrupted.

[Continued on page 2579.]