KING&WOOD MALLESONS

Level 61
Governor Phillip Tower
1 Farrer Place
Sydney NSW 2000
Australia

T +61 2 9296 2000
F +61 2 9296 3999

www.kwm.com

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To Senator Sarah Hanson-Young
Senator for South Australia
Chair, Select Committee into the Resilience of Electricity Infrastructure in a Warming World

Dear Senator

Select Committee into the Resilience of Electricity Infrastructure in a Warming World

We congratulate the Senate on the establishment of the Select Committee into the Resilience of Electricity Infrastructure in a Warming World.

This announcement is well-timed, with developments and innovation in this space at an all-time high. The Senate Committee aligns well with the COAG Energy Market Transformation Project Team's work and stakeholder engagement on issues in this area. KWM recognise the need to bring the legislature into this discussion, to drive and support real improvements in Australia's energy system, including at a policy and regulatory level.

We would also like to take this opportunity to express our interest in supporting the efforts of the Select Committee into the Resilience of Electricity Infrastructure in a Warming World. KWM has expertise in the existing national and jurisdictional regulatory framework, as well as the technological developments and innovation impacting upon it.

Our submission responds to the terms of reference provided. In addition, KWM is also publishing a guide to the "New Energy Future" on 12 February 2016. The guide will explore the commercial, regulatory and legal issues associated with distributed energy resources in greater detail. The guide will be publically accessible on www.kwm.com.au.

Terms of Reference

1(a) The role of storage technologies and localised, distributed generation to provide Australia's electricity networks with the resilience to withstand the increasing severity and frequency of extreme weather events driven by global warming.

The energy sector is fundamentally changing. New technology, customers and industry are transforming how energy is produced, distributed and sold. The pace of these changes poses opportunities and challenges for the sector. The resilience of Australia's energy network and the development of flexible energy infrastructure is paramount to creating a more robust energy system capable of automating and balancing, reliably, Australia's future energy mix.

Providing flexibility – a new approach

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Storage technologies and localised, distributed generation can help provide the necessary flexibility to Australia's electricity networks. Put simply, distributed storage provides a natural geographic advantage for networks, as opposed to traditional centralised base-load power when responding to physical grid interruptions. Further, energy storage can be used to supply energy during high demand and/or variable supply periods, as well as solving transmission and distribution congestion problems. This is particularly important as Australia continues to develop its intermittent renewable resources.

Supporting this conclusion, AEMO's Future Power System Security Program conducted energy system modelling in conjunction with Energy Networks and the CSIRO for the Electricity Network Transformation Roadmap: Key Concepts Report to identify what the energy mix would look like in 2050, if Australia is to meet wholesale energy requirements and zero net emissions by 2050. Interestingly, the analysis assumes a primary role for battery storage in balancing the output of intermittent renewable energy resources. However, while the Roadmap forecasts battery storage will provide the dominant new source of energy balancing, there are also a number of potential solutions which could be deployed as alternatives to create energy system security, such as pumped hydro storage, demand management services and concentrated solar thermal generation.

Further, grid support cannot expand energy capacity within the existing network at the same rate or for the same cost as distributed energy resources. Planning for and implementing enhancements to the network to meet peak demand is also not the most-effective cost option as the added capacity is required for short periods only. Distributed energy resources are already available and, in combination with energy storage solutions, can provide the flexibility and resilience required for Australia's New Energy Future.

1(b) Recommend measures that should be taken by federal, state and local governments to hasten the rollout of such technologies in order to:

a. create jobs in installation, manufacture and research of storage and distribution technologies.

b. stimulate household and business demand for storage technologies.

c. anticipate the rapid deployment of localised distributed generation through changes to market rules.

d. drive the reduction in technology costs through economies of scale.

e. seize on the opportunities to be a global leader in deploying storage technologies because of Australia's high fixed electricity tariffs and significant penetration of rooftop solar.

Distributed energy resources will continue to rely on the existing grid, transmission and distribution systems, as both back-up support and to allow consumers to sell excess electricity back into the grid for a return on investment. However, Australia's grid and electricity regulation were not designed to support high levels of DER penetration. There thus needs to be a rethink of network regulation to identify and remove barriers to entry if increased penetration of DER is to be encouraged and supported.

The need for reform is urgent, given that the regulatory cycle is likely to take some time. We recommend a strong focus on the following four areas to hasten the rollout of DER:

1. Increased competition and choice
2. Consistent policy

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3. Investment in support platforms and support for new business models
4. Access and use of data

Increased competition and choice

More contestability in provision of electricity network services, more competitive markets and engaged consumers will go a long way to achieving the Senate Committee's goals in paragraph 1(b) of its Terms of Reference. Ultimately, consumers will drive the increased uptake in DER.

Increased choice and competition could be achieved by:

- **Investment in demand management technologies –** Key technologies to enable greater competition and choice include demand management technologies – such as 'real' smart metres and intelligent batteries – that allow consumers to control and monitor their usage by connecting to the energy market (network operators, retailers and third party intermediaries) in real time. These technologies (and the jobs in installation, manufacture and research that they create) will be assisted by progressive data access and usage regimes (as discussed below).
- **Changes to network pricing –** Network tariffs are critical for customers, DER participants and distributors and, if set inappropriately, can frustrate innovation and provide perverse incentives. Where network tariffs are primarily based on variable consumption, the costs of the network fall more on those who wholly rely on that network for their electricity versus those who rely on it partially due to solar and/or battery installations. It arguably undervalues the back up or insurance value of the grid to the latter class of customers and is a form of cross-subsidisation. Conversely, moving to predominantly fixed tariffs will likely underestimate the value of customers who invest in distributed energy resources and will inhibit innovation.
- **Resolving Chapter 5A and 'zero' exports –** DERs are increasingly being connected to the grid to allow customers to export energy. Chapter 5A of the National Electricity Rules (**NER**) requires network operators to offer solar PV customers connection to the grid. The offer to connect to the grid is subject to the network owner's terms which can impose import/export restrictions on customers to ensure grid security and safety. The Australian Energy Market Commission's (**AEMC**) Chapter 5A rule change determination in 2014 provided specifications for connecting DERs. However, as more DERs are connected to the grid, reliability challenges have caused concerns for network operators. Network operators have been reported to be offering to connect solar PV customers on a 'zero' export basis. While this may meet their regulatory obligations to offer connection it does not allow customers to export their excess solar energy to the grid. The reality is that connecting solar PV to networks comes at a cost and the question of who should bear the cost of this – the network, the customer concerned or all Australian energy consumers – needs to be addressed, fairly and equitably.

Consistent policy

The uptake of technology, the breadth and depth of investment and the effectiveness of new initiatives relies on clear and nationally consistent policies. The significance of energy policy was highlighted by Dr Finkel in his review into the future security of the national electricity market where he concluded that ongoing investor confidence in the electricity sector will depend on uniform, long-term policy signals. The integration and development of consistent energy policies must be a priority for the Energy Council of the Coalition of Australian Governments.

In particular, this applies to the following:

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- **Market design and incentives for DNSPs: trailing and investing in new technologies –** Regulation, in particular economic regulation, affects the decision of DNSPs to invest in the grid and physical infrastructure (predominantly CAPEX), or place greater reliance on DERs (predominantly OPEX). Regulation of DNSPs should provide incentives for efficiency while also being cost-reflective. Regulatory models that are cost-reflective (ie acknowledge DNSP's natural ability to provide economies of scale) typically provide weak incentives for efficiency as the cost of the OPEX will not pass-through into the Regulated Asset Base (**RAB**) and arguably provides a CAPEX bias. More sophisticated economic regulation may be required to incentivise DNSPs to accept appropriate trade-offs between CAPEX and OPEX, including using DERs (and third party providers) rather than investing CAPEX in more grid assets. The NER must be sufficiently flexible to support industry transformation by removing technology bias, creating certainty for efficient investment and providing incentives for the adoption of what may be a lower (CAPEX) cost, more reliable and safer solution.
- **Unbundling distribution: the need for a DSO? –** Traditional networks are required to balance one-way power flows from remote generation with the demand of end-users. With the uptake of DERs, however, DNSPs are transitioning towards a 'platform provider' that connects multiple distribution points of variable production and consumption of electricity. Globally, this has resulted in the rise of distribution system operators (**DSOs**). DSOs manage and support DER technologies (storage, demand management services, peer-to-peer trading platforms) at a network level, alleviating pressure and conflicting interests faced by traditional network utilities. Importantly, a DSO is not a market participant. Regulation must ensure independence in the way DSOs operate and allocates services. However, DSO models can create their own issues in terms of administrative burden, cost, inefficent risk allocation and complexity. The ideal model might leave primary investment and operational decisions with the owner of the network, within a regime which provies appropriate incentives and transparency. There may be scope in such a model for a DSO 'overlay' or oversight in terms of data access, information provision and other services neccecitated by the New Energy Future.
- **Policy collaboration –** Policy stability and consistency is crucial for investment confidence. For businesses to take risks on the future and invest, they need to be confident that emissions reduction policies and the mechanisms to achieve them (eg investment in renewables) are stable. The lack of clarity and long-term direction with respect to Australia's renewable energy policy has impacted the industry in a profound way. We recommend the government look to (among other things) potential for equity and financing guarantees to ensure investor confidence in large grid scale projects. With this in mind, we commend the collaborative approach taken by ARENA and the CEFC in backing large-scale storage such as AGL Energy's virtual power plant project.

Investment in support platforms and new business models

The rollout of DER technologies will be hastened by investment in and regulatory support for platforms and business models that enhance the role of these technologies and their ability to offer consumers savings, convenience and flexibility of use.

Two important DER platforms and business models that should be considered are:

- **Blockchain –** Solar PV and battery storage are in many respects the starting points, but it will be the evolution of Blockchain based distributed ledger platforms that will allow the retail customer of the future to account for, remotely manage and trade their own power using smart contracts. These platforms already exist in Australia and are expected to be trialed further in 2017. There are many legal and regulatory issues to be considered with greater uptake of Blockchain as a transaction process including

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jurisdictional issues, contract law considerations (smart contracts), anti-competitive conduct, data ownership and privacy.

- **Aggregators –** New demand management technologies will be able to track and learn from consumer's load patterns. They will overlay that information with weather data and forecasts together with spot power prices and network tariffs to determine when to use the consumer's panels, when to use their batteries and when to access the grid (be it to charge the batteries or to consume directly) for the greatest economic benefit. To do all of this, new business models and service providers will step into the market – which, unlike a retailer, will not sell nor buy electricity from the consumer but simply provide services to enable consumers to optimise their power consumption, to synthetically sell power to other consumers and to sell services to network providers, all for a small fee. The roles and definitions ascribed to market players in the energy industry should be considered in light of the goals in the Senate Committee's Terms of Reference.

Access and use of data

To fully utilise and benefit from the new technologies, business models and services discussed above, innovators will need access to various data sources. Having access to market and system information will be fundamental for modelling the success of a project, without which information, sound investment decisions cannot be made and innovation is hampered. It will also be fundamental to the success of many of these innovative projects and business.

To increase access to and use of relevant data, the following should be considered:

- **Integrated battery storage register** – As proposed by COAG recently, knowing the load profiles of generating houses with battery storage would be useful as it would reduce the need for excess standby generation. The ability to store energy produced when generation exceeds demand will facilitate system efficiency and demand peak smoothing. The development of cost-effective open data sharing, particularly in the battery storage space, would facilitate the provision of storage services and associated offerings (such as intelligence battery management systems). As it currently stands there are no requirements on retailers, utilities or other industry participants to provide open-access to network data. This limits the ability to make collaborative network decisions and for third parties to actively provide services. We recommend that the government focus on facilitating collaborative and meaningful data sharing regimes for energy data.
- **Communications infrastructure and standards –** In general, distributed energy resources are smaller and more geographically diverse than traditional power plants. In order to extract value from distributed energy resources, both as a service and for grid flexibility, communication infrastructure is essential. The system must also be sufficiently robust enough to resist cyber-attacks, provide system stability and reliability and operate in near-real time. Further, the adoption of interoperability standards, such as the work Standards Australia and the Energy Networks Association are doing in this space, along with open data sharing for the overall energy system, is recommended as it will ensure that new technologies and developments are inter-operable.
- **Data Governance and Privacy:** Security, privacy and governance of data sharing is something that needs to be considered and thoughtfully addressed. Distributed energy exacerbates these concerns as data can potentially reflect personally identifiable information such as NMI, household consumption patterns and customer billing information. Notwithstanding this, open access to data is in the interest of consumers who benefit from increased service offerings, lower prices and better demand management

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capabilities. AEMC's 2014 final determination made it easier for customers to obtain their electricity consumption data from their retailers and for customers to authorize third parties to obtain their electricity data from both retailers and distributors. This and other such initiatives should be encouraged.

As indicated, we would appreciate the opportunity to discuss our submission further with the Senate.

Yours sincerely

Scott Gardiner | Partner
King & Wood Mallesons

Lauren Murphy | Solicitor
King & Wood Mallesons

Odette Adams | Solicitor
King & Wood Mallesons

Christina Crossman | Solicitor
King & Wood Mallesons