

# **ECONOMICS AND INDUSTRY STANDING COMMITTEE**

**INQUIRY INTO MICROGRIDS AND ASSOCIATED TECHNOLOGIES IN WA**



**TRANSCRIPT OF EVIDENCE  
TAKEN AT PERTH  
WEDNESDAY, 21 NOVEMBER 2018**

**SESSION THREE**

## **Members**

**Ms J.J. Shaw (Chair)  
Mr S.K. L'Estrange (Deputy Chairman)  
Mr Y. Mubarakai  
Mr S.J. Price  
Mr D.T. Redman**

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**Hearing commenced at 11.04 am**

**Mr ANDREW DILLON**

**Chief Executive Officer, Energy Networks Australia, examined:**

**Mr STUART JOHNSTON**

**General Manager, Network Transformation, Energy Networks Australia, examined:**

**The CHAIR:** On behalf of the committee, I would like to thank you for agreeing to appear today to provide evidence for our microgrids inquiry. My name is Jessica Shaw and I am Chair of the Economics and Industry Standing Committee. I would like to introduce the other members of the committee: to my right is Yaz Mubarakai, member for Jandakot; to my left is Deputy Chair Sean L'Estrange, member for Churchlands; Stephen Price, member for Forrestfield; and Terry Redman, member for Warren–Blackwood. It is important that you understand that any deliberate misleading of this committee may be regarded as a contempt of Parliament. Your evidence is protected by parliamentary privilege; however, this privilege does not apply to anything you might say outside of today's proceedings. Before we begin with our questions, do you have any questions about your attendance here today?

**The Witnesses:** No.

**The CHAIR:** Great. Would you like to make an opening statement?

**Mr Dillon:** We would, thank you. On behalf of Energy Networks Australia, I would like to thank the committee for inviting for us to appear today and certainly also thank you for enabling a video hook-up for us. We represent Australian electricity networks and gas distribution businesses—the poles and lines which supply most Australians with electricity, including most Western Australians. I would like to touch a bit on three main things, and I assume most of this will not be news to you.

First of all, the benefits of microgrids. Supporting the uptake of microgrids, we think, is essential to the long-term cost-minimisation of electricity supply to Australians right across the country, but especially in Western Australia where you have a vast geography and dispersed population, leading to high costs of supply.

Expanding the electricity network in the 1950s and 1960s was vital to encouraging economic development in regional Australia and delivering opportunities for residents living and working in these communities, but now, microgrids or standalone power systems—I will call them SAPS from now on—may be a better for option for those at the edge of our electricity grids. This is particularly the case for existing connections where there is a trigger for network expenditure, be that ageing assets needing replacement, load growth leading to augmentation, or a need to augment to reduce, for example, bushfire risk. In these cases, it is now often more cost efficient to look at off-grid supply, and it can often deliver higher reliability levels for these communities.

So what sort of costs have we been seeing? There is no doubt that the costs of the technology used in microgrids and standalone power systems have been falling exponentially over recent years. We have seen that with solar over the last decade and we are starting to really see it with batteries now. You heard from Western Power earlier in this inquiry that just 3% of their customers are served by 52% of their network. This means that there just has to be massive potential benefits in deploying microgrids in far-reaching parts of those networks. Western Power has undertaken a trial of SAPS in the Ravensthorpe area and is looking at installing them at numerous places across its network where they make sense.

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I want to highlight the reliability angle. By definition, we are talking about customers at the edge of the existing grids, whose reliability, due to the long amounts of lines involved, is likely to be materially lower than the average customer. Customers in the Ravensthorpe trial experienced a significant reliability improvement, with an average of only 4.7 hours per year off supply compared to almost 70 if the customers were grid connected.

The other thing I am very keen to highlight is that the benefits of installing standalone power systems are not just limited to those living in remote areas that may get the SAPS. When overall network costs are reduced by networks installing SAPS, all customers connected to the network benefit because the network costs are lowered and the cross-subsidies that are currently involved are therefore also lowered.

In terms of barriers as to why we are not seeing a lot more microgrids and SAPS already, all networks across the country—pretty much every one of our members—is looking to install microgrids or SAPS where the business case stacks up at the edges of their grids. Although this honestly is as close to a no-brainer as you can get in the energy sector, the current regulations here in the East coast, and from what I can gather are similarly mirrored in the West, only allow for electricity to be supplied by a system that is physically connected to the grid. The regulatory framework was built on proven and efficient investment, but the current regulatory framework may create a barrier to prove the investment, denying customer benefits given the technology changes.

The federal rule maker—the Australian Energy Market Commission—rejected a rule change from Western Power on this topic last year, but it is now reviewing the issue with a view to changing the rules and the framework to allow SAPS to be used where it is economically efficient to do so, while maintaining appropriate customer protections and service standards. There are strong similarities between the AEMC's work and this committee's inquiry. The AEMC review is very much ongoing. Submissions to their issues paper were due in last month. They are due to release their draft report on 13 December this year.

Thanks again for having us today. We are very happy to engage with questions and queries you may have.

**The CHAIR:** Thank you very much; that was a very interesting opening statement that covered a lot of territory. We are aware of the Roadmap project that ENA participated in with CSIRO. When I read the report, as is often the case for us over here, it was a little NEM-centric and perhaps did not talk in all that much detail—the report itself—on Western Australian considerations. I wondered whether you could maybe give us an overview of that project and then any observations falling out of that project that are applicable in the Western Australian context.

**Mr Johnston:** I suppose the Roadmap did give you an overview of where they came from. Obviously, it was seen that more and more renewables are coming into the system. We were looking at, with CSIRO as a partnership, what was the best way to look at that whole energy transition with that change of energy mix that is going to be coming into the system, and doing that in a way that would allow those new technologies to come on and actually provide the best outcome for customers across the board. We were looking particularly not just at household PV and batteries into the system, but also how that make-up would actually work. We were looking in terms of the whole issue around optimisation, the whole issue of SAPS actually providing power to the edge of grid in other ways, but also the whole aspect of that.

A central component of that piece of work was: how do we actually provide that value back to customers? It came up with a range of milestones and actions into an action plan to have a look at that transition. It was not specifically just for the NEM—it was looking at the Australia-wide perspective—but because some of the modelling we did took into account the information from

both Western Australia and the NEM, I suppose we got more information from the NEM to actually go into that piece of work. It was seen as a starting point. From that piece of work, we are now driving into some of the key recommendations around that, which is why we have that open energy networks program, which is looking around the whole orchestration of doing it in a better way. As part of that process, we were actually trying to say, “How would that actually work on the ground?” We are looking at that from a NEM and a WEM perspective, so we came over and did specific workshops in Western Australia to see how we could actually look at orchestrating any system we actually come up with—how that could be aligned from a Western Australian perspective.

**The CHAIR:** I actually attended one of those workshops—at least part of the day in any event—and it was really interesting. I wonder if you could perhaps, Stuart, give us a bit of an overview of the key themes that emerged from the workshops that you held while you were over here, to the extent that you are able to at this point.

**Mr Johnston:** It has actually been quite good. Just to give people a bit of background of what we were trying to achieve with that, it is to look at how do we actually optimise the use of renewables into the distribution system and then how can that can be utilised to actually provide better value back to customers. What we have done is propose three different frameworks. Firstly, we looked internationally at what is being done with this around the world, and, secondly, we looked at key trials that had been done around Australia. The good thing about that is Western Australia is leading the pack in a lot of different areas on this, particularly Western Power and Horizon have got some wonderful trials going on in the North West of Western Australia.

Some of the key findings of that is that we are actually starting to engage with all the different key stakeholders. People are now recognising that we need to do something. This change is actually happening organically from the bottom up. If we do not do something about this, then there is going to be some major implications for the system which will end up with adverse outcomes for the system but also for customers. We need to come up with a plan that will not only utilise those resources and investments that have been done, but doing it in a way that is smart, at the least cost and that will extract the best value for customers. Part of that could be around the connected part of the grid but also designing those systems to be standalone as well.

Since that workshop, which you attended, we did a deep-dive workshop in Western Australia with some key stakeholders to look at how each of those different models we were looking at and investigating could work in Western Australia specifically: what would be different and what would be similar to any other model that had been going. We are also now starting to put together a list of key no-regret actions so that no matter what pathway we go forward as part of that orchestration, these are things that are critical that need to be done in the immediate future to manage some of these issues. So we have got the draft actions we have identified and we have just tested those. We had a meeting with the AEMC earlier today to talk through some of those and we are looking at trying to get that out somewhere around Christmas this year.

**The CHAIR:** Great, we would certainly appreciate receiving a copy, if you are in a position to send one to us. I think that would be fantastic.

**Mr Dillon:** Certainly, we can do that.

**The CHAIR:** What were the major points of tension that were identified by your stakeholders? Where are they seeing the barriers?

**Mr Johnston:** I think it is more around who is doing what. There are also some barriers—we are not sure if these are actually true, but the perception was around current regulatory settings, inflexibility in the current settings in terms of what could allow people to trial different aspects. I suppose they

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would be some of the key components. The technology itself, I would say, is not a barrier, but the ability to invest in some of those technologies is also obviously—networks may need to invest in some of the network sensing that will be required to manage some of these issues. There is going to have to be some spend on the system to enable that but that will then create savings because you do not need to strengthen the system going forward, because you are going to be trying to manage the DER in a better way, which will offset any other larger scale investment in pylons, poles and wires.

**The CHAIR:** There are a couple of points in there. Firstly, on investing in network sensing and smart metering, I would welcome your views on the legitimacy of rolling smart meters out and Western Power having the ability to recover the cost for that through its regulatory framework.

The second thing, then, in terms of the “who” and the barriers, everybody seems to be doing this. There is a lot of duplication, there is a lot of overlap and there are a lot of pilots, because nobody legitimately can do it. Everybody is poking around in this space, and everybody is doing it differently. Some are keeping it very much in house and some are really quite open to the market offering solutions. Basically, there is a problem identification and the market said, “Come and provide us with a solution.” I just wondered if you could maybe give us some observations on those issues.

**Mr Dillon:** I will start with the first one on smart meters. As you are probably aware, over in the east, Victoria had a smart meter rollout starting in 2008, led by distributors there. There were some challenges, certainly cost wise, and, I guess, public opinion wise, with that rollout and how it has gone. Partly as a response to that, there was a reluctance from many governments to instigate a similar network-led rollout anywhere else, which is one of the reasons we ended up with a retailer-led rollout, which started in December last year. We are seeing significant challenges with the retailer-led rollout. There were issues with whether the retailers were ready. There were some challenges with the complexity of the structure that has been developed in order to enable the rollout.

From our end, as networks we are now—indeed, next week at our CEO forum we will be discussing what information networks need today and will need into the future as we have more and more penetration of batteries and solar, and what of that information we can already get from the smart meters that have been rolled out. Are there gaps and how might we address that? I think that part is still a work in progress.

The thing that we are certainly starting to see here on the east coast is that the Victorians, where the networks have rolled out smart meters and are still responsible for the metering, are starting to really be able to do some significant smarts with their networks, that elsewhere we simply cannot do at the moment. For example, on safety, often when you touch something and it is getting a bit tingly, the main driver behind that is usually a worn neutral cable from the house back to the grid. Most networks deal with neutral cables simply by replacing them every 20 years or so, by just doing a standard block of them and replacing them each year. Once you have the smart meter data recording the power quality, particularly voltage levels, you can see where there are issues with that power quality, and you can therefore target your replacement program to those that you know are worn and are likely to cause issues.

What we have already seen in Victoria over the last few years is that household electrocutions have dropped off significantly as a result of this. It is clearly identifiable evidence. Things like that are not just theory, we are now starting to see them happening in Victoria. So from our end, we think the network benefits of networks rolling out and managing smart meters are significant. The market benefits of retailers doing it are not theoretical, but realising them has certainly proved challenging so far in the movement, where we have seen the retailer-led rollout.

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I think the short answer to the second point on barriers and overlaps in terms of trials and all that sort of thing is that no-one knows exactly what the future is going to look like. What we do know, and what is certainly pertinent to your review of microgrids and regulations around that, is that the current split we have between the competitive retail sector, a monopoly network sector and a competitive wholesale sector, which has worked broadly reasonably well for the last 25 years, is not working well when we have these disruptive technologies at the consumer end. To be honest, many of our members look with some jealousy at Horizon Power and what they can do because they are the entire supply chain, because they can catch the integrated benefits of many of these technologies. That, combined with the fact that disruptive technology of itself, means no-one knows exactly what the future is going to look like. That has led to pretty much every network in the country doing various trials of various things in partnership with retail providers and also an array of technology providers. The challenge for us as an industry association, but certainly for policymakers, is how do we harness all of those trials and start to figure out what regulatory framework and what technologies we are starting to see and what do we need that is going to set us up for the future?

**Mr Johnston:** One of the reasons why we started the open project was because of that whole issue of so many different people trying different pathways. The danger that was looked at was that each of those trials could be great but you could end up with a whole lot of different bespoke systems which do not talk to each other, so you end up being in the exact position where you do not to be, whereas you have a whole lot of different players with all different technologies. People have invested, but you actually end up with different components not being able to utilise properly or components where they do not talk to each other.

It is not just from a market planning perspective but it is also from standards. We do not even have Australian standards interoperability—an agreed process on that. We do not have one on data protocols or communication protocols, so part of what we are doing is not only just looking at it from a high-level framework perspective, but one of those key enablers that we need everyone to agree to so, whatever people build from a—and it is great that those trials are going on, but they are all aiming for one similar framework so they can all mesh together, and I think that is really important.

**Mr D.T. REDMAN:** Can I take a comment you made a second ago, Andrew, about no-one knowing what the future looks like. Your membership and the networks, particularly on the east coast, privately owned, must be starting to assess the various risks going forward and therefore must have a bit of vision about what they see the future looking like from a network perspective. I suspect, with the introduction of DER and away from central generation, you are going to have not these robust networks, but you will still need to have electricity and energy electrons moving around to capitalise on the benefits of future opportunities, electric vehicles—all the other things that are coming to the party. Does your organisation have some vision for that? By extension, in your opening commentary you talked about standalone systems not being a threat to the participants that are connected to a network. I am assuming—because it is a capex issue—you may well have technology being a threat with people going off-grid who are currently on-grid and, therefore, increasing the unit cost to a network user.

**Mr Dillon:** Yes, I will start with the sort of “what does the future look like?” At a high level, I will talk transmission and distribution slightly separately, although they are somewhat similar. The debate we have seen nationally, if you go back five or so years, there was a lot of talk about death spirals and customers en masse disconnecting from the electricity network. We think the reason you have seen that abate, if not disappear completely, is simply that the practical realities of the number of solar panels you need to put on your roof, the number of batteries you need to have in your garage

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and, potentially, some form of diesel generator in the backyard, first of all, is not very realistic for many people.

But even where it is, 98% of the year you are going to have excess electricity you will want to export to the grid. So, the idea that you would put all that in and disconnect, for most customers, makes no sense at all.

What that means for us as networks is that you are starting to see the thinking moving from any form of defensive, “How do we stop this?” to “How do we become the platforms that enable the two-way trading that many more customers are going to want to do?”, both for those who are going to be owners of solar and storage, but also to continue to deliver affordable and reliable power for those who are not, and how we balance the needs of those two. That was a big flavour behind the electricity network transformation “Roadmap”. It is certainly a big driver behind the open energy networks project that Stuart just spoke about and we are seeing a lot of that through all of our members of the distribution space.

Transmission has some similarities; it is a little bit different. We are at the wholesale generation level seeing a transformational change from thermal, largely coal-based generators to a fleet that is over time going to be dominated by renewable generation, and that has two big implications for transmission. The first is simply where these things are located. Unless you suddenly cover the Hunter Valley in New South Wales and Latrobe Valley in Victoria, for example, with solar panels and wind, you are going to, by definition, need a different transmission network to get the large-scale generation to market.

Then the other one is by moving from what traditionally is known as baseload generation to a system with more variable generation, the benefits of interconnecting and being more linked up are maximised the more variable your generation is. So we think, when you look at the Australian network, it is long and skinny by world standards. That is true of the East and of the West; that is due to our geography and our population. But if you add on to that the generation mix change we are seeing, we think there is a need to have more connected systems to help deliver affordable and reliable power going forward.

The last one on the question about whether standalone power systems are a threat, the key that I would like to convey on that is: it is about what customers pay versus how much it costs to serve them. I will try and walk through this. Many of these customers, again, by definition are at the edge of the grid, so you might have kilometres of line to serve a single customer or only a handful of customers. Some of Western Power’s examples I know are quite extreme with the number of kilometres of powerlines and the limited numbers of customers at the end. So, the cost to serve those customers is very high.

Again, this one is true across the country: they are usually paying, from the network point of view, a postage-stamp price that the entire state or entire region pays, so the cost to serve them is much higher than what they are actually paying. As long as they are on the network, they are getting that cross-subsidy, so the network has to be involved to catch that cross-subsidy to be able to deliver their power supply at a lower cost than what the current cost is and, therefore, that value is caught and spread across everyone. If the cost to serve them is actually lower than what they are currently paying, then, in theory, the flight risk that you are talking about, the disconnection risk, is real. We think, certainly as things sit at the moment, there will be very few cases in that because the current cross-subsidies are often very big. It is catching some of that cross-subsidy by moving them from grid-based supply, to off-grid, get that differential and be able to keep those customers paying the same as what they were, but then everyone else benefits from the total network cost going down. I almost need a whiteboard, but I hope I have explained that a little bit.

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**The CHAIR:** No, that is great. We are all sitting here and nodding, Andrew.

Stuart, can I just pick up a point that you made around standards and protocols? We heard from the IEEE and, in fact, earlier this year, I was at an IEEE conference in Singapore where they have been doing quite a bit of work around standards development and setting Australian standards and global standards for batteries for distributed energy tech. I wondered if you guys have been engaged with that and whether that is something that is facilitated through your organisation.

**Mr Johnston:** I am engaged with both the IEEE and Standards Australia, which is more through the IEC and all the other international standards that are out there as well, because IEEE is more from an American perspective, and there are really good learnings from both of those. We have actually engaged Standards Australia to do a bit of work on a roadmap for cybersecurity technical standards, so that sits under the cybersecurity framework that AEMO is doing at the larger level, but we are looking at more the technical standards that we need to do for cyber. We saw that as the first cab off the rank, but we are now talking to them about the same sort of issues for interoperability, comms and data protocols, and trying to get them to widen their scope from just the IEC international standards to the IEEE and actually getting learnings from those.

Like I said, I am engaged with the IEEE and they have actually asked us to talk at one of their conferences next year as well, in April, regarding this aspect. They are actually asking us to be on some of their committees. I think it is really important for us to be on some of those international committees to influence those, and then we can do a direct adoption of those, rather than trying to create our own. I think that is probably one of the key priorities and I think we need to be working to try to get that direct adoption happening within the next two years. Even if they are not perfect at the moment, at least there is something that we are all working to the same standard and same guidelines.

**The CHAIR:** Thank you. I just want to explore some of the issues in section 8 of the “Roadmap” report about regulatory and policy frameworks, particularly the findings that you made around consumer-centric frameworks. We have just had a discussion with AEMO where the point was made that we need to adopt a more consumer-centric regulatory framework. You also in your paper reference the UK energy sector’s regulation innovation incentives and outputs approach. I just wondered if you might be able to maybe give us an overview of your thoughts on consumer-centric frameworks and then maybe your thoughts on that UK approach.

**Mr Dillon:** I might start, and I will hand it over to you, Stuart. As a concept, obviously, everyone loves saying we are going to have a consumer-centric framework. But you are right—what does that mean? The standalone power systems issue we have both on the East and the West coast in terms of the regulations is a classic example, where much of the regulation was set up from a systems approach. What is the technical system going to be to deliver electricity to any of its consumers and therefore almost walking back through what the regulatory framework becomes. As soon as we start to see changes in this—in this case technology costs with solar and batteries—definitions get thrown out the window and what we have in our reg frameworks is a real challenge.

Because the sort of emphasis when they were developed was the system rather than the customer, we are starting to see some challenges coming through that. It is almost as much about a perspective about how these are things are drafted, and noting that—again, standalone power is a classic case—what works in one situation may not work at all in another. So it is being able to figure out that we have flexibility in regulatory approaches that can differentiate between those two but makes sure it protects and covers both situations. In terms of the UK work, I might hand over to Stuart.

**Mr Johnston:** Look, I think you are talking about the innovation fund over there in terms of how they are looking at trying to come up with innovative situations that get the best customer outcomes

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for lower prices. That has actually been very successful, but obviously there have been some issues around that which they are just tweaking at the moment. But, in large, a lot of the processes and projects that have come out of that have led to innovative approaches which have actually started to look at how can you actually get a pricing forecast, and how you can actually look at providing better services for more customers which actually creates more value for them going forward.

I do know that also led to the piece of work that is going on over there at the moment, which is like a sister program to our open energy networks program; they have one called open networks. That has actually not only been recognised by Ofgem, but it has actually been utilised as a way of informing how they actually go forward to transform their own system, particularly the whole issue around EV systems and the optimisation of larger scale renewables within the distribution system to bring costs down and how those frameworks would work, what does that mean and how does that actually link into the wider system approach to actually get value for customers.

**Mr Dillon:** We followed the UK from a regulatory point of view in many areas, particularly in the network regulation. It is interesting that about six or eight years ago, under the RIIO—I think the first one—they started to strongly encourage innovation projects from networks, and indeed set up specific funding arrangements under the regulatory model. We at that stage here were in the midst, particularly in some states in the east, of challenges with network affordability and network prices going up significantly. I suspect that was one of the main reasons why this has been a part of the UK model we have not really adopted.

We do have some innovation allowances, but they are by no means on the scale they are in the UK. I mean, for example, the UK networks run a low-carbon networks and innovation conference every year, where they do basically update on all the regulatory-funded projects and share knowledge. I was lucky enough to go to it in October; it is a fantastic event of all the innovation that was showcased. So we are in some ways a little bit behind on that in terms of having regulatory drivers behind that, but certainly all our network members are in various projects and, depending on their needs, collaborating with a variety of uses to drive innovation.

**The CHAIR:** Can I explore a little bit —

**Mr Johnston:** In terms of customer-centric regulation, it is also around coming up with solutions or regulatory frameworks that are not just there to actually enable people to own DER, but it is also making sure that there are protections in place and that some of the advantages are actually going to be for all customers across the board, so making sure that your vulnerable customers—your customers who do not own DER—are actually included in this and get value out of this. Again, that is some of the learnings we are getting from the UK because some of theirs are designed around making sure that it is for all customers. So theirs are not quite the same in terms of DER and batteries; it is around customers who do or do not have EVs at the moment in the system, so how do you actually go about doing it for those and how to optimise for that.

**The CHAIR:** Can I just pick up the point that you made around innovation and the UK framework—how it has an innovation fund almost. When we were in the US—we have also been having some discussions this morning around regulatory frameworks and the degree to which they encourage innovation or stifle it—we were in California, which adopted a sort of “set a target, make a market and the market will meet the target” framework, and the regulatory regime that has been set up is specifically geared up to, if you like, a top-down approach to the rollout of distributed energy technologies. Then we went over to New York and it was quite the opposite. There was a problem identification and then a request that the market come up with the tech to solve the problem. Rather than saying, “We want X megawatts of PV” or installed battery capacity, the New Yorkers’

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regulatory system and their market system is very much focused on problem definition and then having the market meet that need.

I wondered what your views are on the benefits of those alternative frameworks or whether there seems to be, particularly in the Western Australian context—do you have any thoughts on applicability or approach and what might be the better course?

**Mr Dillon:** I do not think there is necessarily a straight out black and white, right and wrong. I think one of the things that is very important either way, whether you are going and setting sort of targets and working down through or defining problems, is ensuring—this is something, unfortunately, I have seen various examples of in Australia—we are taking a system-wide approach to this. So we have issues with governments, for example, in some states with large renewable energy targets that are not necessarily working with the networks in that state, be it transmission or distribution, on what the network implications of that are, and therefore what system we need to deliver it. One thing which New York has certainly done well on that front is take a bit more of a systems break approach and figure out what network as the platform in the middle of that is needed, and got them moving on some things to enable further developments. I think certainly that systems end-to-end approach is important.

**Mr Johnston:** As part of the “Roadmap”, we did a very detailed international scan of what was out there so we could actually look at what was good and bad about it and what we could actually take on board. We obviously looked at the New York brand and looked at California. The other ones we looked at were probably closer to Australia’s perspective, and maybe even for Western Australia, is the Texas model, which is more of a standalone system. It is interconnected and Texas is probably closest from an American perspective in terms of how we would set up in Australia. We saw some great learnings from New York in terms of how they set up and how they technically did that, particularly learnings about some of their market-based components, and the same with California.

But some of their regulatory frameworks are so different to ours that there would be some big barriers trying to bring those in. But Texas was probably the closest of the Americans to actually look at in that there was some really good stuff to take there. We then looked at Europe as well. Again, from a technical perspective, the European stuff is really, really good. In terms of [inaudible] system [inaudible] they also have some of our barriers. They have also got interconnection between countries, which is actually really useful, whereas the UK—that is why we also looked very closely at the UK because their regulatory system is very similar to ours and their technical systems are very similar to ours and are set up in the same way.

**The CHAIR:** The Texan example, is it illustrative to Australia? Do you include WA because there is really quite stark differences between Western Australia and the NEM? I just want to make sure that when you say Australia, you are not forgetting about the little guys over here.

**Mr Johnston:** I would actually say Texas is closer for Western Australia than the others, because the others have got quite a lot of interconnection, whereas Texas is actually the number one standalone system. They have actually set that up—it is a very large state, there are a lot of people there, but it has actually been set up specifically [inaudible]. I would actually say there is some real take home from the Texas model than you would get from some of the others.

**Mr Dillon:** And particularly some of the links that they see. Again, they are a much bigger market than Western Australia is standalone, but they have gone ahead of the curve on the generation changes, determined that certain parts of Texas are likely to be very promising, particularly in generation zones. In advance, they have built out transmissions to those things, which is a little bit of a “build it and they will come” approach, which can have its dangers. But with sensible planning, there is no question in the Texas environment how it has worked very well. It has led them to be

one of the leaders in emissions reductions in the US with that sort of model of, “Let’s go forward 10 or 15 years, what are some things we can be reasonably confident the system is going to look like and therefore what should we be doing now to start enabling that?”

**The CHAIR:** I am conscious of the time; we do not have much time left. I am happy for you to take this question on notice because it is probably quite a complex one. One of the issues that has repeatedly come up over the course of this inquiry, both in our initial stages and then when we were overseas, was around the definition of network services—what networks now do and what services they require in order to securely and reliably operate. There are the traditional four that everybody talks about around frequency control, but there is a whole suite of other things around inertia, around VAR support, around voltage control, around flexibility, that is being provided by plant, for free, at the moment but has an inherent value now to networks in support of distributed energy technologies.

As I say, I am happy for you to take it on notice. I am wondering whether you think that the definitions of network services are sufficiently granular or appropriate, and then some thoughts on valuation and procurement and making sure we can continue to ensure their provision on networks because they seem to be becoming more and more important.

**Mr Dillon:** We can probably half answer that for you now because the short answer is that one of the important things we are looking at is part of open energy networks. What services are important to networks, and particularly as you touched on, batteries is the obvious one. You have seen from the performance of the Tesla big battery in South Australia at Hornsdale some of the things it has been able to do in the wholesale market in terms of fast frequency response have been very impressive. If you take that thinking and that sort of control system down to even household batteries, how can networks harness those sort of things to help maintain a safe, stable and reliable network, but then what are the incentives, how do they pay for that and all that sort of thing? There is no question there will need to be regulatory reform to enable that sort of market. Do you want to add to that, Stuart?

**Mr Johnston:** Yes. I was going to say that is the whole issue around—what you are going to be creating value to customers is enabling them to not only go into the network services markets that are there at the wholesale level at the moment, so they will get access to those, but because of having to actually optimise all the way through the system like a layer cake, there are opportunities for network services markets at the street level or a district level. There is always values that we have to try to optimise some of those areas. They are starting to explore as part of this. If we can actually crack that, then that is where the value of all that distributed resources within the distribution system can become really valuable and then that will then—so you can incentivise the customer to allow that to happen. They then get more value for their product.

**Mr Dillon:** It certainly happened in the commonwealth as well.

**The CHAIR:** The corollary of that is that these technologies are having an impact on the operations of existing assets. Existing assets are having to change their cost profile; their operating cost profiles are changing. They are being expected to run differently. The things that they provide for free have a value that is not recognised, and that, I guess, is the flipside.

**Mr Johnston:** That is true. It is actually on both sides. There are things like some of the existing plant out there can actually provide inertia from the system so making sure that that is recognised. There is a service that networks actually provide to customers but also, going the other way, they can provide services to us. It is actually trying to offset that—what can be created by both to get an optimised system that is actually better value, and all that value is actually recognised and utilised in the best manner.

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**The CHAIR:** We are, unfortunately, running out of time. We will have to draw it to a close. Thank you so much for making yourselves available. We really do appreciate your insight and certainly look forward to seeing the outcomes of your open energy networks project. It sounds like a really interesting and very relevant piece of work, particularly relevant to our work. Thank you so much.

I will proceed to close today's hearing. Thank you for your evidence before the committee today. A transcript of this hearing will be emailed to you for the correction of minor errors. Any such corrections must be made and the transcript returned within seven days from the date of the letter attached to the transcript. If the transcript is not returned within this period, it will be deemed to be correct. New material cannot be added via these corrections and the sense of your evidence cannot be altered. Should you wish to provide additional information or elaborate on particular points, please include a supplementary submission for the committee's consideration when you return your corrected transcript of evidence.

**Hearing concluded at 11.49 am**

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