

ECONOMICS AND INDUSTRY STANDING COMMITTEE

INQUIRY INTO MICROGRIDS AND ASSOCIATED TECHNOLOGY IN WA



**TRANSCRIPT OF EVIDENCE
TAKEN AT PERTH
FRIDAY, 8 NOVEMBER 2019**

Members

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

Hearing commenced at 3.08 pm**Mr STEPHEN EDWELL****Chair, Energy Transformation Taskforce, examined:****Ms KATHERINE RYAN****Acting Executive Director, Energy Policy WA, examined:**

The CHAIR: On behalf of the committee, I would like to thank you for agreeing to appear today to provide evidence in relation to the inquiry into microgrids and associated technologies in Western Australia. 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 left is Yaz Mubarakai, member for Jandakot, and Stephen Price, member for Forrestfield. Deputy Chair Sean L'Estrange and Terry Redman, member for Warren–Blackwood, are apologies for today's hearing.

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: Do you have a brief opening statement that you would like to make?

Mr EDWELL: Not really, other than to say, obviously, the agenda that the inquiry is focused on with microgrids is very much related to what we are doing through the transformation process—albeit, microgrids is only one reasonably small element of it, in terms of the SWIS. But I think we are both confronting similar issues through both processes. I am happy to share any information and our views with you.

The CHAIR: Excellent. What we are trying to do today is—as you will be aware, we initiated this inquiry quite some time ago and went through, if you like, an overview phase and a technical phase, and then from October last year onwards, we focused on regulatory issues and market reform issues. We then had that inquiry punctuated by an inquiry that we needed to do on short-stay accommodation, which took far longer than we had anticipated, and we have just tabled that report. So now we would like to finalise this inquiry.

[3.10 pm]

Quite a lot has changed since we initiated this inquiry. I suppose it was a bit of a marginal topic in those days when we started the inquiry, but, obviously, there has been an awful lot that has been going on in this space and particularly since we took a pause to complete that other inquiry. We intend this to be the final hearing into this inquiry. We have some things that we would just like to close out and get a bit of an update on, and then we will finalise our report.

What I would propose to do is invite you to provide us with a bit of an overview of what has been going on with the whole-of-system plan and the DER road map, and then we will put some questions to you in three broad areas: firstly, on technical and operational factors; secondly, on markets and regulatory issues; and, thirdly, on customer-centric issues. So they will be the three broad areas that we would like to cover. There are some notes that we would like to hit in order to test some evidence that has been presented to us, and make our findings and recommendations. If you are comfortable

with us proceeding on that basis, I will invite you to give us an update on where the whole-of-system plan and the DER road map are up to.

Mr EDWELL: I could do that, and Kate can fill in the gaps. The background on this is that, as I am sure you are aware from previous submissions in your own work, we are going through a major transformation in the electricity market, driven by renewable energy. So we have this sort of confluence happening now between a revolution and the cost of renewable energy—solar, wind, batteries and supercomputing in the form of digitalisation. So, basically, what is happening is we have got an electricity system that was designed for large, synchronous plant connected to transmission assets—electricity passing through networks to, historically, passive consumers, who just expect to flick their switch and the lights would come on—to a situation now in which the action is basically moving downstream. We have now got, as you would know, the equivalent of nearly 1 200 megawatts of rooftop solar, which is three times the capacity of the largest generator on the system, all out there in suburbia, which is operating in a way that is quite counter to the design of the system technically as well as economically.

In a state like WA, we have stellar renewable resources—wind and solar. We have got the best in the world, arguably, and, of course, those resources are not only clean, but also basically of zero marginal cost. If you want an electricity market that reduces emissions and puts downward pressure on prices, renewable energy is really a big part of the solution. The trick, though, is that you have to have a plan to get you to that happy space where you can realise the benefits of renewable energy without compromising the reliability and security of the power system. I think the government has got the smarts on this. Looking at the history of other jurisdictions, probably even including the NEM, you need to have a plan. Basically, the task that the task force has been given from the minister is to come up with a suite of actions to modernise the power system.

To answer your question specifically, we have got three programs of work. The first program of work is to make technical modifications to the design and operation of the power system, and the three key areas here are to make access to the grid less onerous and less costly for renewable generators, which means we have to change the whole way that access is gained and priced. Secondly, we are creating different markets or products that are needed for the security of the system, and these are, for example, around the provision of services to keep the system within the tolerances for frequency, because there is a whole lot more volatility happening now. So the idea is to create separate segments of markets where those services can be valued and ultimately procured—and if the market is deemed deep enough, procured through a market process. Then we are making another fundamental change to the way in which generators are dispatched. So we have got those essential systems services and we have got the energy market. We are wanting to co-optimize the dispatch of facilities so that we actually get the least cost outcome across those two markets, and that will ultimately happen on a five-minute basis. So that is the technical design stuff and that is happening as we speak.

The second major category of work that we are doing is to, before the end of this year, give the minister—the ink is not quite dry yet but nearly—a DER road map, a distributed energy resources road map, which really focuses on renewable energy at the distribution, behind-the-meter part of the sector. The question there is: how can we facilitate continuing uptake of small renewables but ensure that that happens in a way that realises the benefits of the lower cost but keeps the power system stable? So there is a whole bunch of work and actions that we are giving the minister to answer that question.

The third suite of work we are doing is in respect of the whole-of-system plan. So this is some quite comprehensive economic modelling of the power system and the network. We are taking a 10 and

20-year view under four different future states—basically, business as usual and then scenarios around high uptake of renewable energy, high demand et cetera, to give quite a detailed view under each of those states about what the capacity mix might look like. So what sorts of facilities in 10 and 20 years' time are going to provide our energy. We will have a view on where the weaknesses are in the network; where we may need to enhance our network for that to happen; and, also, what the cost of that might be. That will be an important piece of work for the government to use in terms of policy decisions and policy direction. We are currently putting that piece of work through what we call the sausage machine—or there are four sausage machines!—and we hope to consult on a draft report with the sector in March —

Ms RYAN: In March–April next year.

Mr EDWELL: Yes. Then there will be a report to the minister probably in around October.

The CHAIR: You say that the whole-of-system plan will go out for industry consultation in March–April. What other industry consultation have you undertaken for the other two programs of work?

Ms RYAN: Each of the three workstreams that we have got have a slightly different engagement approach—two are quite similar, but they are all a little bit different. On a distributed energy resources road map, we have established a working group with other key parties, so the Australian Energy Market Operator, Western Power, and to some extent Synergy and Horizon Power. We are sort of working through the detail of it, but also we have held two stakeholder workshops with industry—so one full-day workshop and one shorter session, just in the last couple of weeks—to get some broader industry input into that plan. That is really all that the time frame allows for the road map itself, but subject to government's endorsement of the actions in the road map, we anticipate progressing implementation of those, again in consultation with the sector. It will depend on what the particular action is as to how broad that consultation is.

We have established a specific industry working group—the transformation design and operations working group—to support those regulatory reforms; that is, the foundation regulatory frameworks workstream. This working group is open to anyone, but membership has tended to be from existing participants in the wholesale electricity market or intending market participants, so we have some new investors also in that group. That group meets monthly-ish to discuss the various detailed design elements of our new regulatory framework for that. That is quite an intensive, detailed consultation approach. Complementing that, as we get to the point of having draft rules, we will have to do formal public consultation on those rules, where we will publish them and take written submissions. That will happen in the first half of next year predominantly.

Finally, on the whole-of-system plan, again we have a working group with AEMO, Western Power and our consultants, who are kind of the party that is delivering the various components of the plan. Again, there was a series of stakeholder workshops, essentially. We held one recently on scenario development. There will obviously be a presentation to the sector early next year accompanying some draft outcomes from the modelling. It is a series of workshops at key points in that process with the sector broadly.

[3.20 pm]

Mr EDWELL: I think it is fair to say that the model we have followed here, because of the timing within which we have to get this thing rolled out, has been different from previous reform processes. I think the industry is supportive of the difference. So rather than put out draft papers and get people's input, we basically do it all in workshops. We get the people in the room who are really the decision-makers and who know the stuff, and then we get a paper on a particular issue. The whole program of work has been sort of compartmentalised into quantum bits, so we do this bit, we

consult on it, we get a set of recommendations up from the implementation unit to the task force, the task force says yea or nay, it goes on our website, and then we just get into doing it. Doing it could be drafting rules to make changes to the market rules, or changing some of the regulatory instruments, or whatever. The emphasis is really on a very focused, but active, process rather than writing submissions.

Ms RYAN: I was just going to say that at the whole-of-program level, there are probably a couple of other things worth mentioning. One is that we have a strategic consultative group that has broad representation from across the sector at the sort of CEO and senior exec level that meets quarterly or thereabouts with task force members, really to gauge the strategic issues in our work—are we looking at the right issues; too fast, too slow; have we missed something?—those kind of really quite big-picture issues. We have that group convened. We also have a group with AEMO and Western Power again as our partners in delivering and implementing a lot of this, to just make sure we are all working alongside each other collectively. The final thing, which is probably the most prolific part of it, has been just hitting the streets and having an open door. We have had over 200 one-on-one meetings with individual stakeholders so far, and that will continue.

Mr EDWELL: The industry support has been fabulous. We actually have very good data. Some of it is confidential, but we have had very good support from the sector in terms of the one-on-one relationships.

The CHAIR: As have we. It has been such a fantastic experience for this committee to see how behind reform the industry is and how willing people are to share their ideas and their thoughts and their experiences, and how constructive that has been. Do you think that your process has been assisted by the fact that the government trading enterprises own and built the major assets that are involved here? You do not have competing private network owners, for example, sort of fighting over what regulatory model or framework would best suit their business but you have GTEs sitting there. I wonder whether you think that has either helped in the delivery or in working to such a tight timetable and being very focused and targeted in the way that you have developed your projects.

Mr EDWELL: I think having a more condensed ownership helps, so one network business rather than, say, over east, where there would be about 10. That helps. I am not sure that it matters too much whether they are government-owned or not. Having said that, we are not giving the GTEs everything they want.

The CHAIR: Nor should you!

Mr EDWELL: There are matters where we differ from the GTEs. But there is fairly diverse ownership at the retail end, and there is a whole bunch of private sector new entrants who want to come in. We are very, very mindful that we need to come up with a model that is pro investment for the private sector —

The CHAIR: Absolutely.

Mr EDWELL: — and not just on a mantra to shore up the GTEs. We have an open door to anybody.

The CHAIR: I think that is a very important point to emphasise—that there is an important space here for the private sector. What that is and how that evolves over time I suppose would be an outworking of both this piece of work and the work that you are doing.

Let us come to markets and regulatory in a minute, but just to take technical and operational factors, one of the things that has been coming through to us loud and clear is the level of visibility that AEMO has at a transmission level and the challenges that it then faces around sub-transmission visibility and ability to coordinate. What work have you been doing specifically looking at that space,

and what major themes have emerged about a distribution system operator or distribution system operations more broadly?

Ms RYAN: Those are issues that have obviously been raised with us and are very actively being considered. In terms of visibility of what is happening deeper into the distribution network, where all the distributed energy resources are, we have a challenge at the moment in that Western Power, which obviously owns the infrastructure, does not actually actively monitor what happens at the distribution level, because it has not historically had to. Therefore, as a first step to improving the information that both Western Power and AEMO use to plan the network and understand what is going on, we are working on developing a DER register, similar to the one that has been established on the east coast, but we working with the stakeholders to understand how we do that most effectively in Western Australia. That is one of our projects, sitting alongside the DER road map. That is the first step, if you like. What we are exploring through the road map is how we transition from that to more dynamic and real-time monitoring, which is likely to be needed into the future to enable distribution services and a more dynamic and real-time provision of those services. That is the actual visibility part of it.

On the DSO–DMO functions, this is obviously a debate that is going on nationally and around the world. Clearly, with such a great pool of resources at the distribution level, to maximise the value of that, not just for the individual customer but the system as a whole, we have to find a way of harnessing that and aggregating it. The whole point of the DER road map in that regard is to work out the path we need to go on to get to that point as and when the business models emerge and as and when the critical mass of customers emerge that want to participate in those kinds of things. That is something that we are working on—to come up with a recommendation in the road map.

The CHAIR: One of the things that AEMO put to us in its evidence is that it does not necessarily need individual facility level visibility, but it might just need areas or regions of visibility where there seems to be a distribution feeder or a sector that is significantly impacting broader network operations. I suppose there has been some evidence as well around webs of smaller grids or smaller operable entities that present to the network operator.

I take your point, that at the first stage we just need to know what is out there. I suppose what I am thinking about is in terms of registration. In Singapore, before they have even got to the problem that we have, they have decided that before anyone is allowed to put in a PV system or any sort of DER, they have to participate in a registration scheme. That is great, because they have seen what has happened here and have gone, “Oh, my God!” Are you thinking about it being for all new installations going forward, or will you retrospectively seek to have some sort of registration?

Ms RYAN: Both.

The CHAIR: Okay.

Ms RYAN: The intent is to get as best a picture as we can of what is there at the moment. There is paperwork, of course, that associates every installation of a PV system, so in a sense that information is there, but it just has not been systematically collected and recorded and it cannot be shared. So there is a process to go through to get that information in a way that can be shared and used. Then it is a case of where do we go from here. As you say, that absolutely requires registration of new DER. We are looking at what the triggers should be. If you upgrade your PV system, that is probably a trigger, or if you put a new battery on. What about EVs? At what point do we care about those? Is it a particular kind of charging station in your home? We have to work through the specific details, but, yes, that is the intent.

The CHAIR: One of the things that was also discussed when we were talking about assets behind the meter is standardisation of equipment, so that AEMO knows how things are going to behave under particular operating conditions. Whether we are looking at larger facilities that are visible to a distribution system operator or a transmission system operator, or aggregations that are visible, what work is going on around equipment standardisation and technical rules at this distribution level?

[3.30 pm]

Ms RYAN: Four key themes are emerging in our proposed DER road map that we shared with the sector just recently. One of those is around the technology integration. There is also one around moving to that future distribution service, and they interrelate with each other, obviously. There are a few things there. One is that we are looking at connection requirements and therefore technical requirements and obligations on large-scale generators as part of the reforms of the wholesale market, and making sure that essentially all the connections are occurring in a way that is understood and helps manage the system security elements. That would be something that Western Power is considering in its technical rules, because Western Power is responsible for those technical rules, and it could cover that.

Probably the thing that we have been thinking about a little bit more is on the small-scale customer and the aggregation side of things. What we have heard from parties like Horizon Power, which is out there testing how to aggregate DER and use it at the moment, is that we are still definitely in the trial and learning phase on that front. There are lots of different pieces of software and technology that have to talk to each other. There is no end-to-end platform. We are kind of working this out as we go. The experience to date has been that even where, for example, an appliance has been installed and we know it is meeting a certain standard and it should behave in a certain way when it sends a signal, but it does not. A lot of time has been spent in understanding why that is not happening as often as it would be expected to happen, and whether the settings in the appliance have been set up wrong out of the manufacturer and all those kinds of things. What we have taken from that, and we are still working through what that means for the road map, is that there is great potential there but there is still a lot of learning to do. Probably some more trials and pilots might be required to fully understand that technology and how the communication flow from a control centre perhaps through an aggregator to a series of individual appliances, or DER, translates into an actual response you can rely on to perform at the time it is needed.

Mr EDWELL: It is fundamental things like do you have cloud-to-cloud, or do you have a whole bunch of comms—systems that basically talk to one another. I think the difference of views across the industry are quite extreme.

The CHAIR: Yes.

Mr EDWELL: I think it is fair to say—I use this from my Horizon Power experience—that the industry has probably engaged in a bit of over-reach in promoting what they can do. I think this is one area where we just need to creep up on, but it will be solved.

The CHAIR: I think this is a really important point that you have just made. The impression out there is that the technology is very mature and it is just a case of getting on and doing it. But the counter view is also out there that a lot more R&D needs to be done. This sort of R&D is very, very expensive. What I am interested in, specifically on the R&D issue, is that there has not been much scope previously around Economic Regulation allowing for R&D, because networks have always operated this way—they are very boring; there is nothing much to see here; what do you need to research? But it seems to me, and certainly there is a fair bit of evidence suggesting to us, that there are a lot

of questions that do need dedicated research in order to evolve the network. On R&D in particular, is there scope within Economic Regulation for more attention to be paid to these sorts of issues?

Mr EDWELL: I do not think the government entities should have the mandate on R&D totally. Western Power, because it owns the grid, is obviously a major player, so it would be unwise for us to sort of lock the whole R&D, if that is what you want to call it —

The CHAIR: I am not proposing that at all. I am saying that where the network owners need to do this, where they need to innovate, should they, through their economic regulatory frameworks, be able to do that?

Mr EDWELL: I think they should. One of the things that we are looking at in the DER road map is to provide firmer guidance to the regulator around providing resources and funding to effectively allow Western Power to do R&D where it needs to, obviously with the appropriate accountabilities.

The CHAIR: Yes.

Mr EDWELL: But you are right. At the moment, it is a matter on which the regulator can either argue that it is constrained, or, where it might have the flexibility to do it, acts in a very conservative way, as regulators do.

The CHAIR: Yes.

Mr EDWELL: I think we are in a world now of uncertainty, and we have to solve the technology problem. The action is all at the distribution level, so it is in the consumers' best interests for the network business, with the appropriate accountabilities, to be able to undertake some of that work. That is a good question. We are hoping to put something in place.

The CHAIR: Great. To slightly change the topic, on battery systems, some evidence has been put to us about the benefits of grid-scale batteries versus behind-the-system household-scale batteries. Is your work program looking at the relative merits of those, and will you be making any findings or conclusions about that?

Mr EDWELL: The way I see batteries, it is also a new thing, and we can get too excited about batteries, albeit if you look at the grid five–10 years down the line, you will be able to see a whole bunch of batteries. But we have got to creep up on it. We are certainly concentrating on batteries in the network. The modelling that has been done—not the modelling we are doing but other modelling I have seen, which both Kate and I have been involved in—has shown clearly that going forward, large-scale batteries embedded in the network, both at the transmission and distribution end, will be prominent in WA, as a sort of a firming for system stability et cetera. As a particular technology in our whole-of-system plan, we have assumptions around large-scale batteries. The model will bring them in to fulfil certain service requirements.

I think that there is a fairly urgent need for us to have some batteries in the system in the short term, because we have what we call this clear and present danger, and I think we have passed a point where we need to remove that off the table. One of the solutions there is to provide Western Power with the wherewithal, albeit through a transparent process, to put batteries in the network, and that is one of the things that we are looking at as a recommendation to the minister. The task force has not made a decision, but that is what we are looking at. I personally think that the best benefit to the system overall in the early stages of this new world will come from larger-scale batteries vis-a-vis smaller-scale batteries. Having said that, they both serve a function. One of the important things going forward is to ensure that we can fully integrate all the rooftop solar into the electricity system and have that rooftop solar provide energy to the system at the times when and in the form that the system needs it, if not through the energy market, then through various support markets.

Batteries will be an important part of that, so they can store up. Whether they are batteries that need to go on your roof or whether they are community batteries where people can actually share, I think the market will determine some of that. So we are not favouring any one particular form of battery, but I think it is fair to say that we are certainly concentrating on the network batteries, and we are also very interested in power banks. Does that cover it, Kate?

Ms RYAN: I think so. The other point I would make is that when we look at the utility-scale batteries—so, ones that could participate at the sort of wholesale-market level—at the moment you could technically register one with the wholesale market, but you could not actually provide many services. Part of that is a barrier in the market rules—they are just not designed for new technologies like storage—but also it is a barrier with the current market systems, which could not physically dispatch it. So part of our work to modernise the regulatory frameworks is to make it really clear how these new technologies participate, and as far as possible not distinguish between the type of technology, but actually say, “If you can provide this kind of service and meet the technical requirements of that service, you should be able to participate in that market.” Until we have worked through that—we are doing that with the sector at the moment—the commercial opportunity for a utility-scale battery is probably not there, because no-one quite understands what that value proposition is. So I think there is a bit of a way to go before we will see an investment driven by commercial opportunities. Even though the opportunity is probably there now, it is not really clear how you value that. So that has got a little bit of a way to go. That will help with the wholesale market.

[3.40 pm]

The other thing at the smaller scale of the market is that with both network batteries and behind-the-meter batteries, we still need to work as a sector, and this is really important for Western Power’s regulatory approvals. But also, more broadly, we need to understand how we value the role that storage and other forms of DER can play in the system, to make sure we capture that value and to make sure that where Western Power is installing a battery, it can apportion a share of it to network support and the value to the network. A portion is probably going to be of use for a customer in storing and reusing the battery. How do we value that? How do we make this whole thing stack up? Because it is not just a single service; it does a range of different things. That is the beauty of it that we need to capture. So we are working with the sector to work out how we value all of that.

The CHAIR: That is great, and that is a really nice segue into a discussion about markets. Before we move on to that, just to clarify your evidence, Steve, based on what you have said, there is a case now, in terms of maintaining systems for security and stability, for Western Power to get on and do this. You have to follow the physics. Obviously, the priority is to maintain security and reliability. Later on, there is a role for these things and there is commercial opportunity here. The fact that we have to do some stuff now should not prevent us from allowing private participation in the future, but the priorities are security, reliability and, over the longer term, looking for the development of markets and structures that will make this a commercial opportunity and allow further economic optimisation of the assets, I would assume.

Mr EDWELL: Yes.

The CHAIR: Cool. Our work here is done! We can all go home!

Mr EDWELL: We will get those words and we will put that in the road map!

The CHAIR: Thank God we have got Hansard, right?

To then move on to more markets and regulatory-type issues, you have talked about the capacity of these distributed energy resources to provide the system security services. There is also a whole heap of traditional assets that provide the systems security-type services. You were talking before about Western Power's work referring to large-scale generation and the security elements that they provide, and the technical rules that Western Power might be evolving to require that conditions of connection are perhaps that these things are provided. I guess this is a high-level question to begin with. There are two schools of thought here. Either you create multiple markets to procure the system security services in, like inertia or voltage support or however you want to do it—you create these markets and they can either be real-time markets or procurement for periods of time on competitive tender—or you can just make it a condition of connection that if you want to play in this game and you want to trade your capacity or your energy, your assets must also perform to the following specifications in order to prop up the grid. How have you explored those two models? If there are more, I am happy to explore those, too. How have you been examining those issues? Where do you think things are heading towards, given that we have such a small market here anyway, and a market that has actually been functioning pretty well to secure capacity and produce energy?

Mr EDWELL: I always bet each way. I think there is room for both. Just on the market side of things, obviously the ideal would be to get competitive pressure for the competitive tension for the provision of these services, but to do that you have to have pretty well-defined services, you have to have separate markets and you have to have a reasonably deep pool of players who can bid. I do not think we are at that stage yet in the WA market in terms of depth. You know, many of these services have hitherto been provided by Synergy. I think whilst it is ideal, we will just need to ensure that our regulatory arrangements provide that, as competition evolves, people can bid in for the provision of these services, much the same as they might bid in to the dispatch process for energy. For most of them, if not all of them, other than maybe a couple of the ancillary services markets, that is probably down the line a bit. I think the more prominent model will be where these are required by either AEMO or Western Power for system stability and reliability, then they need to go through a tender process. I do not support a process where either of those agencies just go ahead and do the whole thing behind closed doors and end up owning the kit and the costs are not transparent, because consumers ultimately pay, but I do recognise that we will not have deep, competitive, transparent markets. In my view, there needs to be a process of procurement and the private sector can enter into contracts for the provision of a service for a year under certain triggers. I think it is a bit of both.

Ms RYAN: I would agree with that. We are working through the full suite of options, right from connection requirements through to competitive markets for the group of things we are collectively calling our essential system services. We have published a task force paper on the initial high-level design for frequency keeping essential system services. They are the ones that we see the most prospect for markets to solve. That is because they are fairly established, well understood and there are a number of players in the sector that can already provide them. That is reasonably straightforward. The newer services around things like inertia and system strength are ones we are looking at really at the moment with the sector. They are very locational in their nature, so we suspect they are going to be better suited to more direct procurement through a tender-type process.

But we are also looking concurrently at what things should be just causer solved. We have two principles: the causer pays or the causer solves. We want to send the right signals to people that if you come to the system, you do no harm, one way or the other. With causer solves, it is what you might have to do yourself when you invest in some new facilities. That is also something we are

looking at to see if there is a way to uplift the general standards that everyone needs to comply with. So we will end up with a mix. Some of the things that are helping us decide which of the buckets they go into, as Steve said, are how deep the market is and the nature of the service—how well-defined it is and how many parties might be able to provide it. Also, whether it is a system-wide issue or something that is quite specific to a location or a facility. If it is system wide, it makes sense to share the costs across the system, but if it is something a bit more specific to a particular plant, we would want to bring that a bit more back to that particular facility or plant. It is also about looking at different options that suit the nature of the problem that we are trying to solve, and it will end up being a mix of all of those things.

The CHAIR: Locational issues are quite challenging, because we have a wholesale electricity market that is structured on a very basic non-locationally specific construct. It really starts to get into these really interesting questions about: What is a network asset? What is a network problem? How does network access pricing operate to incentivise the installation of particular types of assets to solve both network and system problems? And how do you create markets for that? I imagine that the system-wide plan is going to be quite educational from that perspective.

Mr EDWELL: Yes.

The CHAIR: I will not ask you what the answer is to those problems, because I do not know that there is one just yet.

One of the things that has come through on the flipside is that there are all these traditional assets that are performing very differently from the way that they were originally designed, and we are seeing a coal plant that is potentially moving into two shifting phase, and we are seeing the famous duck curve. Perth Energy gave us some really interesting evidence about how their assets were being differently dispatched into the market and providing some things, and both Synergy and Perth Energy said, “Look our kit’s doing stuff that costs but we’re not remunerated for.” Have you given any thought to the position? I mean, we have to respect the fact that companies have put significant investments into assets, and the taxpayer has underwritten a hell of a lot of those investments, and we continue to, through Synergy. Have you given some thought to traditional plant and what it does, and how it should be or could be remunerated for the things that it has always provided but are now so much more valuable to the system?

[3.50 pm]

Mr EDWELL: Yes, I think where a facility provides value, our agenda very clearly is to identify the various value streams across the network, and as Kate said earlier, that is a piece of work we are doing, and we need to ensure that they are appropriately remunerated. Of course, the other end of that is we think that if the DER—the distributed energy resources—can actually be harnessed properly with the right signals, they can actually help solve the problem they are currently creating. That means that, rather than earn their revenue for providing services, which is actually costing the system and providing them at the wrong time, they can be providing those services at a different time, but still be remunerated at the same level, and maybe even more. We need to shift the value around. What is happening at the moment is a big value shift right around the supply chain. It is just shifting all over the place. I think one of the challenges we have is to try to identify where those main value streams are and have a process or a value, so that can be captured.

But, to be quite blunt about it, when you invest in any market, there is always a risk of technology. We are not about protecting incumbents from technology risk. You have just seen the impact on Synergy’s financial position, and the private sector is in the same boat. They do their investment decisions and their bankability based on a risk assessment and a hurdle rate of return, and that hurdle rate of return ought to factor in technology risk. So, yes, where they are currently providing

a value, they should be remunerated, but if there is a new technology out there that can provide that value better, they get the booty.

The CHAIR: I think that is absolutely appropriate, and it is so interesting to see with assets like Hornsdale, it has performed so well it has almost undermined its own business case. It has taken away the problem that it was intended—where it would have earned so much revenue solving the problem, it has done it so well that now it has completely undermined its own business case. So it is the unintended consequences then of market design, and it is just, I suppose, about thinking about how efficient signals pass through markets.

Mr EDWELL: I think the trick in all of this is, because it is such an interesting field, and we are privileged to be working in the sector at this time, it is easy to get caught up in the detail, and say “I’ll have one of those, and I’ll do this and I’ll do that.” We should never lose sight of the fact, in my view, that what we are on about is keeping electricity costs low for consumers. It is all about, in my view, reliable power at low cost. I always try to discipline myself because I like talking about this stuff. I even say this to the guys who are talking about all this detail: “Guys, how will this put downward cost pressure on the sector?” If you cannot answer that question, you have to think about whether you go there or not. It is really a matter of there is a whole bunch of stuff we need to do now, but in a small market like WA, which we all know is a small market, we can over-engineer it and over-cost it. We have got to be conscious that what we end up with is fit for purpose.

The CHAIR: That is such an important point, I think, and, again, we can have very complex market structures to solve problems that do not necessarily need to be complicated by markets with complex registration and participation requirements. It is about thinking about the points of competitive pressure that you need that are going to lead to the most economically efficient outcome that solves a technical problem, that follows the physics, so I think you are quite right; it is important to keep that insight.

Mr EDWELL: Sometimes, near enough is good enough. We talk about 80–20; 100 per cent is good, but it costs you a whole bunch of money to get the extra 20 per cent, so we will settle for 80.

The CHAIR: We can get very excited about market reform, and we have had a lot of evidence put to us about that. One of the things I really do want to tease out—there is obviously a need for changes to the market, but AEMO has put to us that they do have powers to intervene. Despite the fact that we know that markets need to reform, AEMO has put to us that they nonetheless at the moment do have sufficient powers to intervene and ensure the maintenance of system security, because these are market issues that we are talking about here, and I just want to be very careful about managing the perception that some might choose to put out there that the sky is about fall in. AEMO sits there; in your view, do they have a sufficient level of powers and ability to intervene in the market to ensure that we nonetheless maintain a secure and reliable system at the moment?

Ms RYAN: I think, at the moment, the information AEMO has shared with us is very consistent with that conclusion, so they do have options. They might not be the most efficient options, but they can control which power stations generate, and how much, to the point where they can keep the lights on in the SWIS at the moment. The challenge we have is probably two or three years down the track, when system demand is so low, when PV output is high, that they might not have enough demand on the system to actually run enough generation. We are not at that point yet, though.

The CHAIR: Okay; you touched briefly before on the opportunities for microgrids and distributed energy resources to potentially participate in markets. I am interested in your views on what you have observed about forms of participation that microgrids and DER could have. I am assuming, though, that that is a longer term type of issue. When we were talking about opportunities for the private sector to get involved, there are a whole heap of people out there that would love the

opportunity to set their own microgrid up, and then start participating in the market. I am getting the sense, though, that perhaps that is a longer term possibility.

Mr EDWELL: Yes; I think we need to be measured and grounded in the way we approach the future here, and not get ahead of ourselves, because, at the end of the day, if consumers are going to participate in markets either directly or through aggregators or through VPPs et cetera, there has got to be massive data exchange, there have got to be contracts, and one of the issues is going to be, before we end up in that world, we have got to have the appropriate mechanisms to protect consumers. This will be very much a data-driven sector, so you can imagine, in somewhere around 10 years' time, we have got the smart house with the appropriate automation and digitalisation, and it has got all of the appliances which are able to be automated, and it signs a contract with its aggregator to switch on or off different appliances at different times—pool pump, air-conditioning, even down to things like kettles et cetera. That is the way these new appliances will be built. They will all have that sort of facility in them. You sign up to one of those, and that data coming out of your usage is going to be incredibly valuable. People who can access that data know when you are watching TV, when you are home, when you are having a swim, when your hot water is on, or when you are away and not home. We, as part of the DER roadmap, will be recommending that, whilst we support consumers ultimately, given the opportunity, participating in markets, we have got to have the infrastructure around all that to protect them. I guess that is the point that I would make. We will certainly end up in a space where there will be parts of the grid which will be partially microgridded, we will have parts of the grid where there will be community batteries, we will have different sorts of business models that we are hoping to facilitate through our change in regulatory and technical rules, but we are not trying to second-guess the market, but the overarching thing is that we have got to have that protection mechanism there for customers.

The CHAIR: Let us explore that in more detail. Again, this is great, because it segues well into my questions. Thanks, guys. At the moment, if you were to establish either an embedded network or a microgrid and you just wanted a coupling to the network and a meter point and then to take care of everything that sits behind that meter, exemptions must be applied by the minister. I am interested to understand the thinking on whether it is appropriate at this point in time to grant those exemptions or whether more consideration needs to be given to access to things like ombudsman schemes or standard form contracts for particular classes of customers to address these very issues that you have talked about. What I would hate to see emerge is a patchwork of licence exemptions that lock people into monopolies where their only mechanism to get any form of redress is enforcing contracts, which most people just do not have the wherewithal to do. I would really be interested in your views on those sorts of issues.

[4.00 pm]

Ms RYAN: This is something that stretches across the broader work of Energy Policy WA as well as through the DER road map. The recent history has been the granting of a number of exemptions to parties for things like solar power purchase agreements, being one of the more common newer business models that have emerged. The minister has ceased any future exemptions for the time being while we do a review of that framework, and there is a proposal that will be released publicly. I am trying to think if it has been released already; it is imminent, it if it has not already been released. It looks at a different approach to the regulation of these new business models, where we say, "Maybe full-blown licensing as per traditional retail licensing might be a bit heavy-handed; exemptions are probably too light-handed. We need something in the middle." So it is about designing that, and it is exactly the things you talk about. What are the protections for customers, what are their rights, what is potentially the maximum tariff they can be charged, and can they access the Ombudsman? In some cases they probably should be able to, and all the other suite of

customer protections. There is work underway. The solar power purchase agreement is the first problem to solve. The DER road map will identify the order and priority of other new business models that might be able to adopt a similar framework, so we are looking to move that forward for exactly those reasons.

I am sure there are some particular projects that at the moment could find a way of working, and there might be some frustration around proponents of microgrid projects and community power projects that they cannot seem to get through the regulatory framework to make it work. I guess the other thing that is clear from the work we have been doing is coming back to that technology piece. There might be the odd project now that can work, and a bit frustrating for them, but actually for the majority of customers we do not have the enabling technology in place to make this work either, so these things can develop alongside each other and we should not really be delaying these new business models in any material way. They just need to be developed hand in hand and that is what the road map is exploring the priority and timing of.

The CHAIR: On the consumer issue, just to continue on there for a moment, there was funding announced for a consumer advocate within what was then the Public Utilities Office, but now in your stable. How has that role evolved since its introduction? What sort of work have they been doing? How do they engage and know that they are in the minds of consumers? How has that worked?

Ms RYAN: It is really early days. We have now appointed a person to that role. She has been in the organisation for, I think, only about three weeks, so it is very early days, still.

The CHAIR: Well, she should be here!

Ms RYAN: That is an initial part of the work, really—how do we use this fabulous resource we now have to make sure we are getting the customer voice and getting it from a broader range of stakeholders who have not necessarily had the resources themselves to directly engage in what is a really complex sector? But there are two components to that. We have a person who will be a great conduit for that information and is working to get across the various work streams of relevance at the moment and make those connections in the sector, so it is sort of an introduction phase. There is also a small amount of grant funding that that role will be administering, so it is also setting up a framework for making that funding available to, for example, other community organisations to do research, to participate in trials and to maybe do some surveys—various different things that can help us bring the customers' insights into the journey we are on, but also help us share information with customers and help us with that two-way flow, so there are two components of that role, but we are literally at the moment just working out the detail of how that is going to work.

The CHAIR: How are you taking into account hardship issues and protection of vulnerable consumers? There is obviously quite a bit of conversation going on at the moment about cost-of-living pressures. WACOSS put quite an impressive submission to us about how energy poverty is a real issue, and how these technologies tend to benefit the people who are already in a position to install them on their roof. There is a whole category of people—I always talk about the single mum in Ellenbrook who cannot sit on an app all day and work out whether to run her tumble dryer now or not. There is a whole category here of vulnerable consumers. How do they fit in to the program of work that you are undertaking at the moment?

Mr EDWELL: At a high level it is something that the task force is concerned about, I can assure you—this sort of equity issue between the haves and have-nots. There are two broad themes, I think. One is that we have a tariff structure at the moment that is a daily fixed-cost charge—one dollar a day, roughly—and a variable component, which is not aligned with the cost structure for the sector, so we have a whole bunch of assets out there, generation plant, network et cetera, which has to be

there because we have the peakiest load in the nation still. We have this category of “haves”—the people who have the rooftop solar—and they are contributing less to the cost of the system. If they were just avoiding the variable cost of their provision, you would say that is fair and proper, but they are actually avoiding contribution to some of the fixed costs because of the way the tariff is structured. If you follow that through with more and more rooftop solars, you end up with all the haves having solar and all the have-nots picking up the tab. That would not be a very good place for the Western Australian energy market to end up in. The minister is certainly alert to that.

We need to solve that problem and that problem has to be solved by a pricing restructure, a tariff restructure. It is not about people paying more; it is about people paying for the service they are getting. We will have something to say about that. We are not going to solve the problem in the work we are doing up-front, but I certainly want to say something about, if you support renewable energy, particularly distributed energy, and you see all the benefits there as something we should realise, de facto you have to support a reconstruction of the current tariff arrangements because the two are mutually inconsistent otherwise. That is one part.

The other part I would comment on is we are thinking about giving access to the benefits of renewable energy to people who cannot afford it or people living in community accommodation and renters. How can we get them into the market through some sort of structures that might enable them to benefit themselves in solar? We are certainly onto those two issues.

Ms RYAN: Coming back to the idea of the single mum in Ellenbrook who, of course, does not want to be on the app all day managing her energy use, we, like others in the sector, have been drawing on some of the great insights we are getting through some behavioural economic research in the area. While there is, of course, always going to be a small group of customers who really want to actively manage and have all that neat techy stuff going, the vast majority of people just need a set-and-forget service, so we are really conscious of making sure that we are tailoring to that mass and making sure we do not forget that when it comes to thinking about things like tariffs and also thinking about things like the capability of DER and what you can do through automated settings without needing to send clever commands every five minutes or anything like that, but just set-and-forget measures that can help people manage their energy use in a much better way without needing to be actively managing it day to day. The new technology developments are making that more and more doable. We have work to do to make that happen, but that is a really key path for us to explore as well.

The CHAIR: I want to circle back a little, and it is related to cross-subsidisation and cost, particularly around, if you like, the structure of the industry and the roles and functions of the GTEs. I suppose I will give a sort of broad-ranging comment, and we will go from there. There has been quite a bit of evidence put to us about the fact that Western Power, Horizon Power and Synergy seem to be doing a lot of the same stuff. As we have all acknowledged today, this is super interesting, and there is so much enthusiasm. It is technically interesting, commercially interesting, and, of course, it has the added bonus of being sustainable and renewable. It is fabulous, and it does offer the opportunity to get some real downward pressure on electricity prices. That is great, and you can understand why everyone wants a piece of it.

But there do seem to be, particularly in the GTEs, a lot of people doing the same sorts of things. We did get some evidence from the GTEs that they are working together, which is great, but other evidence has been put to us that there is a fair bit of duplication and overlap. There are also, as a legislative quirk, some funny little definitions about who can do what, where and to whom. What happens if somebody disconnects from Western Power and they are no longer Western Power’s responsibility but they are still Synergy’s customer? Let us start with some thoughts on the roles of

the government trading enterprises in avoiding duplication and overlap and trying to not only get those businesses focusing efficiently on solving these problems but then from a regulatory or legislative perspective, clarification on the roles and functions of the GTEs. Do you have any thoughts on that?

[4.10 pm]

Ms RYAN: This is a really tricky area. We have heard similar observations and probably had some ourselves. The minister has obviously made some comments in Parliament recently about Synergy and needing to look at the future of the Synergy business. That is essentially common sense. We know that its business model is not designed for the future and so there is work for government broadly to do there. Western Power is a really interesting one. It is the network in the south west so it will of course continue to have a really fundamental role, but that role will change. I think certainly the task force, and the work that we are doing to support the task force, is looking at how we take the next steps with the Western Power regulatory framework to enable that evolution so that Western Power can facilitate all these changing opportunities in the sector, but do that of course with the right checks and balances. That is something that we have front of mind.

The standalone power systems one is a bit of a unique case. It has been on the cards for a while; it started with the Public Utilities Office and now Energy Policy WA. We are looking at how Western Power can use standalone power systems as an alternative to poles and wires to meet their obligation to connect. That will potentially require legislative change, so that is something we are working through at the moment. It will then require a customer protection framework and things to go with it. But that is really dealing with the specific issue of customers who are entitled to supply and a regulated supply at a regulated price and making sure we have the most cost-effective way of doing that. That is kind of within its sort of notional service area, which, as you say, is not very well defined in the act for this sort of new flexible future that we are moving into.

Otherwise, there is a lot of collaboration between particularly Synergy and Western Power, obviously, being in the same patch. Horizon Power to a large extent has been able to just get on and solve the problems in the regions, being an integrated service provider, and that has been really useful. Now the world is looking to WA in a lot of that. We do see some sharing of ideas between the GTEs, Horizon Power and Western Power but to some extent the problems are different. Every little grid that Horizon Power looks after—Steve would know this better than me—of course has its own unique characteristics and probably its own solution. Horizon Power has been able to roll out advanced metering infrastructure ahead of Western Power so that gives it options that Western Power does not currently have. There are some differences there that actually mean they need to solve the same problem in different ways and cannot necessarily have a common solution. Certainly, I know that this government is very keen and Energy Policy WA and other government bodies are involved in helping with that collaboration and trying to bring that together in a more informal way.

The CHAIR: It is such an interesting topic, because I really think it goes also to the core of this problem about delivering efficient and least-cost energy to the people of Western Australia. Arguably, if you have all those old poles and wires out here, you could dismantle those poles and wires and put people on standalone power systems and the relative cost of that is far cheaper. Again, if you were hundreds of kilometres away from the network and you were offered a standalone power system rather than a feeder connection, again, it is a lot cheaper. We have this fabulous heat map that shows the relative costs of those things. But we obviously have to avoid a situation in which the people who get the benefit of that, and who have also had the benefit for a very long time of a very expensive electricity supply system, all drop off the grid and only they ever

get the benefit of this new thing when the rest of us have paid for a very long time for very expensive electricity supply solutions. There is a very complex issue at play here around the equitable distribution of the benefits and the costs. In the fringe of grid it makes sense from a reliability, from a cost of service and for new connections, but there is a question here again about those who have already paid for a long time and who will potentially continue to pay for more expensive options. I wondered what thinking you have done about the sharing of costs, particularly if private microgrids are going to start dropping. How do we make sure that everybody is still contributing and everybody is still benefitting in the way that this industry has evolved over decades now?

Ms RYAN: Absolutely the sentiment you express is one that is front of mind for us and standalone power systems is something we have been working on with that issue in mind. The idea being that if we are replacing a traditional poles and wires service with a standalone power system, that does not mean that that individual customer gets the benefit of that. We do need to share that benefit and that saving in cost for Western Power across all Western Power customers, which is one of the reasons for continuing to keep Western Power in its patch, if you like, so that we can harness those opportunities. There is a bit of work to be done to make sure all those money flows work but the logic being that if it reduces the overall cost of supply, it reduces costs for everyone. We are not moving away from that sort of uniform tariff or postage stamp network tariff—approach.

Mr EDWELL: Just to clarify, you are taking the wires out of the asset base and you are putting something else in.

The CHAIR: But you are still connecting a customer. I guess we have to reconceptualise our concept of connection. It is connection to a power source as opposed to connection to the network. It is just what is the best way of giving a customer connection to a power source; right?

Ms RYAN: Increasingly standalone power systems are the better way of doing that. Using the heat map, there is a great opportunity there to reduce costs and improve safety and reliability while we are at it. But absolutely the benefits to that in terms of savings to Western Power over time have to be shared across all customers. That is the end game in terms of the regulated monopoly, uniform service that is being provided.

The application to microgrids is an interesting one. I have not seen it—I am sure the guys are thinking about it—but we are looking at the access code. We do not have a mandate at the moment to overhaul the access code or the access framework but we will certainly look at the changes that we need to make to enable Western Power to move forward and to ensure that we have appropriate cost recovery and limits on cost recovery as the system is changing and as Western Power's role in its system is changing as well. So really looking at making sure that things like the complete market benefits of a proposal, an investment, are being factored in. In theory, that can be done now, but it does not work very well. How can we make that work better? In terms of Western Power exploring different options for a network investment or the way it might connect a customer, making sure, again, that it is exploring all options. Should it build something? Should it buy a service off someone else? This kind of comes to something Jess mentioned a little earlier; how does that connection affect the market as a whole? We have had a bit of a disconnect there between the network and the system, and we are looking through our foundation regulatory frameworks work at patching some of those gaps back together so that the system operator is involved in some of those connection discussions and can help articulate the full range of costs and benefits of a particular option. That is a pretty complex thing that we are looking at the components of. It is certainly an issue that is on the radar and we will do what we can to address. Microgrids as a thing is not really the focus of our work, so different kinds of connections, we are trying to be flexible.

The CHAIR: Let us pick up this network access and regulatory change issue. Is it that you need to overhaul the Electricity Networks Access Code or indeed the legislation under which that instrument is created or is there sufficient flexibility in the ENAC now? Given that we have a call-response model where Western Power can put whatever it likes to the regulator to say, “Here’s what my assets are worth, here are the services I provide and here is how I presume to make a living out of that.” It is completely open to them and they have put forward in the past some pretty innovative ways of valuing their assets, recognising their services and receiving revenues, and then the regulator has said no. Is the problem the instrument—the Electricity Networks Access Code? Let me put this another way. Does the ENAC itself require a major overhaul or at least in these early days, when we really are trying to get an 80–20, we are trying to get started on this thing and there is some long-hanging fruit we can pick and some system security and reliability issues we need to address, is there sufficient flexibility in the ENAC right now to do a lot of that work and then over the longer term maybe thinking about overhauling the ENAC?

[4.20 pm]

Mr EDWELL: Yes, I think that is the approach, and I think that is the approach we are following. The ENAC has got some gaps and I think we need to add clarity about how some of those gaps should be addressed by the regulator to provide the regulator more direction in some cases and more flexibility.

The CHAIR: How would that direction be given? Is that the minister making some policy announcements? How does that happen?

Mr EDWELL: No. It would need to be a change to the act. I mean, having spent half my life as a regulator —

The CHAIR: I am very respectful; that is why I am asking you the loaded question, Steve!

Mr EDWELL: I always get weary when you make a decision on the basis of the minister’s policy; it is not a good way to go, as good as the policy might be. Regulators tend to sort of just simply look at the code; it is like a piece of legislation, as you would know. In the interim, I think what we have to do is to look at the low-hanging fruit and, as part of our whole of system plan and the work we are doing, we are looking at the access code and saying that if you take a line of sight from what we are recommending to actual implementation, at the backend is someone going to have their foot on the hose here, purposely or otherwise, then we need to change that and provide more flexibility. We are certainly onto that low-hanging fruit, but they will be, as I see it, specific changes to the ENAC.

Then, I think, once we have gotten through this first wave of quite major material changes, we then need to sit back and say, “Okay; is the current construct of the regulatory environment for Western Power fit for purpose in this brave new world where different assets, different risks, the nature of Western Power’s business will change?” We have now got consumers being generators. How do community batteries fit in? What is in the network; what is not in the network? Even, to be frank, if government is going to continue to hold onto Western Power long term, should they be regulated? That would be a question that people would say, “Oh, wash your mouth out”, but, I think it is a wholesale rethink at some point in time in the future, but with AA5 coming up and a whole bunch of stuff that Western Power has got to do to concentrate on the main game, the best approach is to get the low-hanging fruit, make the changes you need to make now to get this thing done and then at some time, maybe during or before AA6, Energy Policy WA can go through a more fundamental process of change.

The CHAIR: Yes; excellent. On network tariffs and parking consumer tariffs, because I do want to be very clear that we are talking about the signals that come through the access arrangement framework to retailers, large users and Western Power about the location of assets and installation of assets, is your work looking at changes to the way network tariffs are potentially structured—so, thinking about locational signalling, time-of-use pricing—to try to get more sensible decisions about where assets are located and operated?

Mr EDWELL: I think what the road map will say, subject to my fellow task force members agreeing, is argue the case. I think we have to argue the case for a change in the tariff structure. My view is that the case is basically at a stage now where it is pretty compelling and, to be frank, no matter what the future government, whether it is this government getting re-elected or the next government in the next election, the problem is still going to be starkly before them, so it should be a bipartisan view that we need to do something with tariff reform for all sorts of reasons—equity reasons, protecting the grid, making sure we have got enough revenue to provide services et cetera. What I am keen for our process and the task force to do is to make that case. The task force has not yet signed off on that, but I think we need to come up with a construct which is simple. Tariffs generally can be very complex, and I think we need to start from a fairly simplistic perspective. Personally, my view is that a time-of-use-type construct, where we simply price energy at different times of the day, is the best approach that is fit for purpose and simple—that is where the problem is; it is a timing thing—and creep up on it from there. We are not going to be solving the problem in anything we do at this point in time, but I think we need to make the case and I think we need to maybe indicate what type of tariff might be most appropriate at a high-level construct and then, again, it is matter for government response. But there would be a program of work to pilot and trial different tariffs going forward with a view to, in the not-too-far-distant future, making some decisions. But that is not something that the task force has signed off on yet.

The CHAIR: It is such an interesting question because it really relates to the interplay between the wholesale electricity market and the signals that come through it and then the network pricing structure and the signals that come through it. I loved what you were saying before, Kate, about defining the problem rather than procuring a solution—saying here is a problem that we have to solve and it might be that there is a system-wide problem that we have or a very specific locational problem that we have that we need to solve. It is then how do you get the best signals coming through to procure the most efficient solution. Certainly, when we were in the States, that was the approach that the New Yorkers put to us that they had structured their market on and it was very different from the top-down approach that the Californians had adopted. It was really interesting and it is pleasing to see that it seems to be quite a substantial part of your thinking.

Is there anything else that you think we have not covered today, considering our terms of reference, that we should be mindful of as we finalise our report?

Ms RYAN: No.

Mr EDWELL: No, nothing comes to mind, Jessica.

The CHAIR: Great. Thank you. This has been such a fascinating conversation. It has been great and it is going to make our lives much easier over the next—we are working to the same sort of timetable that you are; we are trying to get this done by Christmas!

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 correction of minor errors. Any such corrections must be made and the transcript returned within 10 days of the date of the email 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. Thank you so much. That was so interesting.

Hearing concluded at 4.27 pm
