

TRANSCRIPT

LEGISLATIVE ASSEMBLY ENVIRONMENT AND PLANNING COMMITTEE

Inquiry into Tackling Climate Change in Victorian Communities

Melbourne—Wednesday, 4 December 2019

MEMBERS

Mr Darren Cheeseman—Chair

Mr David Morris—Deputy Chair

Mr Will Fowles

Ms Danielle Green

Mr Paul Hamer

Mr Tim McCurdy

Mr Tim Smith

WITNESSES

Ms Tamatha Smith, General Manager, Corporate Affairs, and

Mr Chris Gilbert, Senior Economic Adviser, Energy Networks Australia.

The CHAIR: Welcome to the public hearing. I will just run through some important formalities before we begin. All evidence taken today will be recorded by Hansard and is protected by parliamentary privilege. This means that you can speak freely without any fear of legal action in relation to the evidence you give; however, it is important to remember that parliamentary privilege does not apply to comments made outside of the hearing, even if you are restating what you have said during the hearing. You will receive a draft transcript of the evidence in the next week or so for you to check and approve. Corrected transcripts are published on the Committee's website and may be quoted from in our final report.

Thank you for making the time to meet with the Committee today. Could each of you please state your name and your titles before beginning your presentation.

Ms SMITH: Certainly. I am Tamatha Smith, General Manger, Corporate Affairs, for Energy Networks Australia.

Mr GILBERT: I am Chris Gilbert, Senior Economic Adviser, Energy Networks Australia.

The CHAIR: Fantastic. Over to you to make your presentation.

Ms SMITH: I have an opening statement. On behalf of Energy Networks Australia I would like to thank the Committee for inviting us to participate today. We are the national industry body representing businesses operating Australia's electricity transmission and distribution and gas distribution networks. Our members provide energy to almost every household and business in Australia.

As an overview I would like to make four key points. While our members do not generate or sell electricity, we are the conduits that deliver it to customers. Energy networks provide the platform to enable a sustainable energy future. Network prices nationally are lower today than they were six years ago, with significantly improved reliability. The Australian Energy Market Commission data shows Victoria has the lowest network bills in Australia and the highest reliability of all the states. Transmission charges make up 5 per cent of the lowest price market offers and contribute even less to the Victorian default market offer.

When we consider the challenges we are addressing, there are three main areas the energy network sector has identified that will help tackle climate change. A reliable and efficient transmission network to connect renewable generation; optimisation of distributed energy resources—that is mainly rooftop solar and household batteries; development of a hydrogen sector; and support for the work network businesses are undertaking in these areas will help achieve the State's goal of a net-zero-emissions economy by 2050.

When it comes to connecting utility-scale renewables, our energy system is changing with the retirement of coal-fired generators and increasing levels of renewables, mostly comprising wind and solar. This new generation is not being built where old generation is retiring. Here in Victoria the strongest part of the transmission grid is between the Latrobe Valley and Melbourne; the weakest part is in the state's north-west, yet the best solar resources are in the state's north-west.

The rapid growth in small- and large-scale renewable generation also means keeping the grid stable and is becoming more of a challenge. While much of the public commentary tends to focus on new base load, aka new fossil fuel generation, what is really needed is a shopping basket of firming and flexibility to support the challenges from increasingly variable generation. This means flexible generation, more sophisticated demand response, more transmission and interconnection, and more storage. For example, pumped hydro, like Snowy 2.0, presents an opportunity to store excess renewable energy generated in the middle of the day and then make that available later at peak times. Hydrogen also offers enormous potential, which I will talk about shortly.

Transmission connections both within Victoria and between states are also key to an efficient and reliable energy system. As the Committee is aware, the Australian Energy Market Operator is the national transmission planner and the local jurisdictional planner here in Victoria. AEMO prepares the national Integrated System Plan, which covers a range of trajectories and identifies the cost to consumers for high levels of renewable energy development that require energy storage and transmission assets to ensure reliability. We would encourage the Victorian Government to be cognisant of national planning and whole-of-system implications when developing sectoral targets for electricity. Meeting renewable targets must be done in a way that maintains a stable and affordable power system. Transmission is the key enabler for moving to a lower emissions economy, and long-term stable policy is needed to ensure that investment signals and financeability can be maintained.

I will now talk briefly about distributed energy resources, such as rooftop solar and household storage—devices like batteries and EVs. Australia now has more rooftop solar installed per capita than anywhere else in the world, and I understand Victoria's solar installations this year have been three times the rate of those in South Australia and Queensland, as the Solar Homes program is rolled out. The grid faces growing challenges and great opportunities as more of these systems are installed on homes and businesses.

In order to maximise benefits to the electricity system and customers of Australia's take-up of distributed energy resources, the following capabilities will be required: enabling AEMO and networks to have better visibility of where these resources are installed and how they can behave; defining network constraints, so customers can be advised about how much they can export to the grid; and establishing standards on how we establish and communicate these constraints with customers.

Higher levels of rooftop solar are changing the dynamics of demand on the grid. We are increasingly seeing low and even negative demand during warm sunny days when solar generation is exporting excess power into the grid and then higher peaks in demand for power once the sun goes down, solar stops generating and everyone gets home from work and turns on appliances.

As we continue our decarbonising journey, renewable gas like hydrogen offers enormous potential to support the energy sector and the economy's transition to a low-emissions future. In Victoria, our gas distribution networks manage more than 2 million connections to households and businesses. The gas supplied through these networks provides 69 per cent of annual energy consumption in Victorian homes. This is much higher than the Australian average of 44 per cent. One way to decarbonise energy will be to replace this gas with electricity. However, this would require an enormous investment in new electricity infrastructure that all customers would pay for. The smarter alternative is to decarbonise our gas networks using renewable gases such as hydrogen. Excess renewable electricity can be converted to hydrogen through electrolysis of water. This can then be injected into existing gas distribution networks, stored to later be converted to electricity, used for household heating and cooking or in transportation, or as you have all heard through Alan Finkel, be exported. It is no surprise the recently released national hydrogen strategy considered the blending of hydrogen in gas distribution networks as a key opportunity for the development of a flourishing hydrogen industry.

In conclusion, we have got five recommendations that were in our submission. We recommend that the Victorian Government, one, considers total system costs when considering how any emissions targets will affect the energy sector; two, should be cognisant of the national grid planning issues when developing sectoral targets for electricity and approval of renewable generation projects; three, should consider the network management issues and constraints identified in the AEMO and Energy Networks Australia open energy networks project in relation to distributed energy resources; four, continues to support renewable gas-related research, development and demonstration activity, both in Victoria and more broadly across the nation; and considers the potential opportunities presented by hydrogen in the electricity supply and in the built environment and industrial sectors when developing its sectoral emissions targets and associated policies.

The CHAIR: Fantastic. I have just got a couple of opening questions before I throw to my colleagues. Obviously the grid as we know it, particularly the electricity grid, was constructed—actually it is the case for both—to distribute electricity from our far east across the state. It occurs to me that—certainly today—where we are putting our renewable energy assets is effectively in west and south-west Victoria and where we are likely, I think, into the future to be putting our solar assets, particularly our commercial-scale solar assets, is in northern Victoria. So the grid is designed to go that way, yet now effectively through public policy we are

going to be asking for it to carry electricity back the other way. I would have thought the grid was designed to have really big pipes in eastern Victoria that effectively contract as you go west, because gas and electricity are dropping off as you move west. How do we invest in a sensible way to build those pipes to carry particularly electricity from western and north-western Victoria back? What sort of investments? Is there grid planning that has been undertaken that is coupling the knowledge of the networks, the knowledge of the Victorian Government and AEMO—whatever it is called.

Ms SMITH: The Australian Energy Market Operator.

The CHAIR: Correct, that one.

Ms SMITH: ‘Absolutely’ is the short answer.

The CHAIR: Yes. Are those three entities working together to reconfigure the grid, given what we have just talked about: that we are now asking the grid to work in effectively the reverse to what it has been designed to do?

Ms SMITH: Yes, absolutely, and you are absolutely right. National planning is essential in an interconnected market, and particularly because we have more renewables coming online. If we do not plan for coordination and interconnection across the system, we risk ad hoc network investment, which costs customers more.

The CHAIR: Is that happening? Is it happening to the extent—

Ms SMITH: It has happened in the past. I would not say that it is happening now because we have interventions like the *Integrated System Plan*, and that is designed to ensure that we have a national planning approach that is sensible and considers customers and is done when it needs to be done, not sooner and not too late. Do you want to add anything, Chris?

Mr GILBERT: No, that is good.

The CHAIR: So it is not happening to the extent that it should, and it sounds like it was happening in the past a little bit better. What could this parliamentary Committee recommend to the Parliament and ultimately to the Government, given that sort of regulatory investigative failure, that we might actually do to address that? If the national body is not doing the work that it should be doing, is it because of things that the Victorian Government is doing, or should the Victorian Government, with the network providers, just step up?

Ms SMITH: No, no. To clarify, certainly the national body is doing the work that it needs to be doing, very much so, and I think that the best advice I can provide to the Victorian Government is to work with AEMO and within the *Integrated System Plan* and consider the planning that is laid out in there, because it is very detailed and it has got very considered modelling, and that modelling takes into account what customers need, the price to customers and the most efficient delivery of the services that are required.

Mr FOWLES: And are we not doing that at the moment?

Ms SMITH: No, I think it is being done at the moment, but it just needs to continue.

Mr GILBERT: Yes. It is a long-term process.

Ms SMITH: Absolutely.

Mr GILBERT: And the scope and uptake of renewables has been quite rapid. The process was not really designed for, I will call it, short-term fixes, because transmission infrastructure is designed and built to last a very, very long time. Part of the *Integrated System Plan* is making sure that that asset will be valuable for a long period of time and those decisions cannot happen overnight; they just take a bit of time. With the *Integrated System Plan*, I do not know exactly how often it is done, but there is an update every 12 months, which considers new data and new information, and it makes recommendations based on that.

The CHAIR: From a state parliamentary perspective, is there legislation that ought be considered that could be put in place that sets long-term goals around this, with a whole lot of annual or biannual requirements or whatever, which might provide greater clarity and deincentivise the opportunity for short-term politics around the deployment of energy? It has been pretty clear, particularly at a commonwealth level, that energy policy has tripped up three or four or five Prime Ministers—it has seen governments come and go—so given that, are there things that the Victorian Parliament might do that can be a backstop that will create that certainty so that your members can get on with doing what they need to do in an effective and efficient way?

Ms SMITH: I would say as the first point that if we could take the politics out of energy, you would have a lot of happy people, particularly on this side of the table, but I suspect that that horse has well and truly bolted. In terms of the creation of another layer of legislation or regulation, if you like, I would not suggest that that would be a great path to go down given that the sector is already well and truly governed by a whole host of regulatory mechanisms. But I think the most appropriate course of action will be to continue to work with those regulators and to consider the planning processes that are in place when it comes to developing central targets and also things like renewable energy zones.

Mr FOWLES: I have got a few questions. The first one is just around duplication of infrastructure. In fact I was driving with my colleague Paul Hamer back from Warrnambool from a Committee hearing, one of these hearings, a couple of weeks ago, and it seemed to us that as all those wind farms are sort of feeding back into the grid, at points in the road there were two or perhaps three sets of high-voltage wires of different scales running in parallel with one another. As I understand it, the financial model for the transmission networks is you say what you think you need to build and you effectively get a regulated return on that capex. Does that create a false incentive, or a perverse incentive, to build more poles and wires, when in fact by simplifying or consolidating that infrastructure you might actually get a better aesthetic outcome?

Ms SMITH: Are we talking wind farms? Because they are not regulated assets in terms of networks.

Mr FOWLES: I am not talking about wind farms themselves; I am talking about the poles and wires that link them back to the grid for transmission.

Ms SMITH: So the transmission infrastructure?

Mr FOWLES: Yes.

Ms SMITH: So that goes through a very stringent regulatory process, and part of that process is a customer benefits test. I do not think the problem is duplication of transmission assets; I think the problem is a lack of them. One issue that there has been in the past is that there were privacy restrictions around proponents knowing, with a wind farm, for example, where another one was going to be developed, so you ended up with lots of projects where lots of resources are—where lots of wind is, for example. We submitted as Energy Networks Australia a rule change to enable sharing of information so that does not occur, and that is just one part of the process to ensure that duplication does not occur. But when it comes to regulated assets like transmission and distribution networks, those regulatory processes are really stringent, and there is definitely no duplication of assets. In fact I do not think there has been a major transmission investment for 25 years in Victoria.

Mr FOWLES: So the poles and wires we are seeing running across the western district—and I am not talking about the Alcoa ones, which have been there since forever—it looked to me like they were newer ones. This is a lay thing. But there were definitely actual sets running in parallel with one another. They are likely to be pre-existing things? They are not related to the development of those wind farms?

Ms SMITH: I would suggest so, yes, but I do not know that for sure.

Mr FOWLES: Okay.

Mr GILBERT: We would not know specifically about those ones.

Ms SMITH: But the reality is if you are going to get large loads of power to customers and connect renewable generation, or any generation, you need transmission. Two sets of lines does not necessarily mean

duplication; it means you have built more capacity in. That capacity to share power across borders and from generation points long distances to customers is the best way that we can accommodate the transition in the energy sector.

The CHAIR: Where are the transmission gaps in Victoria? I suspect north-west Victoria.

Ms SMITH: Yes.

The CHAIR: I am just thinking out loud actually. The benefit of having Alcoa down there and the asset to provide power down there—

Mr FOWLES: Six-hundred kilometres of dedicated high-voltage powerlines.

Ms SMITH: Yes.

Mr GILBERT: Which is well-utilised.

The CHAIR: Which has provided a huge opportunity for the wind farms.

Ms SMITH: Absolutely.

The CHAIR: And it also happens to be in the most windy part of the state.

Ms SMITH: Correct.

The CHAIR: So that was good luck rather than good planning. But nevertheless.

Ms SMITH: Yes.

The CHAIR: So back to sort of the backbone, where is the transmission gap at the moment?

Ms SMITH: You have identified it. I think the big one is the north-west, and that interconnector, that transmission line, is due for an upgrade.

Mr FOWLES: And the order of magnitude for that upgrade?

Ms SMITH: I do not know the megawatts, no.

Mr FOWLES: But in terms of dollar commitment?

Ms SMITH: I do not know that either. I can get that information for you.

Mr FOWLES: Sure, if you would not mind.

The CHAIR: And just one further question. Obviously in some parts of the grid the introduction of panels and people's own batteries and all of that means that it is at capacity or it is under capacity. Is there a role for the network provider to strategically locate batteries to store in these communities? Is that something you have ever thought about?

Ms SMITH: Grid-scale batteries?

The CHAIR: Yes.

Ms SMITH: Yes, and that is being done. AusNet, for example—

The CHAIR: When I say grid scale, it might be grid scale in terms of, say, a community the size of Torquay. You know, 10 000 people, 3000 or 4000 homes—that sort of scale, not necessarily something that can do all of western Victoria in one hit.

Ms SMITH: Definitely, yes. And the answer again is yes. AusNet, for example, has a project called the Ballarat Energy Storage System, which is a grid-scale battery storage system that is connected into the grid. So,

yes, there is scope for that. There are regulatory challenges around that that we are working to overcome. There are always regulatory challenges to overcome, but that is also because—

The CHAIR: Give us a sense of those and how you go about that, and what the Victorian Parliament might do to make that journey easier.

Ms SMITH: I think where there may be rule change proposals that the sector is putting up to support the transition, to support getting things done quicker than they have been in the past, I think it is about having Government support for that. And that I guess comes down to us and others in the sector as well approaching Government and communicating, and I am sure that occurs—but I think that is the main thing I could say.

Mr HAMER: Can I just ask on a related question, obviously you have touched on the growth in single-use solar at the individual house level, and you talked just then about looking at larger scale batteries. How is your industry responding to that—the changing nature of energy generation and how that is going in the future? Because that is obviously a very different proposition to what it was, say, 20 years ago.

Ms SMITH: Absolutely.

Mr HAMER: And I guess linking back to the Chair's question, what might be the barriers from a regulatory point of view that will prevent some of those future initiatives from being implemented?

Ms SMITH: Sure. The integration of distributed energy resources into the grid is a challenge and an enormous opportunity as well. Energy Networks Australia is running a project with the Australian Energy Market Operator called Open Energy Networks, and that is looking at how best to integrate solar and storage devices into the grid to maximise benefits to customers. In normal language that means that customers can utilise the benefits of their systems, that they are not unnecessarily constrained from export and that ultimately we can harness those resources as an aggregate to use them for system support and security and to support peak load. So there are a huge amount of opportunities. There are parts of networks that do have constraints, and that project is looking at how to address that. One of the key things that AEMO networks need is visibility of what is going on behind the meter; that is what your solar and storage, your battery, are doing at any given point in time, where they are located, so we can figure out what the constraints might be. In Victoria we are very lucky because networks control metering, and we have a ubiquitous rollout of meters. This is not the case in other parts of Australia, and in fact it is the envy of other parts of Australia. I know the rollout was very difficult—

Mr FOWLES: Including politically.

Ms SMITH: Very much so! But we are now reaping the rewards of that.

The CHAIR: I will put away my tinfoil.

Can I just ask, in terms of the network and the role your members play—I am just thinking out loud—we heard some evidence earlier in the Inquiry from a bunch of councils that represent the broader Dandenong region. They indicated to us that they had I think something like 15 000 square kilometres of roof space amongst a significant number of manufacturers within the area and that there was potentially huge opportunity for those manufacturers to get together and establish a battery and panels on all of their roofs to I think establish their own kind of network.

Ms SMITH: Like a virtual power plant.

The CHAIR: Yes, which to me seems a good way for those businesses to lower their prices. But the suggestion from them was that it was quite difficult to do that from a distribution perspective because of some of the hurdles that were in the way. I hope I have paraphrased that—

Mr FOWLES: I was going to ask the same thing. I think it would be good for us to know how we incentivise the networks to take on more renewable connections where the power is coming back rather than being sent out.

Ms SMITH: Right. It is not so much a matter of incentivising. We want to be enabling as much as we can wherever possible. It is a matter of ensuring that it can be done safely and reliably. The grid is not a sponge. It cannot just soak up all this renewable energy. It does not expand to fit the electrons that are flowing into it.

The CHAIR: But in the Dandenong community's sense, the types of businesses would be consuming probably largely what they are generating at the time they generate it. So they are using it as they generate it.

Ms SMITH: Yes.

Mr FOWLES: So they are not necessarily pushing electrons back down the wire that often.

The CHAIR: Correct. So they might be doing that on the weekend, I am guessing—and maybe that is where they have a battery—but in a general sense they are generating electricity and they are consuming it on the spot, which is a very efficient way to use energy.

Ms SMITH: It is like a virtual power plant or microgrid.

Mr GILBERT: Yes, it is a type of virtual power plant. The best value you will get from solar is if you are consuming what you are using.

Mr FOWLES: Of course, because the feed-in tariffs are so low.

Mr GILBERT: And any individual business out in the Dandenongs can do that currently. There are some regulatory challenges because there are so many people involved. If you try to coordinate that between a few different businesses, for example, you need complex trading platforms and you need buy-in from multiple parties. It is doable, but it is just difficult at the moment.

The CHAIR: Should the Parliament be looking at setting up an example to show that it can be done? Is it worth the Government looking at that as a prospect?

Mr GILBERT: I know that there are a couple of residential trading communities at the moment that do that. Yackandandah comes to mind; you might have heard of that one. I am not sure if there are any commercial-scale operations.

The CHAIR: Essentially if Dandenong is one example, Broadmeadows and that part of northern Melbourne is another example. You could probably potentially do something out in the western suburbs as well. These are areas that are very large energy users with very large roofs and they are clustered together, so it does provide a unique opportunity to test this and to get it right, which then could be more broadly deployed into all sorts of other communities where you might just have smaller clusters and smaller roofs of businesses operating together.

Mr GILBERT: Yes, absolutely. There is certainly value there. In terms of from a parliamentary perspective making it easier, I am not sure what the best approach would be, but we would be happy to take that on notice and get back to you.

The CHAIR: Yes. It would be worth you providing that to us for us to look at. We will not have the opportunity to quiz you—

Mr GILBERT: No, that is okay. We are happy to send something in writing.

The CHAIR: but if you can, that would be great.

Ms SMITH: Because I know AusNet has a dedicated customer facing team that works with community groups and they are in discussions with some communities in north-east Vic. But I am not sure if that is specifically related to—

Mr FOWLES: I suspect that might be for communities as opposed to businesses.

Ms SMITH: Yes.

Mr GILBERT: Are you asking for a pilot project, sort of a demonstration, or something regulatory that could—

The CHAIR: What I would be looking for from you is what a pilot program might look like: the number of businesses, the number of square metres of roof space that might be required. And if there is any particular bit of regulatory reform that is required to remove barriers, I would be interested in that.

Mr GILBERT: In terms of the number of businesses or the roof space, I do not think there is much that we could say on that. That would be up to the businesses. But in terms of the regulatory barriers, we would be happy to get back to you.

Ms SMITH: Sure.

The CHAIR: There is a point at which your networks—

Mr FOWLES: It is economic or not.

The CHAIR: Yes, it is worth them doing it. There is enough scale for them to actually make the investment. I would just be interested to know what your members think the scale might be to be worth their time.

Ms SMITH: To be reliable.

Mr FOWLES: We heard some evidence when we were down in Gippsland. There is a dairy farm that does a lot of research and the like, and they put a second solar system in place and were told, on their evidence, by AusNet that they had to limit the size of the inverter, which in turn limited the number of panels they could put on the roof, which felt arbitrary and felt like they were being difficult to deal with. Apparently there is a way of limiting the export flow even if you have got a bigger inverter sort of thing. If the grid or the transmission business says, 'Well, you can only send so many electrons back up the pipe', there is a way of configuring it so you can do that without necessarily limiting the scale of the number of panels you want to put on, most of which during the daytime in particular that energy was being consumed on site. Without necessarily asking you to interrogate the specifics of that, are there issues more system-wide like that that are tripping up the ability for people to easily or readily grid connect, and are there things that either the transmission businesses need to be encouraged to do or we can help facilitate them doing or we can help with regulation around?

Mr GILBERT: Are you looking for the distribution solar residential street level—

Ms SMITH: Or transmission?

Mr GILBERT: or connecting large renewable generators to the transmission network?

Mr FOWLES: Well, in this circumstance it was a dairy shed, so it is bigger than residential but it is not industrial scale. They were largely doing it to consume the electricity as it was generated, but they also wanted to feed in. They were told, though, that they could only feed in so much. The additional thing they were told was that that meant they could only have inverter X, even though they wanted inverter 2X so that they could have double the number of panels and still limit the flow back to the grid at an inverter X level.

Mr GILBERT: I cannot comment on the specific example.

Mr FOWLES: Of course.

Mr GILBERT: But generally, there are export limits in place for all businesses, and that is for network security. When you have solar flowing back into the grid it raises the voltage of the poles and wires at our end, in the network, and to make sure that they are at a safe level in certain parts of the grid—and this dairy farm might have been one of them—limiting the exports back into the grid is a way to maintain system security and reliability. If that energy is not being used and the voltage continues to go up, it poses possible safety risks to appliances in residential homes and in this case possibly even the manufacturing technologies at the dairy farm. Although it may seem arbitrary, they are defined by guidelines and those guidelines are overseen by regulatory organisations.

Mr FOWLES: So are they AEMO things or are they State things? Which instruments are involved here?

Mr GILBERT: I believe in Victoria it is Energy Safe Victoria, but I am not 100 per cent sure.

Mr FOWLES: And is there an opportunity for reform in that domain, do you think? Or are you and your members satisfied that that is all working pretty well?

Mr GILBERT: We would certainly like to increase the possibility of our customers exporting into the grid. Unfortunately it is not necessarily a regulatory barrier but a technical barrier. There is only so much electricity you can push back into the grid in the wrong direction before you start to create problems. The only way of dealing with that at the moment is to augment the infrastructure so that there are bigger pipes and you can have more electricity, and that way you can keep the voltage and other things like the frequency at a safe level.

Ms SMITH: But that comes at a cost.

The CHAIR: Or have batteries appropriately located which can store when you generate and push it back down when it is dark and not windy or whatever.

Ms SMITH: Yes.

Mr GILBERT: Yes, and that would be one possible solution, but the cost of batteries is still quite large. But it is something that we have been interested in, yes.

The CHAIR: It just sort of occurs to me that the strategic use of batteries might actually be cheaper than rebuilding the grid.

Ms SMITH: Yes, absolutely.

Mr GILBERT: Possibly.

The CHAIR: So, in some cases?

Ms SMITH: In some cases, sure. Definitely.

Mr GILBERT: It depends on the part of the grid. It depends on the types of customers you have located there. I am aware of some regulatory barriers for batteries as well because we would have to operate them on the network side, not the customer side, because we are not allowed to own assets on the customer side of the meter. So there are some other barriers.

Mr FOWLES: So, if you are using batteries for grid stability reasons, if you like, rather than being an energy manufacturer, those assets would have to be located on your side of the meter?

Mr GILBERT: I believe so.

Mr FOWLES: Right. Is that an opportunity for regulatory reform?

Mr GILBERT: Possibly, but I am not 100 per cent sure of the exact regulations that would need to change.

The CHAIR: It does occur to me that when we are generating electricity, if you have got batteries and you are capturing it when prices are relatively low because it is blowy or the sun is out or whatever, potentially then pumping that back into the grid when energy costs go up might create a source of revenue which could help build the network.

Ms SMITH: The big value is the system support that it provides so you do not have to build too much network.

The CHAIR: Maybe both?

Ms SMITH: Yes. That is the benefit of harnessing and utilising large-scale and small-scale distributor resources like that—that we do not have to spend huge amounts of money on new poles and wires to augment the system to support the transition.

The CHAIR: Okay. Would you be able to perhaps put something along those lines in writing for the Committee as well?

Ms SMITH: Sure. Could I just clarify exactly what you would like?

The CHAIR: The idea of using batteries as a good way to stabilise the grid and maybe as an opportunity to provide a revenue stream, because you are buying when energy is cheap and you are selling when potentially energy is more expensive for the purposes of reinvesting back into the grid.

Mr GILBERT: One thing that I will say is we have to be careful here. We are essentially a transportation company. We do not buy or sell any of the electricity.

Mr FOWLES: Yes, you end up competing with your clients.

Mr GILBERT: Yes, and there are ring-fencing regulations which prevent us doing that and they are there for good reason, so that we do not have, say, a competitive advantage over an energy retailer that might perform that function. So it is a complex space but it is something that we have looked at, and we are happy to get you something in writing.

Ms SMITH: And what we would say too is where it makes sense for networks to provide services that may be deemed to be competitive—when I say it makes sense, it is in the customers' best interest—we would support that occurring.

Mr HAMER: What I was just thinking, and it might relate back to the response, is just the scale of what would be required if you were just upgrading the network, in terms of both the cost but also the time of actually being able to deliver that network. There is a bit of a profile in terms of when the major energy generators will come on board and the transition from some of our older energy generators, and that network distribution requirement by that time, I am assuming, is going to be a very significant task, both in cost and in time. It would be interesting to have what sorts of forecasts you might have.

Ms SMITH: Energy Networks Australia did a project back in 2017 with CSIRO called the Electricity Network Transformation Roadmap, and that has a significant amount of modelling in there for avoided costs, particularly of needing to build network infrastructure, by orchestrating distributed energy resources. The integrated system plan also identifies significant savings because of investment in interconnection and new transmission, because of potentially avoiding costs of new generation. More interconnected states and more transmission can lower wholesale prices, so that has benefits for customers.

The CHAIR: This is my final question. Victoria is a part of a limited national grid, if you like. I think there is a proposal to build an additional connector to Tasmania. What other additional interstate connections might be required to enable a national grid to function as effectively as possible?

Ms SMITH: The integrated system plan identifies those key interconnectors that are going to be required into the future. The Tasmania link that you refer to is Marinus. There is the Victoria and New South Wales interconnector, there is the upgrade to north-west Vic. that we talked about, there is Kerang link, potentially from Snowy down to Vic., and I think that is it for transmission.

Mr GILBERT: Major ones at the moment.

Ms SMITH: The major ones, which is a significant step up, but it is necessary, and ultimately that investment will pay off in spades by having greater interconnection which improves reliability and, as I said previously, puts downward pressure on wholesale prices.

The CHAIR: Okay. And on the hydrogen proposal that you have written up, my understanding is hydrogen burns—it is a very efficient energy—at a very high temperature. Is our existing gas network well-placed to

carry it? It just seems to me if you put a more explosive fuel in usually plastic pipes there is a potential problem. Or do you shandy it up, or is there some way of ensuring our network is actually well-placed to deal with this?

Ms SMITH: Yes. So distribution networks currently in all parts of the country are looking at blending projects of up to 10 per cent, and that has been proven to be able to be done safely, so that is—

The CHAIR: Up to 10 per cent hydrogen?

Ms SMITH: Yes, and that is in existing networks. In the UK, for example, in Leeds they are looking to transition the whole of the north of the UK, more than 3 million homes, to 100 per cent hydrogen by 2035, I think it is.

The CHAIR: That is a population a lot bigger than Victoria in an area about the size of Victoria.

Ms SMITH: Yes. And the reason they are so exercised on that is that 80 per cent of their winter peak is gas, so gas provides a significant proportion of their energy and to replicate that in electricity build would just be extraordinarily expensive. So they really do not have a lot of choice, because they have a decarbonisation goal of net zero by 2050, so they are going gangbusters on that.

Mr HAMER: And that is going to be supplied through the existing gas network?

Ms SMITH: Yes, and so there is a lot of testing going on. And our networks here in Australia are doing a lot of testing work. The Australian Gas Association is also doing testing at different land levels into different appliances to see how they cope. At 100 per cent you would need new appliances but at up to 10 per cent you do not need any change in appliances.

Mr FOWLES: There is obviously the appliance end that is not so much your issue, but how significant are the network constraints to switching to 100 per cent hydrogen, for example? Is it a complete rebuild or is it one of the things where if you change the meters the pipes will survive?

Mr GILBERT: We are not sure quite at the moment. We have got a cooperative research centre called the Future Fuels Cooperative Research Centre. It is a collaboration of industry, Government and universities to answer questions that we have about the possibilities of using future fuels, including hydrogen. Energy Networks Australia is a member of the FFCRC. For example, we do not know that 10 per cent hydrogen is the limit in the gas network at the moment.

The CHAIR: Let alone individual home owners' appliances—their stoves and—

Mr GILBERT: Yes. The last thing we want to do is to rush and do something that is not safe. So we are doing the groundwork now through pilot projects and testing to see what the limit in the gas distribution network is as it stands now, but my understanding is that you might get to a limit that is safe—say, 20 or 30 per cent—and then you will have to transition to 100 per cent hydrogen anyway because it is not necessarily the network that is main barrier to that, it is actually the appliances for customers and use. They are designed to run off natural gas, so are the burners—

The CHAIR: Burn relatively low.

Mr GILBERT: Yes. When you move to 100 per cent hydrogen those appliances start to not work or become unsafe. That is the main barrier.

Ms SMITH: There is a lot of work being done.

Mr FOWLES: But there are some assumptions in there. I presume that you have arrived at some numbers around this if you are saying that the decarbonisation of gas could be achieved through electrification but it would be 40 per cent cheaper to use renewable gases in the existing gas distribution network. So there are some pricing assumption sitting in there. There is probably lots of visibility about what electrification is going to cost; there is less certainty, I am assuming, on the grid retooling required to accommodate hydrogen as opposed to natural gas.

Ms SMITH: As I understand it a significant proportion of the costs around hydrogen is electrolysis, and that is coming down—so if we are talking about renewable hydrogen, obviously—and that is and will come down—

The CHAIR: On the basis of renewable energy, generating it like coal.

Ms SMITH: Yes.

Mr FOWLES: So that 40 per cent less cost, is that X network upgrade?

Ms SMITH: Yes.

Mr FOWLES: So are we just talking—

Ms SMITH: That is total system cost.

Mr FOWLES: Total system cost, so—

Ms SMITH: And that was a study done by Deloitte, so all the modelling was done by them. That is referenced in our submission.

Mr FOWLES: Is that a public document?

Mr GILBERT: Yes.

Mr FOWLES: Cool. We could get to that one. Everyone is nodding over in secretariat land. So I am interested to know, because the idea of liquid sunshine, as I think Alan calls it, the ability to have hydrogen produced by renewables, is a pipe dream. It sounds fantastic. If we can do it, absolutely brilliant. If we can start heating houses with it and driving cars with it and exporting it and all that sort of stuff, that is absolutely brilliant. The concern is that if you have to build new networks in order to do it, even I understand there are some issues around the transportation of hydrogen in a domestic setting because it is so flammable—

Ms SMITH: It is more that it has to be transported at really cold temperatures—it is like minus 240 degrees. Do not quote me exactly, but it is very cold. But there is also a lot of work being done on hydrogen transportation for export, and I think the Japanese have actually developed a ship already that can transport hydrogen.

Mr GILBERT: The Germans.

Ms SMITH: The Germans or Japanese?

Mr GILBERT: I cannot remember.

Ms SMITH: But I think in a broader sense, at a higher level, there is a significant amount of work going on. There is \$180 million-plus being invested at the moment in Australia on pilot projects and investigations to—

Mr FOWLES: So how would you characterise the gas network's stance to this at the moment: that they would say it is highly likely or somewhat likely or a pipe dream—excuse the pun—that they would be able to repurpose their existing network to become a hydrogen network rather than natural gas?

Ms SMITH: They are very exercised on doing just that and making sure that we can decarbonise our gas networks for a whole host of reasons but mainly because cost to customers will be less. But there are also a lot of sunk costs in the ground. There is a lot of infrastructure there that would just be a completely stranded asset throughout the country eventually.

The CHAIR: I am just thinking out aloud, but it also enables the reasonably limited gas resources off Sale, the life of those, to be expanded, because effectively at some point in time we run out. So this extends it, extends their business opportunity, and enables them over time to transition from 10 per cent to 20 per cent to 30 per cent—to grow their business in that way.

Mr GILBERT: To follow on from what Tam was saying, we are very optimistic that we can get there—the gas networks. That question would be one that cannot be answered in the short term because these are long-term asset lives and they need long-term tests to be able to determine whether they can be augmented to take 100 per cent hydrogen, and that is one of the questions that the Future Fuels CRC are certainly looking to answer. But we will not have those answers in the short term.

Mr FOWLES: And does 2035 feel realistic in terms of Leeds and their thing? Does that feel like they will have that technical achievability mapped out at that point, which means that we could go by, say, 2040?

Mr GILBERT: They certainly think they can, so I have no reason to doubt them.

Mr HAMER: I was just thinking in terms of the actual production of the hydrogen. I know you said you can do it through electrolysis, but would you need to be located by the coast or something and you would be using seawater?

Ms SMITH: There is a water requirement, but I think there are challenges using seawater.

Mr GILBERT: Yes. Alan Finkel I think said it best: the amount of electricity you will need is a much greater challenge than the amount of water you will need. We certainly have the water capacity and the availability to build that capacity. The bigger question is the electrolysis and the cost of the equipment to actually transform that water into hydrogen and oxygen. The electrolyser is using renewable electricity to undertake that process. There is also another way of creating hydrogen, which is steam reforming, using carbon capture and storage, but we are focusing on the green alternative. If you do not mind, can I table this document?

The CHAIR: You can.

Mr GILBERT: It is a publication that we and APGA have recently released, and it details the efforts that gas networks and a couple of other projects from the industry are undertaking to see what possibilities are out there for hydrogen and to demonstrate that we think it can work and we can get there. So we would encourage you to have a read.

The CHAIR: We certainly will.

Mr FOWLES: Just one question: when we talk about decarbonisation of gas, are we just talking about hydrogen or is there some other?

Ms SMITH: Biogas as well; so renewable gases generally.

Mr FOWLES: What—potentially methane and things like that?

Mr GILBERT: Yes. In the short term biogases like methane are a really good opportunity because we have some inputs to create the biogas. In the short term that is certainly the opportunity, but we are looking long term. If you are talking about the amount of gas that we are looking to replace with hydrogen, that quantity is just not able to be met with inputs to create biomethane. But in the short term it is certainly something that we are looking at as well.

The CHAIR: I think we have all explored our questions, so thank you very much for your presentation. If you have a couple of parting comments you would like to make, please make them.

Ms SMITH: Very grateful for the opportunity and thank you very much. We will follow up.

Mr GILBERT: Yes. Thanks so much for having us.

Committee adjourned.