



COMMONWEALTH OF AUSTRALIA

Proof Committee Hansard

SENATE

ELECTRIC VEHICLES

Use and manufacture of electric vehicles in Australia

(Public)

THURSDAY, 27 SEPTEMBER 2018

BRISBANE

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SENATE

ELECTRIC VEHICLES

Thursday, 27 September 2018

Members in attendance: Senators Bushby, Kim Carr, Patrick, Rice, David Smith, Storer.

Terms of Reference for the Inquiry:

To inquire into and report on:

The following matters:

- a. the potential economic, environmental and social benefits of widespread electric vehicle uptake in Australia;
- b. opportunities for electric vehicle manufacturing and electric vehicle supply and value chain services in Australia, and related economic benefits;
- c. measures to support the acceleration of electric vehicle uptake;
- d. measures to attract electric vehicle manufacturing and electric vehicle supply and value chain manufacturing to Australia;
- e. how federal, state and territory Governments could work together to support electric vehicle uptake and manufacturing, supply, and value chain activities; and
- f. any other related matters.

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DUNLOP, Mr Nathan, New Markets and Sales Analyst, Tritium

SERNIA, Dr Paul, Chief Product Officer, Tritium

WASHINGTON, Mr Tim, Chief Executive Officer, JET Charge; and Founder, Chargefox

Committee met at 10:59

Evidence from Mr Washington was taken via teleconference—

CHAIR (Senator Storer): Good morning, everyone. I declare open the fourth public hearing of the Senate Select Committee on Electric Vehicles. This is a public hearing, and a Hansard transcript of the proceedings is being made. We're also streaming live via the web, which can be found at aph.gov.au. Before the committee starts taking evidence, I remind all witnesses that in giving evidence to the committee they are protected by parliamentary privilege. It is unlawful for anyone to threaten or disadvantage a witness on account of evidence given to a committee, and such action may be treated by the Senate as a contempt. It is also a contempt to give false or misleading evidence to a committee. In addition, if the committee has reason to believe that evidence about to be given may reflect adversely on a person, the committee may also direct that the evidence be heard in private session. The committee prefers all evidence to be given in public, but, under the Senate's resolutions, witnesses have the right to request to be heard in private session. It is important that witnesses give the committee notice if they intend to ask to give evidence in camera. If a witness objects to answering a question, the witness should state the ground upon which the objection is taken, and the committee will determine whether it will insist on an answer, having regard to the ground which is claimed. If the committee determines to insist on an answer, a witness may request that the answer be given in camera. Such a request may of course also be made at any other time. I would also ask witnesses to remain behind for a few minutes at the conclusion of their evidence in case the Hansard staff need to clarify any terms or references.

On behalf of the committee, I would like to thank all witnesses appearing today for their cooperation with this inquiry. I now welcome Dr Paul Sernia and Mr Nathan Dunlop from Tritium. I also welcome Mr Tim Washington of JET Charge and Chargefox via teleconference. Information on parliamentary privilege and the protection of witnesses in giving evidence to Senate committees has been provided to you. Tritium has lodged submission 58 with the committee. Would you like to make any amendments or additions to that submission?

Dr Sernia: No.

CHAIR: I believe JET Charge and Chargefox have not made a submission. I will now invite you to make short opening statements. At the conclusion of your remarks, I will invite members of the committee to ask questions.

Mr Dunlop: Thank you to the senators for having us today and for the visit this morning, and obviously welcome to Tim on the phone. I'll summarise the submission from Tritium very briefly. We've commented on a few of the terms of reference through our submission, which you have as submission 58. Regarding term of reference B about opportunities for electric vehicle manufacturing, the summary is: Tritium is really a job story. As the senators have learnt this morning, we're almost 250 staff now at Tritium. Those staff are in engineering, automotive and high-tech roles, working on exporting our product overseas. I guess the thing to note here is that those jobs also create downstream jobs throughout the supply chain. We create installation, maintenance and field service opportunities for installers that are putting our product in the ground. That's worldwide and in Australia. We also create jobs in regard to the supply chain. As you saw, our product has very many components in it, and 40 per cent of that procurement spending goes to Australian businesses at the moment. So those jobs are coming to Tritium but are also creating downstream job impacts.

I'll move on to term of reference C—the measures for the acceleration of vehicle uptake. Our comments here are around DC fast charging, which really helps the adoption of electric vehicles. DC fast charging is the 50 kilowatt charger that Tritium makes, or a 350 kilowatt charger, which is an ultrafast charger. These fast chargers help overcome actual and perceived range-anxiety barriers for customers, and we've seen that in places like New Zealand. We mentioned that in New Zealand one of our customers, ChargeNet NZ, was one of the first customers of ours to deploy in New Zealand. At the time, there were almost no DC fast chargers in New Zealand. They've since deployed 100 in the last two years and that's seen almost a 10-fold increase in EV uptake. Of course, that's not the only reason why EVs have grown in New Zealand, but it's certainly a contributing factor.

On term of reference (d), around measures to attract electric vehicle manufacturing, our comments are that we've been the beneficiary of early investment and grants and we're very thankful for those. Tritium would not be the company it is today without those early investments. Some of those are Queensland small investment funds and business development grants. Those total around \$6 million to date of investment and grant money.

The last one is any other related matters—term of reference (f) and that's F. I would touch on this: Tritium believes in DC fast charging. Obviously, electric vehicle chargers can be AC slow chargers, typically found in the home, and publicly as well. We believe in DC fast charging, as we believe that's the quickest way to enable vehicle drivers to quickly refuel their vehicle and have energy freedom to be able to drive where they want, to be able to recharge quickly. This is part of the reason why Tritium only makes DC chargers and we focus on DC technology. Happy to take questions, but that's really a quick summary of our submission. I'll hand over to Tim to make a summary of his as well.

Mr Washington: JET Charge is what I would call a small business, one of the beneficiaries of the downstream jobs that Tritium are talking about. We started about five years ago, and we're now the leading installer of electric vehicle charging stations in Australia, being the recommended installer for nine vehicle brands nationwide. If you think of us as, basically, the people on the ground actually making sure the infrastructure gets installed, we're those people. We're the largest hardware distributor of charging stations in the Australian market. We've seen a large growth period over the last two years in the market. We currently employ 14 people in the head office and have a large contractor network of electricians who perform installations for us. That comes from a base of only two to three people, two years ago, and so we've seen some good growth in the market. From my perspective, it's really important that small businesses like ours have the room to grow into this new industry. Chargefox is basically a software business that controls the charging stations. You need software to control the charging stations, and Chargefox was born out of a joint venture between us and a software business. It is another example of the new age of automotive, in terms of the technologies that are required, and is another Australian-born business, which currently employs four people.

CHAIR: Thank you very much. I may start with questions with Dr Sernia or Mr Dunlop. I am very interested in the customer base that you have predominantly, which I believe is very much export focused. We've touched upon the purchasers of your products, be they consortiums—we've heard of car manufacturers in one case—or government bodies. Could you explain and discuss the differences and approaches that some of these bodies have taken to the provision of these chargers for their customers and also the public.

Mr Dunlop: I can take the one around the customer buckets that we focus on. We have a range of buckets, from a sales perspective, around where we target the market. Obviously, the first one is charge-point operators. These are businesses that have been set up specifically to charge electric vehicles. They are entrepreneurs that have gone out and set up a network of electric vehicle chargers, and their sole purpose is to make a margin off selling electricity through a charger to electric vehicle drivers. An example of those is ChargePoint in the US, which is the largest one. Other buckets of customers are utilities. Depending on where you are, in which jurisdiction or geography around the world you are, the utility may be able to purchase electric vehicle charging and put it onto their network. It really depends in what geography that is and whether legislation allows the utility to own the equipment and add it to their regulatory asset base. Some others are doing this in regard to their unregulated businesses, but it really depends on the utilities around the world and what the law allows them to do. But utilities are certainly a customer bucket for us. Other ones are fuel service providers—typical kind of petrol station owners—that are starting to venture into electric vehicle charging. Another bucket is the fleet space—so this is trucks and bus depot managers, effectively.

The last one, which you mentioned previously, is automotive companies that have got together, and one of those examples is, obviously, the IONITY venture in Europe, where a range of automotive manufacturers have got together and put funding in, to deploy a large network of electric vehicle chargers across Europe. I guess what you're getting to is: what are the motives for that? Partly their motives are obviously to sell vehicles but also to drive the adoption of electric vehicles further and give them a path to start having a market to sell electric vehicles to.

CHAIR: The key part is your focus on DC chargers. I'm interested in the interplay with AC charging and public AC charging. If we throw it to Australia, how do you see the Australian market versus these other markets that you're operating in, in terms of charging infrastructure?

Dr Sernia: We're in the early days. I think there are lots of other comparable markets, in terms of the amount of infrastructure that's in the ground. But it's at a very early stage. At the moment, we're seeing an increase, of course, in interest in deployment of public charging infrastructure, with large deployments such as that by the NRMA in New South Wales, which has already committed to 40 charging stations throughout New South Wales, and we'll see that increase.

As Nathan said, our focus is on DC fast charging. We believe that's that's where the focus will be for automotives in the future. We also believe it's the fastest way. It's really the vital solution for consumers.

In the public space, AC charging generally has a lower speed than DC fast charging. We know that, as the vehicles get more sophisticated, drivers and guests will be looking for more convenient and faster charging solutions, and DC is the pathway to that solution. So, whilst AC plays an important part at the moment, in terms of supporting the vehicles that are currently on the road, we see that that will wane over time. We've seen similar signals from the automotive industry as well, around future vehicles and what their capabilities will be. So there is a stronger focus on DC charging.

CHAIR: It's interesting that you're an Australian company that's been able to make this leap to retain processes. Is this really through the governmental assistance that you've been provided with? You spoke about the grants and the infrastructure and elements like that. Is this really indicative that, if this further industry is to take more root in Australia, we need significant government support in manufacturing but also in infrastructure deployment?

Mr Dunlop: I can only speak for what I've seen here at Tritium. Obviously, the grants have been helpful to establishing this business. But I think there are the key advantages of Tritium as a business: the engineering talent that has been able to be brought on to design this product that we have, and obviously the longevity of their work on developing this technology and having that advantage of developing the technology over time and being able to attract the engineering talent—the software engineers, mechanical engineers and electrical engineers—to be able to drive that product into the market. That's not to say that other geographies in the world don't have that talent, but I think that starting early and having that advantage and being able to be such a market leading product has driven that.

Dr Sernia: I'd also add that really we have benefited from government grants. There are two things which are always important: the amount of money you get and the timing of the money. So often, early in the day, we weren't getting a lot of money out of those grants, but they were very important in pushing us along to the next stage. I'd highlight that one of the key ones was, at the time—this was in 2011—that there was a federal Commercialisation Australia innovation grant scheme, and that was fundamental to us receiving our first private investment into the company. That matched those funds 50-50, so we received a \$1.15 million grant and were able to raise \$1.15 million in private investment. A part of the conditions of that investment was a successful grant outcome, so that's a good example.

I also highlight that that was an innovation scheme. At the time there were other funding schemes targeted at the automotive industry, but we fell outside the terms of those, so perhaps we were looking a bit too far forward in terms of our applications. Broader scope across some of these funding schemes would be interesting. Perhaps another example is the potential for electric vehicles to be used as energy storage devices. Similar to solar schemes, if energy storage schemes are being looked at in the future, perhaps electric vehicles should fall within the scope of those as well.

Senator KIM CARR: You mentioned that you received a small grant when the company was in its infancy. It was important in terms of providing confidence to other investors—that is, if the government was behind you then it was easier to attract investors. Is that correct? Was that your proposition?

Mr Sernia: Yes, that's correct. Raising money from the government has a lot of similarities with raising money from the private sector. There is a level of scrutiny—

Senator KIM CARR: It was a grant. It wasn't a loan, was it?

Mr Sernia: No, it was a grant, but in terms of the scrutiny you go through justifying your technology and looking at your business model—

Senator KIM CARR: That was an innovation program. All those innovation programs have been basically scrubbed now. How much money are you getting at the moment from the national government in Australia?

Mr Sernia: From the national government we benefit from the R&D tax concession and an export market development grant, which we are in the later stages of.

Senator KIM CARR: And how much is that worth to the company?

Mr Sernia: I wouldn't know the exact number.

Senator KIM CARR: How have the recent cuts to the R&D tax concessions affected your company?

Mr Sernia: I'm not aware of what the impact has been on us.

Senator KIM CARR: How much money are you getting from the US government?

Mr Sernia: Just recently we received a US Department of Energy research grant and were awarded US\$400,000 as part of that grant.

Senator KIM CARR: Is that per annum or—

Mr Sernia: That's just a one-off. That's the first time we had received any type of international funding support.

Senator KIM CARR: Do you think it's ironic that you may well be getting more significant amounts of money from a foreign government than you are getting from your national government?

Mr Sernia: I think the national government has been very supportive of us along the way. There is always more that can be done. Personally I believe that the more we can do to foster innovation and help the Tritiums of the future to grow into what we might be—

Senator KIM CARR: Sure, but the bulk of the \$6 million you have mentioned has actually come from the state government here, hasn't it?

Mr Sernia: That's correct, most of it has been state government money.

Senator KIM CARR: Not from the national government—

Mr Sernia: No. That is correct.

Senator KIM CARR: which has been in office for five years now, which is the period in which the bulk of your growth has occurred?

Mr Sernia: That is correct. There have been similar schemes available that we have not put applications in for, but if we had chosen to do so we would have fallen—

Senator KIM CARR: The US government is prepared to back you. I come back to that point. When I heard about the US Department of Energy providing support, I found it ironic that you could get money off a foreign government but you weren't able to get significant sums of money out of the Australian government.

Mr Sernia: I think it's good that an Australian company is getting foreign money. I think that helps us domestically as well.

Senator KIM CARR: You're not subject to any security problems as a result of that, are you?

Mr Sernia: No. We comply with the necessary security requirements.

Senator KIM CARR: That's because it's not a Chinese government; is that right? Is the American government asking you to do anything for that money, like move to the United States?

Mr Sernia: No, but we do have a Los Angeles office and without the local presence there we would not have been eligible.

Senator KIM CARR: Sure, but there's no pressure on you to move your manufacturing operations?

Mr Sernia: Not at all.

Senator KIM CARR: It's not a condition in any way?

Mr Sernia: No, not at all. We do some small levels of manufacturing in the US, and that's because some of our customers use government funds there to buy our products and that's one of the requirements, but not the bulk of our manufacturing.

Senator KIM CARR: Thank you.

Senator PATRICK: Have any of the three companies had any involvement with ARENA from a funding perspective?

Mr Sernia: Tim, do you want to start on that?

Mr Washington: Yes, Chargefox is going through a process with ARENA at the moment.

Senator PATRICK: Have you made applications in the past?

Mr Washington: No, this will be our first application.

Senator PATRICK: Okay. What about you, Mr Sernia?

Mr Sernia: Yes, about two years ago, I believe, we put an application to ARENA to assist with funding a public infrastructure project.

Senator PATRICK: Were you successful with that?

Mr Sernia: No, we weren't.

Senator PATRICK: Did they give reasons for that?

Mr Sernia: Yes. I think our thought processes were a little ahead of what the committee had contemplated as their scope, so I think it really started that conversation within ARENA.

Senator PATRICK: But the purpose of ARENA is actually to get ahead of the game with new technologies and to act as a catalyst for new technologies. Are you saying that you were too far ahead?

Mr Sernia: Yes, I think we had some ideas that they hadn't come across before, and it took some time to process that. I think now we're seeing that they're engaging with Tim in JET Charge and other companies, so I think they're there. They're at the right place. Maybe we were just a little bit too early. I'd like to think that.

Senator PATRICK: Or alternatively they were a bit too slow. I don't want you to answer that question, but maybe that's something I'll take up with them. So you're applying for additional funding now?

Mr Sernia: No, we don't have any applications in front of ARENA.

Senator PATRICK: So it's just Mr Washington that's got that funding. I wonder if you could provide the committee on notice with the application and the response, perhaps redacted if there are any commercial sensitivities in there, because that's something I would like to take up with ARENA at estimates, because you're not the only company that I've come across where that has been too advanced for ARENA. In some sense, perhaps they are being conservative. You would agree that sometimes a company like yours doesn't have the capacity to take on blue-sky risk, and that's where you probably need some assistance from government.

Mr Sernia: Yes, absolutely. The more you can de-risk blue sky, the better it is and the easier it is for companies to move forward on those ideas.

Senator PATRICK: Okay. We visited your company this morning; thank you very much for hosting us. It looks like it's doing some fantastic work. You've moved from one building to now two buildings here. Can you give some sort of order of magnitude of the growth you're expecting from this industry and how that growth might be affected if the Australian government were to jump on board with this idea of electric vehicles, which they haven't seemed to thus far?

Mr Sernia: On a global level, generally we're seeing the electric vehicle market double year on year. Is that fair to say?

Mr Dunlop: Yes.

Mr Sernia: I don't know the latest number, but if we were to keep pace with that opportunity size then in an ideal world we would be at least doubling year on year in terms of growth.

Senator PATRICK: Do you see the Australian market affecting that? The committee had an answer to a question on notice where the government simply stated that they don't want to pick winners. The reality is that the vehicle-manufacturing industry have already picked this as a winner, so they're all transitioning to this, and the government are just dragging their feet on this. But surely that would make a difference to your presence in Australia and, of course, your bottom line if we could accelerate electric vehicles here.

Mr Sernia: Yes, absolutely. As Nathan said, if we can do more to foster a local talent pool and a more sophisticated supply chain and more local content, that would help support our business and reduce some of those barriers to trading. To your point about picking winners, as you said, the electric vehicles are coming; we know that this shift will happen. So, as an Australian I think that if we can be on the front foot and actually carve out our niches sooner and be ahead of not only the adoption rate but also the business opportunities then that's better for us. It's inevitable that it's coming anyway.

Senator PATRICK: I have one last question. Noting your experience overseas, what's the biggest thing the Australian government could do to kick this along?

Mr Dunlop: What we're seeing overseas in markets that are more advanced and where EV charging is obviously pricing parity with combustion engines—if we looked in Norway, artificially making combustion engines and electric vehicles, it's a similar price point for similar vehicles. It certainly has advanced that market. But even down to small-scale benefits—not pricing at a vehicle level—in Norway you don't pay for toll roads if you're an EV driver and you have a lot more free parking. Even small benefits like this have been shown to have a very big benefit to EV drivers on a day-to-day basis. I don't drive an EV, but this would be something that EV drivers like Paul would certainly benefit from. So, those are the kinds of government incentives that have been put in place that have driven up uptake overseas.

Mr Washington: Perhaps I could add to that. In my mind it basically starts with a vision of where Australia wants to be and then a practical means of delivering that vision and then specific policies under that practical delivery. So, in my mind we need to have an EV target so that Australia basically says, 'Yes, we are going to pick EVs as one of the winners and we are going to commit to a certain target by a certain time frame.' You've seen all the leading EV markets do that. Then you have a practical means of delivering that vision, which is something like the UK's Office of Low Emission Vehicles, whereby basically all the government policy is channelled

through that office. Then you have very specific policies that the office enforces, which are the kinds of things that Tritium were just talking about, like toll roads and all that kind of stuff, and vehicle incentives.

But I think that unless you start at the start, where the government basically says, 'Yes, there is a vision for it,' and if you want to start a business in this space the government has already said you will be in an industry that the government supports, that's incredibly important. And the thing for me is that everybody says that EVs are coming. What I can say, being in the industry itself and working with these manufacturers, is that yes, vehicles are coming, but they're not going to come as soon as you necessarily think they will in the Australian market if those manufacturer head offices don't think the Australian market is suitable. We are in a supply-constrained market right now in terms of electric vehicles. So, what I call OEMs have the power to choose what markets they send the vehicle to.

In Australia, in every conversation I have with these vehicle manufacturers, they say they have to fight for volume. And when we fight for that volume, head office—literally the conversation that goes into these business proposals is, 'What infrastructure do you have?' What are your government policies and vision on electric vehicles? In Australia we always have to say, 'It's coming, it's coming' or 'It's in talks' or whatever. And they say, 'Well, we may delay the introduction of our EVs in your space, or give you reduced volume.' So, it's kind of a cycle that keeps on going such that we see less EV penetration because we don't have a government decision on successive EVs, so OEMs don't bring the cars here as early as they should. Australian consumers will be shocked by that, because we actually have the most competitive car market in the world, per capita. So, all of a sudden that choice is taken out of the market, which means that Australian consumers don't get to benefit from the latest technology.

Senator PATRICK: It's okay, because Senator Bushby's on this committee! He'll get the government into action!

Senator BUSHBY: Well, thank you for that, Senator Patrick! Anyway, first, thank you all for assisting us today and thank you also for the tour of your facilities this morning. It's great to see that a company like yours has grown at the rate that it has, particularly over the past few years, without the need for direct and specific investment by the government. It shows that it can grow and meet market demand without necessarily having to be propped up by taxpayer dollars. But in that sense I acknowledge that you mentioned that you have been receiving the benefit of the R&D measures and you weren't aware of what the value of those were. Would it be possible for you to take that on notice?

Dr Sernia: Yes, we could provide you with some figure.

Senator BUSHBY: Yes, an estimate of how much you think that has been of value to the company in terms of dollars, and also any other federal government grants that you did receive, like this small one you mentioned earlier.

Senator KIM CARR: And could we get the effect of the government reductions, particularly to the intensity measure, as it relates directly to your manufacturing operations?

Dr Sernia: Okay. We'd have to look into that.

Senator BUSHBY: This morning, I was talking to David from your company—I probably need to get this back on the record: what percentage of your sales goes to Australia, and what percentage goes overseas?

Dr Sernia: Approximately two per cent is Australia and 98 per cent is exported.

Senator BUSHBY: Ninety-eight per cent goes overseas. That highlights the issues that are being talked about here this morning, which is that in Australia there is a slower uptake of electric vehicles than in some other countries. Do you think there are any regulatory barriers that the government could address that would improve the likelihood that consumers would choose an electric vehicle when they go to buy a car?

Dr Sernia: Maybe Tim can say some more about this—I am not the expert on this, but I think that, in addition to infrastructure, availability and choice of vehicles is one of the key drivers. We need multiple choices in multiple vehicle classes in order for people to be able to make buying choices—

Senator BUSHBY: How do government decisions or regulations restrict that?

Dr Sernia: Tim, do you want to comment on that? I can't comment on that. I don't know the specifics.

Mr Washington: To give you an example of regulations that would encourage EV uptake, and this is not necessarily a federal government issue: the incorporation of EV charging infrastructure in new developments under state planning schemes is incredibly important to facilitate EV uptake in multi-unit dwellings, which we're moving further and further towards. That's an example of regulation that could be changed to encourage EV uptake.

Senator BUSHBY: That's putting additional regulation on. We'll be looking at what steps the government can take, but I'm more interested in whether there are regulations in place at the moment. An example, but possibly not the best, is one that was mentioned at the meeting this morning: a restriction on the importation of second-hand electric vehicles. If that were eased it would obviously allow greater choice to consumers in Australia to buy a lower-cost electric vehicles rather than brand new ones. It might help to facilitate the market. Correct me if I'm wrong: what I heard this morning was that that occurs in New Zealand, where it has not only increased the number of electric vehicles, because of those coming in, but has also helped to prepare the market and deliver a greater degree of acceptance of electric vehicles by consumers in general. Obviously, if the government looked at that sort of regulation, it's no cost to government. It's actually going to improve outcomes for consumers in terms of cost—there may be other issues. At the same time it will increase the number of electric vehicles that are being used. I'm looking for examples of that type—things where the government might have in place rules or regulations at the moment that in the end work as a disincentive, at all levels, to consumers being able to buy or wanting to buy electric vehicles.

Mr Washington: On the infrastructure side there is regulation at the moment among the electricity sector of something very specific called the 'dual supply rule into a property'. It basically means that on any given title you can have only one point of connection for electricity. That's mostly done for safety reasons and for practical reasons. But with the deployment of public charging infrastructure it becomes extremely costly if we can't get an exemption from that rule, because you may have a property that goes 100 metres and the carpark is at one end and the point of supply is at the other end. To be very specific, if we have to trench 100 metres from the point of electricity supply to where the car park is, it naturally rules out that site for use of public charging infrastructure, whereas if we can have an exemption to the dual-supply rule for electric vehicle charging, for example, it would basically increase the number of sites that are available for public charging infrastructure, which would naturally mean more charging stations, which would then mean higher EV uptake.

Senator BUSHBY: That's exactly the sort of thing that I was asking about. I invite you both to take notice to let us know if you can think of any other regulation or anything else that didn't occur to you today. That would be much appreciated.

Senator RICE: At our site visit this morning, which was fascinating, I was impressed in particular at the level of growth that Tritium has experienced in recent years, noting as we've already noted that most of that is for the export market and not because of the Australian market. Would you like to reflect upon what sort of growth you would expect if there was leadership from the Australian government and we did, say, double our EV sales or catch up with the rest of the world.

Dr Sernia: I think that is difficult to reflect upon. What I would say is that in Australia it is more typical for strong export companies to have a strong domestic customer base as well. I wouldn't be able to quantify it but it would definitely help. It would help us to ride out the fluctuations in different international markets as well. If you could help smooth that out, that would be of assistance.

Mr Washington: Perhaps I can also add a bit to that. Our growth, although not on the same scale as Tritium's, has come completely as a result of the domestic market. We don't do any export work—it is all the domestic market—and we have grown our workforce by 10 people over the last two years. That is not a lot of people, but we still employ people in this new sector and that is something we can be proud of. But that comes at a stage where the Australian market is at 0.4 per cent of new vehicle sales. I would encourage the committee to consider what it might mean for jobs overall in the electric vehicle sector and the electric vehicle charging sector if we were able to hit 10 or 20 per cent ahead of time, ahead of natural market forces. It would mean a lot more jobs in this sector. I would like to employ more people, but we need certainty that the sector is going to get the support it needs and the traction it needs in the time frame that we are thinking of. We expect to continue growing and will probably double our staff over the next couple of years. That is purely as a result of the domestic market.

Senator RICE: I wanted to go to the potential growth and jobs. What is the market in terms of charger installation? What sort of jobs are we looking at overall, both in R&D and in manufacturing—as we have spoken about with Tritium this morning—and the installation, which you have spoken about, Mr Washington? Has either company done a prospectus as to what jobs growth would look like associated with this part of the industry if we had, at least, medium acceleration of our EV uptake?

Mr Washington: I can talk for JET charge. I can't talk for the wider industry. Right now, we employ around 500 domestic installations. I am talking purely about domestic installations. When you buy an electric vehicle, in all likelihood you are going to have a charging station in your home. So domestic installation is a good proxy for EV uptake as well. We do about 500 a year at the moment, and we are at 0.4 per cent of new vehicle sales. We expect that to accelerate to about 10,000 a year in the next seven years. With proper government support and

vision, I think that can be accelerated. We have 14 people at head office now and we do 500 domestic installations. We are looking at going to 10,000 a year in about five to seven years. You can do the maths. It won't be a one to one, but we expect to employ about 100 people in five years to carry forward that growth.

Senator RICE: To be able to do that level of sales—10,000 a year?

Mr Washington: Correct. You talked about jobs in R&D and in technology. Something I have been talking about for a while is that all of the services we are doing right now—what Tritium is doing and what we're doing on installation services—should be considered as part of the automotive market in Australia. Right now, there is this perception that the automotive industry in Australia is purely about the cars and assembly of cars. In reality, the future of the automotive industry is all about technology and things like electricity grid integration. All of that stuff belongs in the automotive sector. So if the government has a focus on the automotive sector and transforming our automotive sector—in fact, we have a fund designed specifically to do that—it should consider the wider technology implications and the jobs that that creates. Look at Holden, for example. Recently, General Motors said it is going to employ engineers to head up the electric vehicle and autonomous vehicle program globally. Those are the kinds of things we should be focusing on to revive our automotive industry in Australia.

Dr Sernia: Well said, Tim. We have approximately 100 people in our manufacturing function within our company. But people don't come to you as charger manufacturers; they don't have that skill set. So we are actually bringing people in and training them up. We are giving them skills and a career in an industry that is only going to get better; within their lifetime it is not going to decline. The opportunity to do more of that, and the mindset that this is the automotive industry of the future, is really important.

Senator RICE: So that is 100 people in manufacturing for your current throughput. We talked this morning about what your current throughput of chargers is. How many are you building per month? Are you able to put that on record?

Dr Sernia: I can't put the specifics on the record, but we would be capable of doing thousands a year, from just our current facility.

Senator RICE: I'm trying to get to the potential for growth. If we ramped up the current rate, what are the jobs going to be like in your manufacturing sector?

Dr Sernia: I expect it would be thousands. It would have to be thousands to support the kind of volume that I would expect over the next five to 10 years, absolutely.

Senator RICE: Based on your current production levels, are you willing to give us an exact number, or do you feel it is commercial in confidence?

Dr Sernia: It is commercial in confidence, so I can't give you the numbers.

Senator RICE: So there is a huge amount of potential growth. Do you have an estimate of the extent of the market? How many fast chargers do we currently have installed in Australia, and how many would we need over the next 10 years if we did support a ramp-up of electric vehicles?

Mr Dunlop: I think there are presently around 50 to 70 DC fast chargers in Australia. Going forward, it is hard to project how many DC fast chargers would be needed with a certain level of growth. It really depends on preferences around home charging and public charging—and pricing and how you can be competitive. We could potentially give you something on notice, but it is very hard to project what the potential numbers might be in the DC fast charging sector.

Senator RICE: If you could take that on notice, that would be useful.

Dr Sernia: On a global level, when we had between one million and two million electric vehicles on the road globally—just passenger vehicles—there were probably 30,000 to 40,000 fast chargers installed across the globe. That is probably more than you need for that vehicle population. Our passenger vehicle fleet in Australia is about 12,000. That gives you some idea of the scale; it is probably hundreds of thousands of vehicles.

Senator RICE: Could you tell us about the impressively short charging speed of your 350 kilowatt chargers? What is that capable of doing?

Dr Sernia: The state of the art with vehicle technology is that we can recharge them in about 20 minutes depending on the size of the pack. At the moment, the fastest they can receive charge is at 350 kilowatts. Our technology can already do almost 500 kilowatts, but there aren't many vehicles that can accommodate that. Again, as we go to higher powers, we want the charging experience to be down to between five and 10 minutes, which would be similar to what consumers experience now at a petrol station. That is where we see the market headed.

Senator RICE: I think you said that that 350 kilowatt charger, if the car was capable of taking it, could give you a—

Dr Sernia: A range of 750 kilometres with 20 minutes of charging.

Senator RICE: Or 350 kilometres in 10 minutes, which is pretty impressive.

Dr Sernia: Yes. It is practical.

Senator DAVID SMITH: Thanks for the site visit earlier today. One of the most impressive things is the growth in R&D and engineering over just the last year. I wonder whether there's a challenge, particularly if that growth is replicated in terms of being able to attract the right sets of technical and engineering skills at the moment? Are there any particular challenges you see?

Dr Sernia: Access to talent is a continuous problem. We have a small population. We have some good talent here. We have to compete on a global scale. For the engineers with those skill sets, there are other opportunities internationally, so we need to create an environment where we can give them career progression and match them in terms of conditions. Lifestyle plays a big part, as is making sure the cities where we live are good. Having a community where they can grow professionally locally is important as well. So there are lots of challenges.

Senator DAVID SMITH: Engineering degrees and the like are expensive. I guess both have a technical college aspect and, at the university level, there's a need to have that sort of investment to deliver the workforce that an industry like this requires.

Dr Sernia: Absolutely, and working closely with the research institutes and the universities is important, and we do that. We have close ties with them as well to get assistance from that sector. The more we can promote interest in these fields, in the research sector, the more it will help us.

Senator DAVID SMITH: I noticed that there's a strong relationship and interest from energy companies and also from companies like the NRMA. Has Tritium or Mr Washington's organisation had much contact with state and local governments? The reason I ask is that we've heard from my local government, the ACT government, and certainly a couple of other local government bodies about plans that they have to try and support the uptake of EVs—in the ACT's case, through their fleets—but I'd be interested to know whether there's been much contact from those bodies with Australian charging companies like yours.

Mr Washington: We've had intensive contact from local and state governments. One thing that's quite contrasting from a local and state government perspective is that the ones that we've dealt with certainly know that this is the future and that they want to be a part of it. One good example is the ACT. We're working with the ACT government, as well as the service providers, to help them transition to an electric vehicle fleet. We also operate a 46-strong charging network in the city of Adelaide, which was done by the local government. All of the local councils, with their various environmental initiatives, are doing this for either the public, like the City of Adelaide are, or their own fleets as they transition to electric vehicles. But all of it is driven by, basically, a desire to transition as fast as possible to electric vehicles. It's been quite interesting. There's certainly more and more interest and there are lots of local partnerships between councils and local governments to accelerate EV adoption. One example of that is the Cities Power Partnership, which the ACT is part of, given that they're also a council. Basically, a lot of councils, together, are working on strategies to transition to electric vehicles. So there's a lot of enthusiasm in that sector.

Senator KIM CARR: You mentioned a range of measures that you think the Commonwealth should take an interest in. You mentioned the question of regulation, you mentioned the question of R&D, you mentioned the question of training—the higher education program, particularly with regard to the automotive engineering programs—and you mentioned some grant arrangements that should be made, but you haven't mentioned procurement. One of our terms of reference goes to the measures we can take to actually encourage domestic manufacturing. Frankly, I'm not much interested in encouraging manufacturing in other countries; I want to encourage domestic manufacturing. You are one of the few people coming before this committee who actually manufactures in Australia. How important is preference arrangements for government procurement in terms of laying out charging facilities for Australian manufactured products?

Dr Sernia: I think it's important. I would want to be judged competitively on an international scale. I think that's important as well—

Senator KIM CARR: We're not going to throw money away.

Dr Sernia: No.

Senator KIM CARR: You think we should not give preference to Australian companies?

Dr Sernia: I'd have to form a view on that. In a commercial setting and, looking at things on balance, there'd have to be a decision made on what the other benefits are of going with Australian content. Spending Australian—

Senator KIM CARR: I'll remember this answer when we come to decide on this question.

Dr Sernia: In general, Australian money should be spent on Australian content, if you can, if there's no disadvantage.

Senator PATRICK: Mr Dunlop mentioned the effect of doing the manufacturing here in Australia. I think you would agree that it ought to be factored into the procurement decision of the Australian government—the benefits that flow to the general economy as a result of buying things from Australian companies.

Dr Sernia: Yes, absolutely.

Mr Washington: I'll couch this slightly to Paul. As long as it's commercially sensible, it's a no-brainer to buy Australian products, and that includes Tritium, obviously. I think it just encourages an industry of innovation, as long as we extend that procurement to things like software—the technology that surrounds the vehicle—not just the hardware itself. It's an absolute no-brainer. One thing I will highlight is that we really do have a chance, because moving to an EV-predominant automotive market does represent a reset of the automotive industry in many ways and it means that a country like Australia has a really great chance to participate in that new industry. Yes, absolutely, I would support preference for Australian products.

Dr Sernia: Touching on Tim's last point, the opportunity is for us to choose what we will become good at. We can't do everything in the automotive manufacturing sector of the future, but certainly charging is one place we are already ahead and we should encourage that space. But I'm really interested in other areas where we can be world-class and support long success in those areas.

Senator KIM CARR: In your judgement, what areas do you think we could be—

Dr Sernia: As Tim said, we're resetting, so there are lots and lots of different places. We need to be strategic. We need to plan ahead and look at what our capabilities are and what areas we're best suited to winning. I'm being non-specific because I think there are lots and lots of different areas where we can take that opportunity.

CHAIR: I thank you for your appearance here today and I thank Mr Washington for participating via teleconference. Thank you very much.

Dr Sernia: Thank you.

Mr Dunlop: Thank you.

Mr Washington: Thank you.

CRAIGHEAD, Mr Brian James, Director, Energy Renaissance

[11:53]

Evidence from Mr Craighead was taken via teleconference—

CHAIR: Welcome. Information on parliamentary privilege and the protection of witnesses and giving evidence to Senate committees has been provided to you. Energy Renaissance have lodged a submission with the committee. Do you wish to make any amendments to this submission?

Mr Craighead: I don't.

CHAIR: I now invite you to make a short opening statement and, at the conclusion of your remarks, I will invite members of the committee to ask questions.

Mr Craighead: First let me thank you, Chair, and committee members. I really appreciate the opportunity to talk today. My introduction is short and simple. We are in the process of developing a lithium-ion battery manufacturing facility in the Northern Territory, which wouldn't have been possible a few years ago. The economics of manufacturing these batteries have become much more attractive, particularly in Australia, through automation and some other industry trends. That's good news, but much better news is that's a big enabler for electronic vehicles. From my perspective, the work this committee is doing is going to look seriously at the opportunity for Australia to be involved in all aspects of the electronic vehicle market: the supply chain, the manufacturing and the export out of Australia. That is absolutely fantastic. We applaud it. And I think your timing is almost sublime.

From our perspective, we are fierce supporters of the industry. We feel very clearly the opportunity in front of us, and it's nice to see there's an opportunity for a renaissance not just in energy but in manufacturing in Australia. We'll do whatever we can to make sure that happens.

CHAIR: Thank you very much. I might specifically move to the terms of reference and the focus on your actions to date and what measures you believe, from governmental levels, could assist a company and this industry, in the supply chain and manufacturing aspects, to flourish. As I understand it, your proposal is for the production of these supercells and to possibly deliver high-tech jobs. So could you perhaps speak about how you see the Australian governmental context in terms of your proposal?

Mr Craighead: Sure. Firstly, the background to our business is that there was about three, maybe 3½ years of research around the world to see if there was any commercially viable way you could manufacture lithium-ion batteries in Australia. Very clearly, there were two opportunities. One of them was for very large scale batteries in boxes that were going to perform better in hot climates. The second, very clearly led by the market, was electronic vehicles. The reason for that is fairly self-evident. The manufacture of electronic vehicles, as I'm sure you all know, is a quantum leap ahead of what it used to be—the old large-scale, smelly, noisy manufacturing facilities for our traditional cars' industrial combustion engine: noisy, messy, very complicated and expensive.

I have personally been in several different electronic vehicle start-up manufacturing facilities around the world. They're small, they're lean, they're clean and they are more about smarts and design beauty. Scale isn't the advantage it once was. It's intelligence and design and customisation for market. For me, that works perfectly with the advantage here in Australia, we have very smart folks. We have the raw materials we need all within our walled garden. Pretty much every single raw material required to construct an electronic vehicle is within our walled garden of Australia, and that's quite unique. We've got the smarts, certainly. So, for me, it was really about: if the opportunity is there, the demand is there. What we really need is the support to get this thing kickstarted. I think that's where government comes in. For me, it's more about being big and bold and clear that electronic vehicles are a part of the future of Australia—a vital part of the future—and they are leading the way.

I think there's enough investment with government support to do this, but what's really needed is something similar to the way that countries such as France and Germany and Scotland—my old home country—set clear directions: 'By 2030, we're going to no longer be purchasing industrial combustion engines.' Those clear statements have led to much faster adoption than we anticipated. That, I think, more than anything is what the government could do: set a clear and ambitious target, and everybody will fall in behind it. It's an intuitively correct thing. There's a great aspirational desire to do this and, with a clear statement of a direction and an ambitious target, I think that's the most important thing. So, from that perspective, the opportunity is right there. It fits very well with what Australia is very good at. For us, the government's primary task will be to dig and build and set an ambitious target.

CHAIR: But, in the absence of that, your proposal is still moving ahead. I would imagine that your focus is significantly in export markets. How do you see the Australian market for your products?

Mr Craighead: That's right. We are manufacturing a particular type of battery cell that works better in hot climates. That's South-East Asia and Australia. Part of the reason we're up in Darwin is that the export capability is very good for us when it comes to South-East Asian markets. Ours is, we think, about 70 per cent an export business, but Australia is an important market for us in both the grid market and the electronic vehicle market. We've met a few folks who seem to be quite ambitious with plans for electronic vehicle manufacturing. An EV, fundamentally, is a battery on wheels. So for us it's a very attractive market. We can customise batteries and stick them in EVs. For hot-climate electronic vehicles, we think that there will be a very clear market. So, yes, we're moving ahead regardless, but things would be an awful lot easier if the EV market moved faster here. It's a very attractive market for us. So anything that can spark or accelerate that would be very good for us.

Senator KIM CARR: Mr Craighead, you'll have to forgive my ignorance, but I'll confess it quite readily. What is the exact status of your proposal?

Mr Craighead: No problem at all. We are, I would say probably a few months away—maybe about four months away—from financial close, which is when we close off the project funding and go into construction. It's been about two years in development. The land is identified up in East Arm, Darwin. A lot of the primary things we need to get done with regard to technology selection and various construction contracts are largely progressed. The way I describe it is that most of the planning is done. There's still some work to be done. We're probably a few months away from going into project close and construction starting.

Senator KIM CARR: Do you have approvals?

Mr Craighead: We have preliminary approvals. The approvals we don't have yet are for the finalised design work, the development approvals for the factory and a few other things like that. So I guess we're probably a few months away from getting final approval of construction on the site that we've identified.

Senator KIM CARR: So that's planning approvals. Have you got planning approvals?

Mr Craighead: No, we don't have final planning approvals. The way I'd describe it is that we're several months away from getting into project close.

Senator KIM CARR: You've organised finance, have you?

Mr Craighead: Correct, yes.

Senator KIM CARR: When do you anticipate that you'll be able to actually start construction?

Mr Craighead: There are two phases to this. For the construction, our aim continues to be that within four to six months physical construction will start. Of course, that's right in the middle of wet season, so we may have to move things around a little bit depending on what happens, but our aim is still four to six months for construction to start. It's basically a 12-month construction, and six months into it we start commissioning the production capability, which is basically the robots. While construction is happening, we have the ability to import and fabricate some components, so we can start delivering batteries a little bit early. That's basically it. So we're talking about, let's say, four to six months before construction starts and somewhere between six and 12 months for construction and automation to get going.

Senator KIM CARR: When will you be delivering batteries?

Mr Craighead: We can import some elements of it to deliver batteries early. We'll fabricate batteries by the middle of next calendar year. The locally, indigenously manufactured cells will come out at the end of 2019.

Senator KIM CARR: You said that you've got territory government support. The site is in Darwin, isn't it?

Mr Craighead: That's correct, yes.

Senator KIM CARR: And you've got territory government support?

Mr Craighead: That's correct, yes.

Senator KIM CARR: What's the form of that support?

Mr Craighead: From the Chief Minister down we have support, and we're actually working on a market led proposal to get private support.

Senator KIM CARR: So the business case has been seen by the territory government?

Mr Craighead: It has, yes.

Senator KIM CARR: Do you have Commonwealth government support?

Mr Craighead: We haven't really sought any. In the early days we engaged with various parts of the federal government. I'm not really sure if we've engaged recently. I don't handle that part of it, and I am not quite sure what support we'd seek from them right now. I should point out that we did actually engage PwC to do an

economic impact analysis for the facility. It should generate about \$800 million in economic benefit for the Northern Territory and house about 300 people. Up there, it is a reasonable benefit. On federal government support, a couple of years ago, I think, we looked to get major project status at the federal level, but it doesn't really seem like that's going to be needed.

Senator KIM CARR: Am I correct in assuming that you haven't approached the Commonwealth government Department of Industry, Innovation and Science?

Mr Craighead: That's correct.

Senator KIM CARR: I find that a little odd that you haven't spoken to them at all.

Mr Craighead: We'd like as much help from as many people as possible.

Senator KIM CARR: But normally you've got to ask. That's the normal process.

Mr Craighead: Yes, that's true. I'm not quite sure what I'm asking for, though. I agree with you and certainly once we start operating we will be looking to get as much assistance as possible to buy locally. But, right now, our focus is that this thing has to stand on its own legs as a commercial operation privately funded. So that's kind of how we approached it.

Senator KIM CARR: There's another proposal to build a gigafactory in Townsville. Are you familiar with that?

Mr Craighead: I am. For us, the more the merrier. We support that and we support anybody else who wants to get involved. The reason for that is that after you have constructed these things—and the capital expense of these things is not what it once used to be and the automation has come down quite a bit—the biggest operational expense is raw material. The great sadness of Australia—the kind of twist here—is that, although we have all the raw materials we need to manufacture competitively lithium-ion batteries in Australia, the reality is that all those raw materials without exception are mined and shipped overseas to be processed to battery grade and then reimported; we have to re-import. Most of the margin is given overseas because there aren't processing facilities locally for battery-grade raw material.

Senator KIM CARR: The Queensland government is providing support in terms of the feasibility study for the Townsville project. Have you received any government support for your feasibility study?

Mr Craighead: I think we received a small amount of money—around \$40,000 or something like that—from the Northern Territory government, but we've received no financial assistance other than. I don't think we sought any, either. We funded it entirely ourselves.

Senator KIM CARR: I've looked at this question of establishing factories here and what I'm told is that the raw materials are available but they require processing and there's a whole series of supply chain development that's actually required before they're in a form to be able to put into a manufacturing plant. How do you overcome that problem?

Mr Craighead: That's a great question; in fact, it might be the pivotal question of how we make money as a country. Here's how you do it. The reality is that most of the resource companies, whether it's cobalt, manganese, graphite or lithium, all want to get higher up the value chain and keep more of that revenue margin in Australia. What they need is security in offtake. If there is enough confidence in forward orders, people can justify and bank the capital investment to do the processing locally. In some cases—lithium, less so—it's quite expensive to bring a processing facility on shore. And it's the process as well, because some of them are power hungry and with some of them you have to be very careful that you're not hurting the environment. So because of the cost involved all of them need security in forward orders. Basically, they need to know if they have enough orders for the next three years to justify the capital investment.

And here's how you get that: we will bring some level of security in forward orders to these folks locally, because, obviously, the reason you exist is to buy Australian. But if another factory comes up—if the Townsville comes up—it will be much bigger than ours; it's a very differently sized facility. If that goes up it would bring even more security in forward orders. So, really, it's just like any bankable project: the more forward orders you've got then the more comfortable the lenders are and the more comfortable the investors are. That's what will suit our local processing. For every dollar of benefit and economic benefit that our little factory brings there's about six that go to the raw material producers so that they can get processing. There's much more in it for Australia if we can have them processing to battery grade, rather than our little factory.

And that's how you do it: forward orders. When I heard the tail end of the conversation about the government making commitments to fleets of EVs, for example, if they were locally manufactured, that would translate to quite a large forward order for raw materials. It would be quite possible for some folks to say, 'Well, now we can

afford to invest in local processing.' Those upstream are bouncing around to look at benefits. We really are a big deal—a big deal—because as soon as you start processing locally you can skip past part 1 and sell to the global market. That's how you do it: forward orders are the thing.

Senator KIM CARR: You said you've organised the finance for this project. Is that organised domestically or internationally?

Mr Craighead: To be clear: our project is going to cost—let's not go into that; it's not a terribly expensive project. We are splitting it fifty-fifty debt to equity, and at this point our aim is for all funds to have both debt and equity sourced locally. That might change; that may well change because, honestly, I would say that there is more interest internationally than domestically in the equity investment. That's very sad, but that's just what it is. So that may change. I could tell you right now that our preference is to have it sourced locally. That's all I can say.

Senator PATRICK: I'm just wondering if you've had a look at the Association of Mining and Exploration Companies' lithium roadmap?

Mr Craighead: Yes.

Senator PATRICK: You have? So they've been engaging with you on that?

Mr Craighead: No, not with me personally. We have a couple of folks dealing with the raw material providers. I have had several meetings up in the Northern Territory around the sourcing of fuels, including lithium. And we had a couple of conversations—not me, but others—in Western Australia. Our interest is purely and simply if we can source battery-grade lithium concentrate locally. That's a big margin improver for us. So we are keen to engage with anybody who has a realistic plan for sourcing in the amounts that we need.

Senator PATRICK: Obviously, there is hard rock lithium in the Pilbara. Have you looked also at the proposed chemical-processing plant in Kwinana?

Mr Craighead: Yes. We're aware of it. Here is our issue with these plants. Fundamentally, we have to guarantee supply. I describe it this way: as soon as we can see folks able and with a path towards providing battery-grade concentrate then we will engage commercially. Obviously, we need to make sure we've got the offtake people engaged so that they can commit to forward orders. We're supportive of these plants, but what is really important for us is that they're going to happen and that we know when they're going to begin.

So I guess we have a watching brief locally. I think the graphite is the one that'll probably come up for us first, but the others we'll be keen to engage as soon as we can see when that's likely to be locally—

Senator PATRICK: But it's not just a case of getting the battery-grade lithium. There are, I think, about five steps before you produce a battery. Aren't you playing in step 5?

Mr Craighead: I guess the way to look at it is that we start at step 5 and start filling in earlier stages. So we will start by pulling in some of the key components—imported, because we've got no choice. So we'll import jelly rolls and some other components of the cell for stage 1, and we'll fabricate them locally and use local electrolytes. So we'll basically pull in some major components, fabricate them and use some local materials to make them heat optimised. Then we will progressively extend backwards through the chain. Once you get to a certain size, it becomes economically viable for us to start actually pulling in literally raw materials at one end of the facility and manufacturing jelly rolls locally. So our aim is to start with fabrication and import and work our way backwards as the market catches up with us, basically.

Senator PATRICK: But obviously this entire processing chain would involve some input from government, and you said to Senator Carr that you really haven't been talking to government. I just wonder: are you channelling that through the exploration and mining association? How do you approach that?

Mr Craighead: Just to be really clear, the hardest way to do this is to have a completely vertically integrated manufacturing facility on day one. By that I mean that, if we were to start on day one with sacks of raw material at one end of the facility—concentrated lithium—and then have to handle and store that raw material, start mixing it and turn it into the compounds, it would be a much more complicated, slow and expensive way to start the facility, and we need to start the facility faster. So we are not going to start handling raw materials and a supply chain around raw materials; we're going to start with pretreated jelly rolls so we don't have to worry about the chemical handling. Then, as the market locally matures, we'll start to source those and work backwards to the point where we can handle it. At this point, it would be premature to worry too much. It's where we started about three years ago; that's what we thought we'd have to do. But our view pretty clearly, from the marketplace, is that it would involve too much complexity, too much risk and too much time to do that, so we'll start a little bit further down and work our way backwards as the market matures.

Senator PATRICK: I have a final question. You're going ahead, I assume, with approvals from a board and appropriate finance. I presume you have offtake agreements in place. I'm just wondering: what's your niche and what's your market?

Mr Craighead: We are a very, very small player in the world market, on the world stage. Our facility up in Darwin has a maximum capacity of 1.3 gigawatts. That sounds like a lot, but in the grand scheme of things we're very much a niche player. We are producing cells specifically engineered, from the chemistry of the cell up to the packaging, to perform better in hot climates. They last longer and degrade more slowly, and you need fewer of them. Our focus is only on two markets. One is the grid market, so large boxes at utility scale that reduce the need for diesel, spinning turbines or end-of-grid stabilisation of communities that are off grid and need power. In hot climates in Australia and South-East Asia, our batteries will be cheaper and last longer because they are engineered from the chemistry up to perform better there. The other is what we call niche electronic vehicles. Those aren't Teslas or anything like that; those are the forklifts, ride-on mowers and machines that move things around in airports and defence bases. In our world, they have basically the same heat challenges as boxes of batteries stuck out in the middle of nowhere. So our niches are large organisations that need big batteries to last a long time in hot climates and manufacturers of niche electronic vehicles that, again, have a particular sort of charge profile and need to last longer and be cheaper in hot climates. So our entire focus as a business is heat: the mitigation of heat and making batteries perform better in hot places.

Senator PATRICK: Thank you. I'm going to just ask one last question, with the chair's indulgence. I just remembered a statement you made during your opening statement. I'm looking at your submission, where you have laid out countries that have banned the sale of diesel and petrol cars by various years. We can see Norway at 2025, India at 2030, China at 2030 and so forth. I then contrast that with an answer I've got from a government official in respect of Australia that's been provided to the committee. I'll quote what this government official has written: 'Until at least 2030 conventional engines will stay the main platform.' That appears to be the view of the Australian government. How damaging is that in the context of your statement about needing to send clear signals in order to get uptake?

Mr Craighead: It's bad. I understand where they're coming from. Australia has very few people spread over a massive space, so we have people driving around with V8s and giant engines because of range anxiety and because, practically speaking, there's a lot of distance. A lot of people who travel much further than in most other countries, so we can't really extrapolate from Europe and North America. But, that said, I would be very disappointed to hear that, because the reality of it is that, if you then disregard the outliers and think about the majority of travel and if you look at the cities—and I'm sure much smarter people than me will have given you the stats for this—the vast majority of drivers, the vast majority of the time, are probably commuting between 20 and 30 kilometres a day. So there is really no excuse in Australia not to set an ambitious target to remove these industrial combustion engines in most places or to have heavy incentives for that to happen. These markets that I've mentioned that have set those targets are going through a car sales economic boom. The down-flow impact of it has been remarkable. Folks are looking at industrial combustion engines today in France and saying: 'Should I buy this? I cannot really sell it. It would reduce its value. I might as well move ahead and go to an EV faster.' That's having an accelerating effect on charging networks and jobs. That's pushing forward clean energy generation to be part of the power production agreement for these charging networks. So setting a target is having a really lovely ripple effect to create jobs and a new industry. Not setting a target or somehow thinking we have an exceptionalism here, I think, is not good. We're missing out again, unfortunately, if we find a way to think we're somehow different from the world. I would be very disappointed. I am very disappointed to hear that that would be the view.

Senator PATRICK: Thank you very much.

Senator RICE: Thanks, Mr Craighead. It's really interesting evidence that you've been giving us this morning. I want to continue on your view that, if the government sets that target and creates that investment signal, an awful lot of downstream benefits are going to flow from that. In terms of the processing of lithium, it sounds as if, even when your business is set up, that's still going to be happening offshore, but it would be beneficial to bring that to Australia. Do you think that just having government incentives to encourage the uptake of electric vehicles would be enough to create the market signal that could potentially bring that lithium processing on shore standing on its own two feet, or would there still be a requirement for government incentives for that lithium processing to be brought to Australia?

Mr Craighead: My answer would be, of course, 'All of the above.' I know this can't ever happen that way, but, if you could set a clear target and have incentives in some way—there are lots of examples of incentives to encourage folks to adopt EVs a bit faster—that's only going to be good. But there's more to it than that. I'm

looking out my window right now in the office, and I'm literally looking—you couldn't write this better—at an installer putting what looks like a large residential battery onto a home. I guarantee that all the materials there have come from outside of Australia, and yet Australia is the only country where every single material there, from the graphite on up—cobalt and manganese—could all be from Australia.

So I think the short answer is: absolutely. Set a target that will have a beneficial effect. Include the smaller volume providers, lithium being the smallest. It could well be enough. For the higher volume providers—graphite, cobalt and those guys—you'd probably need a bit more than just a nascent EV market, so there are other things you could do. To me, it would be encouraging the adoption of these vehicles, setting a target and making some sort of incentive. It doesn't take much. A lot of people aspirationally want an EV. If you can tip it towards them, they'll move towards it. So, from an EV perspective, that's a great idea. Leading the way, moving the fleets and the buses—there's no reason at all now that those aren't powered by battery. Those things will really drive volume. Buses and trams would be lots more, and bulk things like that where government has a heavier hand in moving would also be a big plus.

And then of course the largest chunk of the things that will tip it over is for the government to also look into: instead of importing big storage things from South Korea, let's start using some of those locally. I guarantee that those bigger, chunkier projects will be enough to get not just the lithium guys up but the cobalt and graphite guys up as well, and probably manganese as well. So I would say—

Senator RICE: In summary, for the lithium, you reckon that just having that target and having the support—the implementation of the target, not just the target—would be enough to bring that lithium processing to Australia?

Mr Craighead: To me, if you do three things—you set a target, support it with some incentives and have some sort of government move toward at least major projects being battery powered—that would be enough, I would have thought. It's often lithium. That's funny, because lithium is actually relatively small by volume. Lithium is one of the easier ones to process locally now, relatively speaking. So I would have thought, from a lithium perspective, yes. You'd want more than now. We've got the best cobalt and graphite in the world here, so we'd want to have those guys having the economics to tip over in local processing as well. So I would say yes to lithium. But, the more you do, the more likely you are bring other ones, so I would be focused on all the things you can do to incentivise EV and stretching out, just like we do. EV batteries are basically the same as the big batteries of certain energy communities. Look at those as well and treat them all as reasons to spark an industry upstream. That's what I would do.

The thing is that, as soon as processing happens locally, as soon as you have a battery grade processor of cobalt, manganese, lithium or graphite locally, we will immediately become the smallest customer they have, because they can sell that processed grade quality, skip past Taiwan and other processing plants and go straight to the world market. That's where the big opportunity, I think, for the country is. Anything we can do to get their economics working or their business case working—we all benefit.

Senator RICE: I've just got one question. We've had quite a bit of evidence about different battery chemistry technologies. How confident are you that lithium based technologies will be the winners in battery chemistry over the medium term?

Mr Craighead: We're manufacturers. I guess we're kind of agnostic. If there were something that we thought we could manufacture that was more compelling and more sellable, we'd look at that. We are agnostic to the chemistry. There are different lithium ion chemistries, and we're entirely agnostic about that.

The other thing is that I think storage in all its forms is a horses-for-courses thing. Sometimes pumped hydro solar is fantastic, and sometimes flow energy batteries are. I would encourage all forms of storage. Storage is the unlocking key to getting us an awful lot of the way towards much, much cheaper energy and energy independence. So I don't see it really as competitive, but lithium ion—we talked to a whole bunch of battery gurus around the world before selecting our partners. We're not inventors; we license and manufacture. Pretty much the consensus is: when you sell a battery, if it's for a car, you want the car's battery to last seven to 10 years before it's replaced. You want your battery for the Defence Force or on a remote community to last 12 or 15 years. So you need to be certain, when you buy it, how it will perform in your three-year, seven-year or 12-year term.

Today lithium ion is the most predictable. You know pretty much exactly how it performs, based on the way you use it, the charge and the condition. As a result, it's the safest way—it's the safest horse to bet on—for a long-term storage requirement. There are going to be annual improvements in it, and eventually other blockbuster things will come on line. For now, I think niche technologies will fit niche requirements, but the bread and butter of things in your phone or your computer or your Tesla are going to be lithium ion for a while.

Senator RICE: Thank you.

CHAIR: Thank you very much, Mr Craighead, for your appearance today and your information. Thank you very much.

Mr Craighead: You're welcome. Thanks again for the opportunity.

PARTRIDGE, Mr Greg, President, Australian Electric Vehicle Association

[12:31]

CHAIR: I would now like to welcome Mr Greg Partridge, from the Australian Electric Vehicle Association. Information on parliamentary privilege and the protection of witnesses in giving evidence to Senate committees has been provided to you. The Australian Electric Vehicle Association have lodged submission No. 8 with the committee. Would you like to make any amendments or additions to it?

Mr Partridge: No, not at this time.

CHAIR: I now invite you to make a short opening statement, and at the conclusion of your remarks I will let members of the committee ask questions. Thank you very much, Mr Partridge.

Mr Partridge: Thank you, senators, for giving me the opportunity to address you today. The Australian Electric Vehicle Association, otherwise known as AEVA, was formed in 1973. We're a member based organisation of electric vehicle owners. I would like to address two areas in our submission—due to time limits—those being sales and charging.

AEVA would recommend incorporating electric vehicles into government fleets as a highly visible and relatively low-cost initiative that would drive the second-hand market for electric vehicles. There are quite a few electric vehicles that are coming to market at present, including the Renault Zoe, Hyundai Ioniq, Hyundai Kona and Nissan Leaf—not that we recommend any particular vehicle, but all of these vehicles could play a role in government fleets. This could be done with a target of, say, 20 per cent by 2020 or 2025 or something like that, and that would then in turn stimulate the second-hand market for electric vehicles as well. The benefit to government departments, of course, is that there would be significant savings in costs for fuel and maintenance, as electric vehicles have lower running costs.

To further promote the sales of electric vehicles, AEVA would also support the removal of the luxury car tax from electric vehicles until they reach a certain percentage in new car sales or for a fixed time period for vehicles up to a certain threshold. The luxury car tax adds a significant amount to the cost of a new electric vehicle and as such acts as a barrier to EV adoption in Australia.

Furthermore, AEVA would also support the relaxing of parallel import laws—which was discussed earlier—to allow Australians to import their own vehicle from other right-hand-drive markets, which is not currently possible to do.

One of the other initiatives that could be undertaken would be to encourage workplace EV charging, which would have the benefit of soaking up the excess solar that's generated throughout the day and reducing the evening peak demands. AEVA would also recommend that the government endorse the type 2 charging connector, the 61851-1, as the mandated standard in Australia, and the CCS 2 for DC purposes. Other low-cost initiatives that could be adopted would be incorporating level 2 charging for electric vehicles in long-term car parks such as railway stations, park-and-ride stations et cetera. Typically vehicles are parked there for eight to 10 hours throughout the day, and it wouldn't be a particularly expensive exercise to incorporate lower-amperage chargers in these parking bays.

Finally, residents of apartment buildings in multi-dwelling developments pose unique challenges when it comes to charging their electric vehicles. Currently there are very few unit blocks or townhouses that do have charging facilities. We would recommend that future developments have the provision for EVSEs in each of the dedicated car parking spots so that the owners could install their own charging equipment there.

CHAIR: A question I was going to raise earlier focuses on this charging-standard issue. I'm quite interested in whether other markets around the world have similar issues and are solving them in a different manner. Could you please talk a bit more about what is existing, because, as you note here, this change would be important in preventing further delays in infrastructure rollouts. Could you talk a little bit more about that.

Mr Partridge: Our first generation electric vehicles, which were the Nissan Leaf and the Mitsubishi i-MiEV, both Japanese made, came with a J1772 connector, a type 1. That's only capable of single-phase power. The type 2 connector is capable of both single- and three-phase power. A lot of our other vehicles that are coming to the Australian market now have the type 2 connector attached to them, so we've now got a combination of charging standards out there, both J1772 and the type 2 connectors, which is creating a VHS-Beta type scenario. What we really need is some clear guidance from the government that Australia will have type 2 and CCS 2 as the Australian standards so that manufacturers know what we expect in the Australian market.

CHAIR: But initiatives by certain governments or councils or other entities are still undertaking infrastructure without type 2?

Mr Partridge: Certainly the way we're heading at the moment is type 2. The Renault Zoe and the Hyundai vehicles are type 2, and BMW has converted from CCS 1 and J1772 across to the CCS 2 and type 2 connectors in their most recent i3 models.

CHAIR: You've spoken about government fleets and luxury car tax. Could you perhaps speak about your issues regarding salary sacrifice and ICE vehicles versus electric vehicles. Are you seeing a problem?

Mr Partridge: If I can just refer to the original statement—

CHAIR: I think it says here: clarifying these rules will make—

Senator BUSHBY: Tax deductible.

Mr Partridge: In regard to the fringe benefits?

CHAIR: Yes, in terms of clarifying rules for making EVs for work use more appealing from an accounting perspective. Are other markets doing this and you're reflecting on this, or is this just a—

Mr Partridge: Sorry, I'm not quite sure—

CHAIR: I'm just interested in whether that's a key issue in terms of your members' growth.

Mr Partridge: In terms of when you charge your vehicle at home using your own power supply and so on, there needs to be some clarification as to how that's going to be compensated by the workplace. Typically, with petrol vehicles and so on, you're filling up from a commercial source, but where the vehicle is taken home and charged up at home—

CHAIR: I understand. Senator Rice, I thought I should give you a chance to start.

Senator RICE: Thank you, Chair. Thanks, Mr Partridge. Can you summarise for us—in your submission you state that Australia's uptake of electric vehicles has been far too slow. What are the key reasons why this is the case?

Mr Partridge: We've had a very limited range of choice of vehicles in Australia. We've had the Mitsubishi i-MiEV and the Nissan Leaf, which I mentioned earlier, and more recently the Tesla vehicles. But one of the main stumbling blocks has been the lack of charging infrastructure. With the exception of Tesla, who are rolling out their own charging infrastructure, up until recently Australia had very poor charging infrastructure. A lot of it was level 2 as opposed to the DC fast charging, and, as a result, people have 'range anxiety'—you would've heard the term. They're concerned: can I actually get my car from Sydney to Melbourne or Sydney to Brisbane? If it couldn't do 100 per cent of what they would want it to do at some stage then they would be concerned. One of the things we could do is encourage DC charging networks to be established, like the one that's been done in New South Wales and, more recently, in Queensland as well.

Senator RICE: In terms of getting that charging infrastructure and the limit on the number of models available, how important is government leadership to shift things along?

Mr Partridge: Coming back to the charging connectors, I think we need the government to mandate that Australia will be using the CCS type 2 and CHAdeMO connectors, as opposed to the CCS 1. That way there can be a clear indication for car manufacturers that Australia is a CCS 2 market and there will be clear guidance as to what we should be importing into Australia.

Senator RICE: But, more generally, in terms of government leadership—you make quite a number of recommendations in your submission, a lot of which are government responsibility. How much is the fact that the government is not doing that holding us back at the moment?

Mr Partridge: There are certain barriers because of the parallel import laws. If the government could relax those laws to permit individuals to bring their own vehicles into the country, like what's being done in New Zealand, the electric vehicle industry would flourish a lot more. That would be one thing that government could do.

Senator RICE: You talk about the need for vehicle emissions regulations. How important do you think they are?

Mr Partridge: If the emissions levels in the standards were lowered, it would also increase the popularity of electric vehicles, which are effectively zero emissions when they are recharged from a renewable source. A lot of electric vehicle owners do use renewable energy when they charge their vehicles up.

Senator RICE: There's a whole range of things that this committee is considering that could and should be done. I'm just trying to get your view as to which of them you think are the most critical things and where vehicle emissions standards fit in terms of level of importance.

Mr Partridge: I feel that the strongest thing that the government could do at the moment would be to incorporate electric vehicles into their fleets and encourage the DC charging networks to be installed throughout the country. That would give people confidence to purchase an electric vehicle and be able to travel distances. Placing the electric vehicles into the government fleets would also then have a roll-on effect in making electric vehicles more affordable on the second-hand market.

Senator RICE: Finally, your submission talks about the role of electric bicycles. As somebody who owns an electric bike and as an avid cyclist, it'd be remiss of me not to question you about what role you see electric bicycles playing in our transport options.

Mr Partridge: Electric bicycles are a much more affordable option for many people. Currently, we have laws in Australia that require the maximum wattage of the electric bicycle to be 250 watts with pedal assist or 200 without, which is on the low side as far as other countries go. If that were to be revised, it would make them more practical. When you hit a little bit of a hill on a 250-watt one, it's still hard work; it's still a lot of work. But if you could have up to, say, 800 or a thousand watts with pedal assist then that would make them a much more practical option.

Senator RICE: That would be pretty powerful bicycle. Have you considered or do you have any recommendations of other things that government could do to encourage greater use of electric bicycles in addition to having more powerful ones?

Mr Partridge: I believe that changing the rules regarding the wattage is the main thing they can do. At the moment, they're little more than toys. People would adopt them like they have over in Europe if they had higher-wattage motors to make them more of a practical option.

Senator BUSHBY: Thank you for assisting us with this and for the submission. On the whole, most things in your submission are pretty clear—what you're recommending and why—but there are a couple things I want to seek some clarification on. At the end of it, you talked about some additional matters to promote consumer education and protection. What exactly are the electric vehicle proclamations—oh, I'm in the wrong one, am I?

Mr Partridge: Yes.

Senator BUSHBY: I had moved forward. My apologies—I'll leave it at that, then. I was looking ahead.

CHAIR: Senator Patrick, do you have anything?

Senator PATRICK: Your association formed back in 1973.

Mr Partridge: That's right.

Senator PATRICK: Were these mad scientists who were predicting the future? What's the story?

Mr Partridge: We started out as an association of, you might say, tinkerers who solely converted electric vehicles from petrol and diesel vehicles. Back then, there were only lead and DC motors. In many cases, they were torpedo motors or forklift motors et cetera that we used. The range was 20 to 30 kilometres, in many cases. Over the years, we got better motors. As has been discussed today, we have lithium batteries, which has been a huge step forward. We're now using AC motors and, in more recent years, we've been using salvaged parts from other electric vehicles such as Teslas and Nissan Leafs et cetera when doing conversions. A lot of our owners now have OEM vehicles, and we see that as perhaps the main future for electric vehicles.

Senator PATRICK: You still have these tinkerers who are playing with permanent magnet motors and lithium-ion batteries.

Mr Partridge: They do, but in many cases the conversions now are of classic vehicles. Someone might've had an old MG that they've had for many years and they want to give it a new lease on life or a family vehicle, for instance. It might be some form of specialty vehicle that they want to make into an EV for, say, mining purposes. You don't want to have a petrol vehicle underground, so they convert a vehicle to be electric for those purposes.

Senator PATRICK: So you're not a replacement to the NRMA or the Queensland motoring—

Mr Partridge: No. We started out as a club, you might say. We're more of a support group and an advocacy organisation.

Senator PATRICK: Principally, you still have these tinkerers in the background.

Mr Partridge: There are still quite a few of the original members.

Senator PATRICK: And they have electric vehicles as a reliable—

Mr Partridge: Yes. We still have quite a few legacy conversions, but a lot of our newer members are mainly focused on OEM vehicles.

Senator PATRICK: In some sense, you've been dealing with this lack of infrastructure for 40, almost 50, years.

Mr Partridge: It's been a long time. You just do most of your charging at home if you have a conversion. In fact, if you have an OEM vehicle, you can pretty much do 95 per cent of your charging each night—just plug it in at home. But if you do want to take an OEM vehicle on a longer trip, at the moment, you can't pull into a service station and just top up; you need to know where the charging facilities are. There are apps, of course, to look at to find out where you can charge up. I've driven my Nissan Leaf to Hobart from Sydney. It's just a matter of knowing where to plug in.

Senator PATRICK: Did you have to take a special route to do that?

Mr Partridge: I went down the Princes Highway.

Senator PATRICK: So that's just like anyone else would.

Mr Partridge: That's just like anyone else. I just looked at an app called PlugShare and used ChargePoint and was able to locate where my next charging spot was going to be.

Senator PATRICK: I was quoting from some Australian government officials who were making some rather uninspiring comments or setting some pretty low objectives. I think the saying is: 'It doesn't matter whether you think you can or you think you can't, you're probably right.' In this instance, are you uninspired by what's been happening in Australia compared to overseas?

Mr Partridge: I'm disappointed. I would like to see a lot more support for electric vehicles in Australia. I think it's very close; I think we will be getting a lot more electric vehicles coming into Australia.

Senator PATRICK: So we'll be dragged kicking and screaming, if necessary.

Mr Partridge: I think there has been some reluctance with the manufacturers to supply them to Australia. The earlier manufacturers—Mitsubishi and Nissan—might have had their fingers burnt a little bit with some slow sales, but I think we've reached a time now where people are sitting up and taking more notice. There are a lot of Teslas out there on the road at the moment, and they're getting a lot of attention. I think people are becoming more aware of electric vehicles whereas, before, they'd typically say, 'I didn't know you could buy one.' There's more awareness out there at the moment.

Senator KIM CARR: What support would your association recommend for domestic manufacturing?

Mr Partridge: For the car industry or—what sort of manufacturing do you specifically mean?

Senator KIM CARR: Have you not thought about it? You've been operating since—what did you say?

Mr Partridge: It was 1973.

Senator KIM CARR: You've been operating since 1973 and you have not thought about manufacturing.

Mr Partridge: We're buying a lot of our parts from overseas. The original motors all came from overseas. A lot of the components we use now come from overseas. Australia is fairly small.

Senator KIM CARR: Let me put it this way: there's a Nissan factory in Melbourne that produces the bulk of its work for electric vehicles for Nissan globally. There were a number of green-car manufacturing projects for electric vehicles. There are hydrogen vehicles that have a number of joint-use componentry from conventional vehicles. Surely you've considered these matters, since you've been operating since '73. We've just had a presentation from a vehicle charging factory.

Mr Partridge: Yes, I was going to say that we certainly have a number of electric vehicle charging companies in Australia. You heard from Tritium and JET Charge earlier. There are a couple of others who provide software and so on for payment. It would be good to see these companies be able to sell more of their products within Australia. Certainly the Tritium charger is very popular globally.

Senator KIM CARR: But my question was: what should we do to support domestic manufacturing? What thought has your association given to this matter? Do I conclude from the way you have responded to that question, not very much?

Mr Partridge: I would like to see Tritium and other charging manufacturers play on an even playing field. I don't know whether subsidies are necessarily the right way to go.

Senator KIM CARR: I see, but you have recommended that the federal government provide various support measures for foreign manufacturers.

Mr Partridge: You're referring to the vehicle manufacturers themselves?

Senator KIM CARR: Yes.

Mr Partridge: In order to make vehicles more affordable—

Senator KIM CARR: That's the point. You are prepared to support someone else's manufacturing industry, but you don't think we should be supporting Australian manufacturing.

Mr Partridge: I did suggest that we waive the fringe benefits tax in order to make them more affordable in Australia.

Senator KIM CARR: I'm just trying to see the logic of the position.

Mr Partridge: That's not something that is faced overseas. The vehicles ultimately become more expensive when they reach the retail market here.

Senator KIM CARR: Thank you very much.

Senator DAVID SMITH: This is connected to Senator Carr's question. Mr Partridge, you and a number of people who have made submissions have made suggestions about government playing a much stronger role and using procurement policy for their own fleets to increase EV uptake. If governments were to do that, would it make sense in that procurement approach to also think about Australian content in those EVs?

Mr Partridge: I must admit that I'm not 100 per cent sure how much content is in some of the vehicles that are currently manufactured overseas, but that would be something that would be worthwhile looking at.

Senator DAVID SMITH: Senator Carr provided an example. There are Nissan vehicles at the moment that have parts made in Melbourne. That could be an example. Of course it could end up being a stimulus for the domestic manufacture of other components too.

Mr Partridge: I'm sorry, I'm not quite sure how to answer your question.

Senator DAVID SMITH: If we're going to use such significant procurement power to possibly increase the uptake of EVs, would it also make sense to potentially preference Australian content in those EVs at the same time?

Mr Partridge: I suppose it would, yes.

Senator DAVID SMITH: Thank you.

CHAIR: Thank you very much, Mr Partridge.

FOX, Mr Paul, Head, Corporate Development, Fast Cities Australia

WHITBY, Mr Rodger, Chief Executive Officer, St Baker Energy Innovation Fund

[12:58]

CHAIR: I now welcome Mr Rodger Whitby from the St Baker Energy Innovation Fund and Mr Paul Fox from Fast Cities Australia. Information on parliamentary privilege and the protection of witnesses in the giving of evidence to Senate committees has been provided to you. St Baker have lodged submission No. 59 with the committee. Would you like to make any amendments or additions to this submission?

Mr Whitby: No.

CHAIR: Fast Cities Australia have lodged submission No. 54 with the committee. Would you like to make any amendments or additions to this submission?

Mr Fox: No, thank you.

CHAIR: I now invite you to make short opening statements. At the conclusion of your remarks I will invite members of the committee to ask questions.

Mr Whitby: Thank you, Mr Chairman and committee members, for the opportunity to appear today. St Baker Energy Innovation Fund is an investor in early-stage companies that are developing disruptive products and services in the clean energy sector. We have a particular interest in electric vehicles and electrification of transportation. This is evidenced by our significant investment in Tritium, who I believe you visited this morning, and Fast Cities, which is a national infrastructure project designed to dispel range anxiety amongst EV drivers. Tritium have managed to secure a leading position in the global market for EV chargers, so our investment is less reliant on the uptake of EVs here in Australia. However, the Fast Cities project is a bold move to build critical infrastructure here in Australia well ahead of the minimal viable uptake level of EVs. It's a chicken-and-egg scenario. If the infrastructure is not built, the EVs will not come, but, until the EVs come, the infrastructure is not viable. So this investment is a huge risk for private investors such as ourselves, and we are actively seeking ways to share that risk with others, including, for instance, ARENA. Other companies within the St Baker group include significant investments in power generation and electricity retailing, so the future of EVs will definitely have an impact on our investment portfolio.

Both Tritium and Fast Cities made submissions to this committee focusing on issues relevant to their specific activities. In our submission to the committee, we chose to focus our comments on issues related just to the electricity networks and, in particular, the vexing problem of demand tariffs. Ultrafast chargers, by their very nature, have a low capacity factor, and this means that traditional demand tariff structures tend to be very detrimental to the overall economic viability when taken as an average cost per kilowatt hour of energy delivered from those ultrafast chargers. Electric vehicles are essentially batteries on wheels, so they can charge in multiple locations, but only in one location at a time, so it seems unfair that their contribution to a network demand charge should be counted more than once. Our proposal is that EVs should not be penalised by having to pay a demand tariff at all locations—rather, they should only pay a demand tariff at their principal place of residence—and that public charging facilities should be exempt from the demand charge, the motorists having already paid at home.

Of course, it's not a one-dimensional issue. In some instances, EV charging will have a negative impact on electricity networks. We recognise that. But, if managed properly, these batteries on wheels have the potential to be actually a huge benefit to the electricity network, by helping to smooth out demand by, for instance, absorbing renewable energy at times of abundance and improving network stability and reliability. Tariff reform will be essential as new business models emerge to capture the full advantages that can be offered by EVs, so that's why we're advocating some tariff reviews. I'm happy to take questions on the topic but also to provide our perspective on investment in the EV sector here in Australia.

Mr Fox: Thank you to the chair, senators and staff of the committee for building a broader understanding of the benefits of transportation electrification. Confidence is the missing ingredient—confidence amongst drivers to buy an EV, confidence amongst fleet owners to realise the productivity benefits, confidence amongst automotive importers to bring more models to Australia and confidence amongst investors, like the St Baker Energy Innovation Fund, to finance infrastructure and fleets. We believe that a public-private partnership for highway charging is a key to unlocking confidence that will flow down those value chains.

Australians love their road trips. I was in Long Beach in California and I was telling people the stats in Australia, and they were quite surprised, even in the wild west of the United States, but, according to ABS data, 15 per cent of passenger vehicle kilometres are on the highway, long distance. In the case of light commercial

vehicles, which are a much bigger contributor to pollution and emissions, it's almost 25 per cent of their vehicle kilometres travelled. So, whilst most owners will charge at home or in the depot, highway charging is the biggest gap in infrastructure. In order of magnitude, it's more capital-intensive than 50-kilowatt or AC chargers, so it requires even higher levels of confidence in order to invest. The good news is that, if you can create that investment, it has a stimulatory effect, and that was outlined in our presentation. I'll talk a little bit more about where that comes from. The good thing about that stimulatory effect is that it is more long-lasting than direct vehicle subsidies, for example. A \$100 million investment in infrastructure—and that would basically be around 100 ultrafast sites—would have a stimulatory effect similar to a \$5,000 direct vehicle subsidy. If you think about it, \$100 million in infrastructure terms compared to a bridge, a toll road or a tunnel is peanuts, so we think it's great value for money.

How does it have a stimulative effect? The Clean Energy Finance Corporation talked about the trifecta: lower cost of vehicles, greater choice of models and more charging infrastructure. It's obvious that more charging infrastructure is directly affected. What's a little bit more subtle is the impact on the lower cost of vehicles and the greater choice of models. Obviously, choice of models is dependent on the confidence of the importers. They're quite nervous. We heard Tim Washington earlier today talking about his discussions and how they have to go back to headquarters in Germany and Japan and convince head office that we deserve to get more models. We're constantly being asked questions by the OEMs about where we're at and when the network is going to be built. It's very important to them. But there's another question: how do you decide on the vehicle that you're going to buy as a fleet owner or as a consumer? You've got to consider your driving needs; you've got to consider how far you're going to travel. If the chargers are too far apart, then you're going to need a more expensive, longer range vehicle in order to get from charger to charger. That impacts on the density of chargers required in order to make it possible for people to use affordable vehicles versus prestige vehicles. We've calculated that we need about 42 sites to provide what we call minimum viable coverage of the national land transportation network. If we did 100, we'd kind of get all the way around, but, if we just want to make sure that the key city and regional areas are covered, we need 42 sites, each with two heads. A smaller network—say, equivalent to the Tesla network of 20 sites, covering roughly the same area—would mean that the network only works for people buying prestige cars. So we do need more. We need a substantial investment and we need it rapidly in order to generate a shock to the current system and the current levels of inaction in that system. We need to get that network built quickly.

Investment infrastructure can create confidence. We have an application to ARENA at the moment for a significant amount of money to help match the money that's been put up by the St Baker fund. We think it is a good value-for-money investment and, as I said, peanuts in terms of the sorts of infrastructure investments we make in Australia today. Thank you very much.

CHAIR: Thank you.

Senator KIM CARR: Thank you very much. So you need 42 chargers. That gets you basically the Pacific and the Indian Ocean Rim, doesn't it?

Mr Fox: It is 42 sites. Each of those sites should have two charging heads. You saw those. They're like a bowser. Two of those—

Senator KIM CARR: Sure. Would the 42 facilities basically get you the main highway links on the coast?

Mr Fox: It gets you from Adelaide to Cairns, it gets you a bit of Tassie, which the senator from Tasmania would like to know, and a bit around Perth as well, so that we—

Senator KIM CARR: But it doesn't get you up through the north-west?

Mr Fox: No. That would take 100 sites. Our current vision is to get 100 sites—

Senator KIM CARR: I just want to get an idea of what it means. That's essentially the largely populated coastal strip?

Mr Fox: Yes.

Senator KIM CARR: And it doesn't cover the less populated coastal strip of the north-west?

Mr Fox: No.

Senator KIM CARR: Or the gulf?

Mr Fox: It would basically follow highway 1, if you like—the main routes in Australia. Once we get to 100 sites we start to cater to some of the secondary routes—New England, inland Victoria and so forth.

Senator KIM CARR: So, the hinterland doesn't get covered under this model?

Mr Fox: Not under the 42, but under 100.

Senator KIM CARR: So, 100 gets you—what, is it out the back of Queensland?

Mr Fox: It doesn't necessarily get you the back of Queensland. I can probably take it on notice. I think we did supply a map—

Senator KIM CARR: Yes, if you would, please. I just want to see this, because one of the issues that does occur to me is the regional disparity.

Mr Fox: Yes. We believe that's—

Senator KIM CARR: The electrification issue does pose some really serious social—

Mr Fox: Yes.

Senator KIM CARR: There's clearly a demographic issue, and you've made the point in your presentation about the cost of vehicles. The more-expensive vehicles—obviously people have a lot more money.

Mr Fox: Yes.

Senator KIM CARR: So, there's an inbuilt demographic question there about people who can afford the Tesla, versus some of these smaller vehicles. Then there's the question of the geographic distribution.

Mr Fox: Exactly.

Senator KIM CARR: And if you're away from a regional centre of any size then the capacity to actually use these vehicles is somewhat limited. So I think that needs to be clear when we're talking about the reality versus the mythology.

Mr Fox: The way we've looked at it is that there is a national land transportation network, which is federally funded highways—managed by the states but funded by the federal government. When we did some initial calculations, we thought, 'What would it take to cover the national land transportation network?' That actually does take in a lot of those regional routes. The second part is tying in with regional networks. The NRMA, Energy Queensland and others are doing great work. They're not putting the ultrafast chargers in but they are putting the 50-kilowatt fast chargers in. There needs to be a degree of coordination and integration between them to make sure that those regional areas and towns get a look-in.

Senator KIM CARR: You mentioned that we've got a problem in outback Queensland. What about outback New South Wales?

Mr Fox: It's not dissimilar. There is some treatment from the regional networks, but I think it will be very similar to rolling out the—remember the 3G networks in Australia, when digital mobile communications started to come in?

Senator KIM CARR: We're not going to have a satellite for this, so it's not going to work.

Mr Fox: Yes. You've got to go out there and build it.

Senator KIM CARR: The second question that comes to mind, and given that you're essentially an energy company, is the question of the effect on the grid. FCAI tells us that they expect price parity of electric vehicles with conventional vehicles in the mid-twenties. That's the best estimate in terms of the automotive engine industry. At that point they would expect a take-off in electric vehicles. It's seven or eight years away. And we can expect an increase in demand for electricity commensurate with the increase in the sales of electric vehicles—an increase of as much as a third on the grid is predicted. But under the current energy policies there is no capacity to expand the grid by a third. What do you say to that problem?

Mr Fox: I think their estimate of the additional demand is probably on the high side, and maybe some of their recent—

Senator KIM CARR: What's your estimate, then?

Mr Fox: What's been happening in Australia in the last few years is that electricity demand has actually been falling at a residential level—

Senator KIM CARR: That's because we've essentially been de-industrialising the country, which is really clever.

Mr Fox: Part of it is that. Electric vehicles probably won't replace the lost demand, but they will result in redistribution of that demand to a certain extent. Also, these are batteries on wheels, so in the time frame—

Senator KIM CARR: What evidence do you have for this? No-one else is telling us that this is going to be able to be done without an expansion in the capacity of the grid.

Mr Fox: I'd say that there have been some levels of studies, as I understand it, by the CSIRO. I'm by no means an expert on the grid side of things, but I would say that it would be easy to get carried away and put the brakes on over worries about the grid.

Senator KIM CARR: No, I'm not talking about that. I'm saying that there needs to be a commensurate increase in capacity.

Mr Fox: There may in certain locations.

Senator KIM CARR: Some locations? The other part of your—

Mr Fox: In other locations, the grid is already being well catered for.

Senator KIM CARR: Your group of companies consists of energy producers. You make electricity.

Mr Whitby: Correct.

Senator KIM CARR: Let's not play games here. You make electricity. There is an issue here about the energy policies of the country that goes together with this question.

Mr Whitby: Absolutely.

Senator KIM CARR: It can't be seen as separate.

Mr Whitby: No doubt. Absolutely.

Senator KIM CARR: So the answer is not to say, 'Oh, maybe we can fiddle with batteries,' which we know last a few minutes in an energy context in terms of running big industry. They're not the answer to our energy problems. We need continuous, reliable, cost-effective power generation. If you put a one-third increase in demand on the energy system, we're going to actually need to increase our generation capacity. Surely that's a consideration that your group of companies has considered, given that you're in the coal business.

Mr Whitby: Could I answer that.

Senator KIM CARR: Yes.

Mr Whitby: It's a very important point. Adding vehicles is definitely going to increase the amount of energy consumed. I think it's not the normal proportional relationship with extra network demand required for that extra energy. Because of the nature of these devices—they are batteries on wheels—we can be a lot more choosy about the times that we charge those batteries, and that will help to utilise the existing network a lot better.

Senator KIM CARR: I see. Thank you. All right. I just want to be clear, though: is it the view of your group of companies that there needs to be a connection between our energy policies and our policies towards electric vehicles?

Mr Whitby: Absolutely—100 per cent.

Senator KIM CARR: Thank you very much.

Senator BUSHBY: I just have a couple of questions. Coming back to the 42 and the 100 charging stations, I note that we have a map here, but in just quickly looking at it I couldn't actually get the numbers. Figure 1 is the Australian DC fast charging network—I think it's in one of yours—as of July 2018. It looks like Queensland's quite well serviced, there seem to be a lot in Perth and then the rest of the country is not doing too well on that. How many are actually up and running now?

Mr Fox: None of them are up and running now.

Senator BUSHBY: Okay. It says 'Australian DC fast charging network as of July 2018'.

Mr Fox: That's the plan as of that date, not the actual number of chargers.

Senator BUSHBY: Okay. So there aren't any up and running at the moment?

Mr Fox: The first 350-kilowatt chargers in the world were installed—they were Tritium units—only a few months ago. There's quite a long lead time in terms of acquiring sites but also in getting grid connection approvals and so forth. So we expect the first ones to be installed early next year.

Senator BUSHBY: So does this map show the 42 and where they will be? It looks like there would be roughly 42.

Mr Fox: Yes.

Senator BUSHBY: It doesn't have any in Tasmania on that map, by the way, so maybe it's not the 42.

Mr Fox: It might not be. We do have sites in Tassie.

Senator BUSHBY: On the cards, what is currently committed to be built? Do you have any of those sites where you're ready to go and roll out?

Mr Fox: Yes, we've actually got our first site, which is in Queensland, north of here. It's similar to the mobile tower business, where you are deploying this equipment—quite expensive equipment—onto other people's land, and there have been cases of predatory speculative property acquisition and so forth. So we're quite deliberately secretive about where the actual sites are going in until we've actually secured them. We have the first site just north of Brisbane now. Essentially, the sites that we're focusing on now are those that are connecting Brisbane through to Melbourne and then on to Adelaide. We haven't done as much work on Far North Queensland, Western Australia and Tassie so far.

Senator BUSHBY: If it's not exposing some of the sensitivities, are you looking to co-locate with existing petrol stations, rest stops and things like that?

Mr Fox: Yes. The purpose of our project is to catalyse the uptake of electric vehicles, so we want to make the experience for the driver as great as it can be. So we're going to operate all of the sites 24/7, so they're well lit, they're secure, they have amenities 24/7 and somewhere to eat, and all those sorts of things. As you can imagine, that's where you want your family.

Senator BUSHBY: So you're effectively looking to join those existing sites rather than create new ones?

Mr Fox: Yes, exactly. So they are on existing highway rest stops. We're not putting them in council depots or on roadside—

Senator BUSHBY: Not buying old houses and knocking them down or something like that?

Mr Fox: Yes.

Senator BUSHBY: In the normal course of events, how long do you think it would take to get to the 42, in the absence of government assistance?

Mr Fox: My colleague tells me that he could knock out 42 sites very quickly. It's really a matter of the timing of funding. But our intention is to have the Melbourne to Brisbane completed by the end of next year, and then we would roll out the remaining 42 sites in the following year and six months. So it's about a two and a half year process in total. We could go faster; we have to be careful about going faster, because we need to match it to the growth in demand. We're already going ahead of ourselves; we don't want to go too far ahead of ourselves.

Senator BUSHBY: You were saying before that—like any company looking at a situation like this where you can see that there will be demand but the demand is not here yet—you've got to balance the commercial risk in doing so. Are you saying that an investment by government of some level is necessary to minimise that commercial risk to the point where you would actually make a decision to go ahead?

Mr Fox: Yes.

Senator BUSHBY: You wouldn't go ahead in the absence of government investment?

Mr Fox: We definitely need support and I think the quantum of that support is quite important in view of the need to kind of shock the system out of where we currently are and create the level of confidence we want. It needs to be coincident with the availability of the vehicles, and that's why we're charging hard to get the absolute backbone of that network in by the end of next year. But yes, definitely we need that, because currently our investors are taking a venture like risk in return for something that's you know infrastructure like in terms of return but also a long way out. So there's a big gap between the risk and return.

Senator BUSHBY: When you say \$100 million for 100 fast charge stations, is that the overall cost or how much you would be looking for the government to put in?

Mr Fox: That's our estimate of the total installed cost.

Senator BUSHBY: So if a government was to partner with you, it would be working back from that?

Mr Fox: It would be less than that. For example, with the 42 sites a total investment of \$50 million—it's a little bit more expensive on the first 42 and then you start getting economies of scale—\$25 million private and \$25 million of public money could basically fund that minimum viable network for Australia.

Senator RICE: So is what you're asking for government investment, so essentially there'd be a return to government, or are you looking for a grant?

Mr Fox: A grant would be nice, but I think the current system is more around recoupable grants so the money goes back.

Senator PATRICK: So this is CEFC?

Mr Fox: Actually, ARENA.

Senator PATRICK: I thought ARENA did grants whereas CEFC did the financing with return?

Senator BUSHBY: CEFC are pretty stringent on commercial risk and return as well.

Mr Fox: Yes, CEFC told us we were a little early for them, but ARENA is considering it very seriously.

Senator BUSHBY: Mr Whitby, you were talking about a one-only demand tariff charge. Just explain to me why they would be paying more than one if they went to different places I mean it's not a single payment, is it? It's an additional charge that is attracted whenever you use energy.

Mr Whitby: So the instantaneous demand contributes to the demand charge that's assessed over an entire year. But if their demand is contributing towards that demand calculation in multiple locations then essentially then someone is being charged for that tariff multiple times.

Senator BUSHBY: I hear what you're saying, but to get my head around it I think it takes a little bit more. Would you mind setting that out, explaining it in as simple terms as you possibly can and putting it—

CHAIR: Don't you mean that they're paying more than they should?

Mr Fox: What happens with demand charges is they're a payment for the capacity provided, and so that's why they're worked out on the instantaneous demand. But the way in which it is calculated in the networks is that it is smeared across the whole network. So essentially that total cost of providing that capacity, if you like, is amortised across the kilowatt hours you buy. And so since you're mainly charging at home, you're paying for that as you as you go at home as you charge it. If you then have to pay for that instantaneous charge out in the field when you get a fast charge, it's being double counted. It's partly an artefact of the way they calculate it.

Senator BUSHBY: It's still contributing to the capacity that is required at that point where you fast charge?

Mr Fox: In which case it shouldn't be based on the full amount of that instantaneous demand.

Mr Whitby: Maybe it's handy to think of it this way: in a home if you have an appliance it contributes to demand, you can plug it in at this power point or that power point over there, but you're only using it once; you're not using it at both power points at the same time. So at home those two power points are being aggregated to a single meter point where you pay for the demand. So it's a little bit like if an electric vehicle plugs in at home versus down the street, it should aggregate to only one payment and not be two separate payments. Does that help?

Senator BUSHBY: It got me a bit closer, but not quite there.

Mr Fox: It is an arcane field.

Senator BUSHBY: It's like if your demand charge is worked out on the number of power points you've got, rather than the number of power points you're actually using?

Mr Whitby: No. It's worked out on how much is being used instantaneously. The point is an electric vehicle can't be used instantaneously at two locations, so therefore the formula would have it contributing to the demand in two locations, but in reality it can't.

Senator BUSHBY: If you are able to put anything to assist further—

Mr Fox: That does sound arcane. It is. We had a tariff specialist who suggested it to us; at first, we were quite lost. It is arcane. We've made some submissions to networks that kind to lay it out in a little bit more plain English, and we can share those.

Senator BUSHBY: Thank you.

Senator RICE: Mr Whitby, in your submission and you identified quite a number of challenges for installation particularly in dealing with the network service providers and delays. What role do you think the Commonwealth could play in fixing those problems?

Mr Whitby: I think we can think of it in a similar context to the emerging solar industry or all renewables for that matter. They've been faced with very similar challenges of the time to get the connections, the cost to get them, the lack of transparency et cetera. I guess to some extent that's been handled through regulatory mechanisms with maximum times to respond and making more data available. It's worked to some extent, but I think anyone in the solar industry would tell you it's still not particularly well tuned. I think EV chargers face exactly the same thing and the one mechanism available now is both tightening up and standardising regulatory requirements between states.

Senator RICE: So that would have to go through COAG presumably or the Australian Energy Market Commission? How would that happen?

Mr Whitby: I'm not really an expert on the mechanism.

Mr Fox: I think a lot of it would probably be through the AEMC; maybe some of it is through AEMO. There's been a struggle to standardise between the 19 different service areas in Australia.

Senator RICE: Do you see that the Commonwealth is the body that to take a leadership role in making sure that this happens?

Mr Whitby: Yes, I think that there is a leadership role to be had there.

Senator RICE: It's not going to happen if it's left to the individual jurisdictions to do it themselves. I want to note, Mr Fox, the massive difference in model availability in Australia compared with other countries and that you say in your submission that if you provide the fast-charging infrastructure it will have the flow-on impact of improving model availability. Is there anything more that you have got to add in terms of increasing model availability in Australia and what's what needs to happen for that to occur?

Mr Fox: We tried to be very focused in our submission, but we're very supportive of the EV Council's overall platform. I think it's quite representative of the sorts of things that the industry as a whole would like to see. I think there are something like a dozen different things that are in there, ranging from direct vehicle subsidies to the infrastructure and in between—little things that can make it easier to own an electric vehicle. For the OEMs, again, it's this matter of confidence to be able to go to their headquarters and say, 'We can sell these electric vehicles here in Australia and here is the evidence of strong government support for electric vehicles in Australia,' because that's the kind of missing link; that's the thing they're always fighting with their headquarters to prove that they have. The headquarters are going to send the cars where they think they can be sold. At the moment, they've got big questions about whether the cars can be sold in Australia. So demonstrating commitment will generate confidence.

Senator RICE: Again the role that government's got is the leadership role to create that confidence?

Mr Fox: Yes.

Senator RICE: Thank you.

Senator PATRICK: You are rolling out these stations and the view is you can't be half pregnant here—you've got to do the whole lot, otherwise it doesn't work. Is that how it works?

Mr Fox: Yes, there is a risk. We are entrepreneurs. We're taking a risk. We have an entrepreneurial backer, and we are charging ahead. So we are acquiring sites and doing all these things. There's a risk we may not get support from the government. There's a risk that the uptake of electric vehicles won't be there. There's a risk that we won't be able to get sufficient capital to build the 42 we think are needed.

Senator PATRICK: You said you've got an ARENA application?

Mr Fox: Yes, we do.

Senator PATRICK: Just to clarify: is it a grant application or a loan application?

Mr Fox: It is a grant application.

Senator PATRICK: So that's money that's provided to you which you don't have to pay back? What's the quantum of that?

Mr Fox: No, it is what is called a recoupable grant. We're in the middle of the whole process. We have seen a funding agreement, but the actual terminology around that is yet to be defined. Our expectation is that it's a recoupable grant, which is the typical method used by ARENA at the moment.

Senator PATRICK: So the advantage for you is that they're not taking equity in the proposal; they're going to get a return of some value to them as a result of this?

Mr Fox: It's still a grant, which is kind of ARENA's mandate, but it is a grant which is returned to them if certain conditions are met. In other words, if things go gangbusters then they get their money back; if things don't go well, then they don't get their money back.

Senator PATRICK: What's the quantum of the grant that you're seeking?

Mr Fox: It is \$25 million.

Senator PATRICK: In circumstances where we can see—noting the visit we had this morning—that this is not in any way developmental technology, I'm wondering why you don't hit the investment profile of the Clean Energy Finance Corporation? Is it because of offtake?

Mr Fox: Essentially it's kind of the equivalent of offtake; the equivalent of offtake is the demand from electric vehicles, and there's a lot of uncertainty around that demand. However the Clean Energy Finance Corporation does have the Clean Energy Innovation Fund, which is more VC like, so we could go to them and ask for it.

Senator PATRICK: I think the act actually permits the minister to make a direction as well to the Clean Energy Finance Corporation. I'm just wondering whether or not you've actually talked to a minister in government about this proposal?

Mr Fox: Not about any kind of CEFC thing. We've briefed ministers about our project, but we haven't asked for anything like that. I wasn't aware that that's a possibility.

Senator PATRICK: I recall doing something with SolarReserve at Port Augusta, which was an equity arrangement. Does your proposition fail if you don't receive this grant?

Mr Fox: We're entrepreneurs. Perhaps we don't believe in failure.

Senator PATRICK: It will slow you down, but—

Mr Fox: Here's what it is: it is a big opportunity to actually make a difference, and if we don't get it it's just going to be a hard road. I don't know if we've quite hit that tipping point that we need.

Senator PATRICK: Have you attempted something similar in the past with either ARENA or the Clean Energy Finance Corporation?

Mr Fox: Not in this form. There was a previous application for a similar project by Tritium, but not by us.

Senator PATRICK: I've already asked, on notice, for that to be looked at. That was also to ARENA, I understand.

Mr Fox: That was some years ago. I think it was 2014.

Mr Whitby: Yes, I think so.

Senator PATRICK: Does this project that you're proposing here mirror overseas projects, or do you find that overseas it's funded in some other way by government or purely by commercial entities?

Mr Fox: There are a variety of funding mechanisms. The most popular one in the States is to sue Volkswagen—

Senator PATRICK: Yes, over emission standards.

Mr Fox: or NRG. In fact, both the big networks over there are the result of lawsuits and settlements from lawsuits. In Europe there has obviously been a much greater government drive. But in Europe, in particular, we see these coalitions of the OEMs in order to fund networks or we see a single company, like Tesla. I think in Australia we've got a somewhat different situation, where we do have a very large area but we have a relatively small population. It's a bit of a case where it's too big for one party to build it just for themselves, so there is a need for shared infrastructure that everyone can use, and that's our intention: to build an open network that anyone can use. You can go up, tap your card and use the network. It is different here because we are somewhat different. In terms of the network design, there are some differences here. We've been very conscious of the need to cater to the large distances and also allow affordable vehicles to travel those distances into regional Australia and so forth.

Senator PATRICK: So you're proceeding with your process on the basis of a particular risk profile that involves a certain offtake or demand, as we might call it. How have you determined that demand within the context of your risk analysis? Is it simply based on current trajectories or does that also rely on some factor coming into play, other than the existence of the system itself, that you are relying on to make sure that your investors see a profit at the end?

Mr Fox: We don't attempt to be professional forecasters. There are lots of people out there who have forecasted. We use the forecasts of others and our assessment of how good their assumptions are to work out what the upper and lower limits of those might be. We are describing ourselves as a catalytic project. It's like *Field of Dreams*: build it and they will come. We've seen in New Zealand, for example, where Steve West built ChargeNet NZ. Once he started building, other people said, 'Wow, I'll tip in some money too, and we'll join in,' or 'We'll give you some demand, some business and so forth.' We very much see this as a catalytic project, and that's part of the risk here, which is whether we can make it big enough to have sufficient catalytic impact.

CHAIR: We'll stop there because we're well over time. Thank you very much, Mr Whitby and Mr Fox for your submission and your attendance today.

Mr Fox: Thank you.

Proceedings suspended from 13:39 to 14:06

NOONAN, Ms Sally, Chief Economist, Queensland Department of Transport and Main Roads

ACTING CHAIR (Senator Kim Carr): I now welcome Ms Sally Noonan from the Queensland Department of Transport and Main Roads. Good afternoon.

Ms Noonan: Good afternoon.

ACTING CHAIR: I trust that information on parliamentary privilege and the protection of witnesses in giving evidence to Senate committees has been provided to you.

Ms Noonan: Yes, thank you.

ACTING CHAIR: I remind senators that the Senate has resolved that an officer of a department of the Commonwealth or a state or territory shall not be asked to give opinions on matters of state or territory policy or Commonwealth policy and shall be given reasonable opportunity to refer questions asked of any officer to a superior or a minister. This resolution prohibits only questions asking for opinions on matters of policy but does not preclude questions asking for explanations of policies or factual questions about when and how policies were adopted. You might be asked about dates and various other things like that. Officers of departments are also reminded that any claim made in regard to public interest immunity must be made by a minister and should be accompanied by a statement setting out the basis for such a claim.

We have the Department of Transport and Main Roads's submission, which is No. 43. Would you like to make any amendments or additions to that submission?

Ms Noonan: No, thank you.

ACTING CHAIR: I invite you to make a short opening statement. At the conclusion of your remarks I will invite members of the committee to ask questions.

Ms Noonan: Thank you very much, Deputy Chair and committee members, for this opportunity for the Department of Transport and Main Roads to speak to you about our submission. The Department of Transport and Main Roads plans, manages and delivers Queensland's integrated transport system to achieve sustainable transport solutions for road, rail, air and sea. Our integrated transport planning approach ensures that we contribute to Queenslanders' quality of life, our state's economic wellbeing and our environmental sustainability.

The Queensland government released the Queensland Climate Transition Strategy in July 2017 and has committed Queensland to developing a pathway to net zero emissions across all sectors of the economy by 2050. To contribute to this objective the Department of Transport and Main Roads, TMR, is delivering The Future is Electric: Queensland's Electric Vehicle Strategy. Currently an electric vehicle, EV, charged on Queensland's existing electricity grid will produce approximately 25 per cent less emissions than fossil fuel vehicles. This reduction in emissions will only increase as more renewable energy is brought into the Queensland electricity grid.

In 2017 almost 1.2 million new cars were sold in Australia but less than 0.1 per cent of these vehicles were electric. The Future is Electric strategy has been designed to address the three main barriers to a greater uptake of electric vehicles, these being a lack of awareness, a lack of charging infrastructure and a lack of lower-cost EV models, and we've heard quite a bit about this from previous speakers today. To accelerate the adoption of EVs, effort is needed from across multiple and diverse stakeholders, from the energy sector to tourism, fleet operators and industry development leaders. To raise awareness, TMR has participated in multiple community events across Queensland, including showcasing the benefits of EVs and the electric superhighway at the recent Royal Queensland Show in Brisbane. There were something like over 5,000 Queenslanders who visited that particular stand and showed interest. In November this year, we will sponsor a major event in Brisbane, hosted by the Australian Electric Vehicle Association.

To encourage Queenslanders to shift to EVs, a network of EV charging infrastructure was needed. This infrastructure aimed to address—and, again, we've heard a bit about this morning—range anxiety, an often-cited issue for a consumer thinking about switching to an electric vehicle. The Queensland Electric Super Highway, from Coolangatta to Cairns and, west, from Brisbane to Toowoomba, was completed in January this year, allowing uninhibited long-distance travel for consumers. The highway is a network of 17 fast-charging stations. The 18th site will soon be built on the Gold Coast at Helensvale. All chargers are powered by green energy, either through direct green energy credits or offsets, making them a carbon-neutral and pollutant-free transport solution. This project was the result of multiple agencies working together, including the Queensland Department of Transport and Main Roads, Economic Development Queensland and Energy Queensland. The Queensland government has committed a further \$2.5 million to build additional charging stations at new sites along the Queensland electric superhighway. Queensland now has the highest number of fast chargers in any state of Australia. The number of slower charging sites has also increased.

Although the purchase price for EVs is higher in comparison to fossil fuel vehicles, EVs attract the lowest vehicle registration costs for any vehicle registered in Queensland. In June 2018, the Queensland government released the QFleet Electric Vehicle Transition Strategy. This strategy commits to at least doubling the number of electric vehicles in the Queensland government's fleet each year for the next four years. This will encourage manufacturers to provide a greater range of EV models into the market, eventually making EVs more affordable as these vehicles then move into the second-hand market as the QFleet is refreshed.

EVs directly support the development of new green high-tech industries in the transport value chain. We've heard from Tritium this morning, as an example. In recognising the need for greater and deeper collaboration, Queensland has set up the Queensland Electric Vehicle Committee, which is chaired by my minister, the Hon. Mark Bailey, Minister for Transport and Main Roads. This committee provides a forum for industry, government and the community to discuss key priorities that will encourage a higher uptake of EVs in Queensland. We're making steady progress. So far, efforts in encouraging EV uptake have benefited Queensland. Around 800 battery EVs are currently registered in Queensland, and this number is continuing to grow. EVs offer an opportunity for Queensland and Australia to reduce carbon pollution, improve urban air quality, improve electricity grid utilisation, reduce transport costs, create new jobs, reduce oil dependency and increase climate resilience. We look forward to working with our partners across governments, industry and the community to ensure the successful implementation of the Queensland electric vehicle strategy.

ACTING CHAIR: I commend the Queensland government's submission and the policies that you're pursuing. What weight do you give local industry participation into procurement policies of the Queensland government?

Ms Noonan: Thank you for the question. You may be interested to know that the \$2.5 million investment that we are proposing to expand the Queensland electric superhighway is in addition to the \$3 million investment that we have already made to procure those 18 fast-charging stations. The company that you heard from this morning, Tritium, has actually been a local supplier of most of that charging infrastructure. We do have a Queensland procurement policy, which looks to support the growth and expansion of local industries. I can say that in the case of Tritium and its role with respect to the Queensland electric superhighway it was a competitive and a high-value customer in that market. So, we're confident in the quality of the product that was supplied.

ACTING CHAIR: There's no doubt that that's the case. I'm not questioning that. I'd just like to know the weight you give to local production processes—which you can, under the trading rules. There have been some issues raised about the Queensland government procurement policies in regard to WTO.

Ms Noonan: Yes.

ACTING CHAIR: You are saying that this approach is compliant—that's the evidence you're presenting to the committee?

Ms Noonan: Yes.

ACTING CHAIR: So, how do you make the preference for Queensland compliant with WTO?

Ms Noonan: That's probably an issue that's beyond my expertise in the Department of Transport and Main Roads with respect to this. As I have outlined, the Queensland Electric Vehicle Superhighway is a project that involves three partner organisations, including Economic Development Queensland and Energy Queensland. Energy Queensland's commercial arm, Yurika, is actually responsible for the installation and maintenance of the electric superhighway, and Yurika would have been required to be compliant under the Queensland procurement policy for the installation.

ACTING CHAIR: Would you be prepared to take that question on notice?

Ms Noonan: Sure, yes. I'm happy to do that.

ACTING CHAIR: I raise this because state governments have policies of this type. In my own state, the Labor government there has policies similar to this in regard to rail procurement. The South Australian government—the previous government—had policies and had company advocates that were able to pursue these policies in regard to a whole range of government manufacturing policies. Do you have a similar type of approach in terms of seeking out suppliers and the encouragement of people's understanding of what is actually available in Queensland in terms of supply chain development?

Ms Noonan: Absolutely. The Queensland procurement policy was actually refreshed and came into effect last year, in 2017. There's been a very strong consideration in terms of strengthening the supply chain. In addition to the work that our department—the Department of Transport and Main Roads—is doing with the partners that I've indicated, we also have a Department of State Development, Manufacturing, Infrastructure and Planning, which

has been very strong in the area of encouraging advanced manufacturing. They've developed a 10-year advanced manufacturing road map, and the emphasis with respect to the transport industry that is played out in that road map is really around looking at strengthening the supply chain capacity at a local level. Again drawing on some of the comments that previous speakers have made, the Queensland government, through its Advance Queensland program—a \$650 million program to encourage innovation, research and development into commercialisation—is really looking at growing a lot of our own capability in that sort of high-tech componentry space to support the ability to ultimately have Queensland suppliers who can participate successfully in the supply chains of manufacturing industries.

ACTING CHAIR: Thinking about the lessons that you've learned in the rolling out of these programs, what's the engagement with the Commonwealth been like?

Ms Noonan: In terms of engagement with the Commonwealth, there is an opportunity, and it's sort of something that we are looking at. Obviously, Queensland, like all state and territory governments, is involved in a range of COAG related organisations. The issue around electric vehicles in particular is an issue that I can say our minister has been quite a champion of. He has been engaging with his Commonwealth counterparts, as have his ministerial colleagues in both the innovation space and the manufacturing space.

ACTING CHAIR: Thanks very much.

Senator RICE: Congratulations to the Queensland government for having your strategy to encourage electric vehicle uptake. Can you go into some more detail about the financial incentives that are on offer in Queensland to bridge the price differential between EVs and other vehicles?

Ms Noonan: It's an interesting question in terms of the interpretation around incentives and price differential. I suppose from a Queensland government perspective we've taken quite a broad interpretation around what will actually encourage the use and uptake of EVs, with an emphasis being around the formulation of the electric superhighway, for example. Having said that, as I've mentioned in my opening comments, the registration of electric vehicles in Queensland attracts a lower level of registration than similar vehicles.

Senator RICE: Can you tell me exactly what that differential is?

Ms Noonan: Sure. For example, the current cost to register an EV, excluding compulsory third-party and traffic improvement fee is \$252.70, compared to a four-cylinder passenger car at \$321.35. Electric vehicles also attract the lowest rate of registration duty, at two per cent, compared to three per cent for a four-cylinder car. This registration duty is applicable to both new and second-hand vehicles, so that will obviously vary in terms of the purchase cost of the car.

Senator RICE: So, if you had a \$60,000 EV, that would be \$600 or \$1,800?

Ms Noonan: It's roughly one per cent per cent of the value.

Senator RICE: So it would be a saving of about \$600.

Senator BUSHBY: To clarify: that's the stamp duty you pay—the one-off payment you pay when you purchase a car?

Ms Noonan: Correct. We're conscious that this is a relatively small cost with respect to the cost of many of the electric vehicles that are on the market at this point in time, but we're not considering any further financial incentives at this point in time.

Senator RICE: Right. If you add up those, if you're looking at that difference between \$252 and \$321, that's about \$170 a year. Then there's a saving of about \$600 in the stamp duty—

Ms Noonan: depending on the value of the car.

Senator RICE: Yes, so \$770. Clearly, if you've still got the major price differential, it's nice to have. Have you got research to show that that's actually making a difference in people's purchase of electric vehicles?

Ms Noonan: We have research that indicates that the number of electric vehicles in terms of uptake has increased dramatically—52 per cent in the previous financial year, for example—but, in terms of the differential that that price saving makes, it's hard to do that kind of modelling without any kind of base case. So there are a number of factors that we understand influence the uptake of electric vehicles. Cost is one of them, and I suppose there are some indirect actions that we're looking at around that cost. As I mentioned earlier, it's the Queensland government fleet provider, QFleet, which is responsible for a fleet of 10,000 vehicles. QFleet itself has actually developed, as part of the work on the Queensland Electric Vehicle Strategy, a policy to increase uptake to double on an annual basis the uptake of electric vehicles in that Queensland government fleet.

Senator RICE: Okay. I'll get back to that. I want to go back to the price differential. Would the Queensland government like to see other measures that the Commonwealth would be responsible for to reduce the price differential between electric vehicles and conventional vehicles?

Ms Noonan: Sure. As outlined in the department's submission, there are a range of federal government duties—for example, luxury car tax—that could be considered. Obviously, that's a federal government consideration in terms of how decisions are made around those, but those levers or other import duties could, for example, be used to affect the purchase price.

Senator RICE: So the Queensland government hasn't got a position as to whether they should be reduced other than just that they could be?

Ms Noonan: I suppose one thing that we're very mindful of is equity. The price of many of the electric vehicles that are currently on the market is out of the price range of many Queenslanders, and we're very conscious of being fair and not creating market distortions to any great extent. They are factors of a practical nature. A reduction of a duty will make a vehicle cheaper. Whether that's something that accords with federal government values is a federal government decision.

Senator RICE: You're aiming to double the number of electric vehicles in the fleet on an annual basis. You said there were 10,000 vehicles. How many electric vehicles are there in the fleet at the moment?

Ms Noonan: It is a very small number. It's 18 currently, and they are the plug-in hybrid electric vehicles. They're mainly vehicles that are used for long distances. We're very confident of that figure easily doubling within the current financial year. We're also very interested in the issue that was raised by some of the earlier speakers around that buying power and the signal that government fleets can send to those providers of electric vehicles that the market can actually absorb. So, in the process that we have with respect to having a QFleet electric vehicle strategy, one of the other levers or opportunities is that, through collaborative arrangements with other governments across Australia and the federal government, we would like to see the purchasing power send some signals to the marketplace which could ultimately result in the introduction sooner of cheaper electric vehicles.

Senator RICE: I'm interested in the ambition of that. If you've got 18 at the moment, doubling over the four years we take you to 36 the next year, 72 the next year, 144 the next year and then 288. That seems to actually be a fairly limited ambition given you've got 10,000 vehicles in the fleet. Do you think that is sufficient to provide a market signal?

Ms Noonan: I take your point. The strategy and the supporting strategies that are currently supported by the Queensland government are new. As I said, the Queensland Electric Vehicle Strategy came into being last year. Similarly, the QFleet electric vehicle strategy is very new. We are continually looking at these issues for opportunities to improve and update, capitalising on the momentum and what more we can do. So I absolutely take your point about the numbers at this point in time being small. We expect the numbers next year to far exceed the target, but it's an active area of consideration and policy development.

Senator RICE: Okay. How important does the Queensland government see vehicle fuel efficiency standards being?

Ms Noonan: They are very important. To reflect again on the submission that the department has provided as part of this inquiry process: the issue around emissions standards is something that we have raised as something that we're very interested in learning more about in terms of the previous inquiry, which we understand is still yet to provide any recommendations or outcomes. We're very interested in where the federal government might go with respect to those emissions standards for vehicles.

Senator RICE: Certainly there's a delay in announcing that those standards are going to come into place. It seems that there is push-back from some parts of the automotive industry to those standards. Is the Queensland government concerned about those? Are you making representations to the federal government about your support for the proposed vehicle emissions standards?

Ms Noonan: As I've said, we've highlighted it in our submission to this Senate inquiry. I really don't want to be drawn in terms of anything that might be construed as opinion on that process, but we've made it very clear in our submission what the Queensland government's position is around those emissions standards.

Senator RICE: Finally, I'm interested in whether you're doing any work on electrifying public transport vehicles.

Ms Noonan: We're having some really constructive discussions with the ACT government at the moment. As I said, we're really looking at opportunities to collaborate with other levels of government, and we've had some

excellent collaboration with local government in the state, and we are looking at what's happening. The ACT government has an interest in electric buses. We have some technology that's been trialled, at a prototype level, in Queensland. We're really looking at opportunities where we might be able to collaborate in that space. But it's still quite early days. You would have seen today that there are 11 electric buses in this precinct, between here and the airport. They're part of the support we have for looking at electric vehicles in passenger transport and also in the heavy vehicle sector. But it's still quite early days.

Senator RICE: Can you give us a bit more detail about that sort of prototype and the work that's going on there?

Ms Noonan: A Gold Coast based organisation, Transit Australia Group, is looking at developing that work further. They are in discussions with other parts of state government around that. It's very early days at this stage. But we're certainly supportive of moves towards electric buses.

Senator BUSHBY: Thank you for assisting us today. On the 18 fast-charging stations: they are Tritium stations; are they the 50 kilowatts or the 350 kilowatts?

Ms Noonan: No, they are the 50 kilowatts. They have a combination of the direct charge for the 50 kilowatts and, with the exception of one of the chargers, a slower, 25 AC kilowatt, charging facility as well.

Senator BUSHBY: So all 17 of them are dual AC/DC—is that what you are saying?

Ms Noonan: Correct. In terms of the 350 watt fast chargers, at the moment, to our knowledge, there's only one vehicle which could accept that fast charger, that being an electric Porsche. The decision to build the infrastructure superhighway was made before the 350 ultrafast charging technology was available. So we made that decision on the basis of the technology that was available, the 50 watt fast-charging stations. The decision around the placement of those chargers was also made with respect to the understanding that a lot of the charging is done in home, overnight; that is where a lot of people will use those chargers. But it was an opportunity to address range anxiety, the electric superhighway, and also to provide an opportunity to complement the Queensland tourism industry. As to the siting of those fast chargers: at the Department of Transport and Main Roads, one of our major objectives is safety, so we're encouraging people to stop, revive and survive and charge their car. It might take 40 minutes. We've provided those charging stations near facilities where people might be able to have a cup of coffee and enjoy some sights—

Senator BUSHBY: So have they been co-located with existing service centres—is that what you're saying? Have you had greenfield sites where you've put them in? What sites have they gone into?

Ms Noonan: There's a variety of sites. For example, James Cook University has a site. We have some of what we're calling campus sites, where vehicles might be parked for a period of time. At James Cook University they might be used by staff and students. There are other sites that are co-located with public transport. For example, Queensland Rail has been one of our partners. The other sites have been provided by a range of local governments, so they have been co-located where there might be some tourist facilities. It really has been looking at what is the capacity and the opportunity with respect to the electricity grid and what makes sense in terms of a consumer amenity perspective. As I said, we're really trying to encourage this as part of our tourism product as well. We're looking at a further investment of \$3.5 million in where we may have some gaps in meeting some of those demands.

Senator BUSHBY: It sounds like a variety of reasons have gone into the location decision-making. But, if you're driving along a long stretch of coast—which you have a lot of in Queensland—between towns, where range anxiety may be an issue, you haven't co-located them with the service centre that's got the KFC, the McDonald's, the BP and whatever else it might be? They are in different sites? None of them are in those sorts of sites?

Ms Noonan: To my knowledge, that hasn't been a driver. I'm not saying that there aren't any that couldn't fit that kind of profile—

Senator BUSHBY: But that's not how it's been approached at this point?

Ms Noonan: It's not how it's been approached at this point. It's a very different proposition to filling up your car, which might take five minutes. It could be up to 40 minutes.

Senator BUSHBY: One of the reasons why I'm asking is that the previous witnesses were talking to us about what appears to me, at first blush, to be replicating what the Queensland government has done, with a minimum of 42 across the nation and maybe 100 across the nation, starting in Queensland and talking about up the coast. I think they were talking about co-locating their facilities with service centres and the like and potentially having the 50 but maybe the 350. They're also using the Tritium technology. I was just wondering how the Queensland

government sees what it's done interacting with what the commercial sector is effectively looking to do but also the commercial sector looking to do it with the assistance of federal government money.

Ms Noonan: It's a good question. It's quite a different experience. The Queensland government's Electric Super Highway is not about just filling up in 10 minutes and then you're gone. It's actually trying to, in particular, look at that range anxiety around tourists, for example. That is where we see there's a real opportunity, where people are going to spend some time in the location where their vehicle is charging. It's quite a different proposition to the petrol station kind of scenario that I understand.

Senator BUSHBY: That would also help address the range anxiety aspect, I would have thought, if you're driving from Sydney and you're looking to drive up the coast in Queensland, and you look at the distances and you think, 'Gee, I hope there are some stations,' knowing that there is a charging station at your local service centre, where you can stop, the kids can get out and have a play and have lunch and you can spend 10 minutes or 20 minutes to put in a full 700-kilometre range and then off you go. That also deals with the range anxiety.

Ms Noonan: Sure.

Senator BUSHBY: Who owns your stations now?

Ms Noonan: They're currently owned by the Queensland government.

Senator BUSHBY: Do you charge for vehicles to be filled up?

Ms Noonan: No. At the moment, it's free to use those charging stations—up until the end of this year. The idea was that the stations would be provided free of charge till the end of this calendar year. After this calendar year, the cost of charging will be managed, as I mentioned before, by Yurika, as a commercialised arm of Energy Queensland, and they will be looking at charging on a cost-recovery basis.

Senator BUSHBY: You have already partly answered this question, in an answer to Senator Rice. You mentioned that there had been a significant uptake in the purchase of electric vehicles since this strategy came into being. Have you got any evidence, or are you able to get any, that shows how Queensland's uptake has compared to other states since this has come in?

Ms Noonan: That's a question that I'm happy to take on notice.

Senator BUSHBY: I'd be interested to get some sort of feel for what impact that program has actually had. If you could take that on notice, that would be fantastic.

Ms Noonan: Yes.

Senator BUSHBY: Thank you.

CHAIR: Do you have a question, Senator Patrick or Senator Smith?

Senator DAVID SMITH: Yes, Chair. This is connected to Senator Bushby's questions. Ms Noonan, have you got much evidence on the usage of the superhighway? Are you measuring the usage of those 18 stations, and does that tell us anything yet?

Ms Noonan: Absolutely. We do work very closely with Yurika. We have a very strong relationship. We get monthly figures from Yurika on the number of uses and the volume of use. The station at Hamilton, which is here in Brisbane, is the station with the highest use, for example. We know there is a good volume of use at that station in particular. Of those 17 stations that are currently in play, each has recorded use, which is quite interesting. One of the issues around the location of those stations which I didn't mention earlier is range anxiety. Everything is within a 200-kilometre distance from point to point, and some much shorter than that distance, but there is a town along the Queensland coast, Marlborough, which has a population of around 350 people, and that station gets used as well. There is not a single station along the superhighway that hasn't been used. Cairns is also one of the more popular destinations. So all the stations are getting used. We do have that very strong relationship.

In terms of our future charging infrastructure, that will be one of the pieces of evidence we look at for siting the future charging stations.

Senator PATRICK: Firstly, congratulations on having a plan. It seems the federal government has an electric car in reverse that has no steering wheel and no windscreen-wipers—it's got no vision. In that context, what was the core motivation for your plan? At the Commonwealth level we don't seem to have one. What was the motivation behind the Queensland government doing what it's done?

Ms Noonan: Thank you for the question. As I outlined in my opening statement, Queensland has its Climate Transition Strategy, which came into being last year as well. That's been a key motivator, in that the second highest emitter of greenhouse gases is the transport sector. For Queensland it's around 14 per cent. Another issue is looking at how we can encourage, as part of that process, the uptake of renewable energy. We already have

some renewable energies in the Queensland electricity grid but we're looking at opportunities to increase the uptake of renewable energies into the grid. The energy sector is the highest emitter of greenhouse gases in Queensland, so—

Senator PATRICK: Was there any productivity motivation in the thought process?

Ms Noonan: In terms of productivity around—

Senator PATRICK: I'll ask another question first and then come back to that. There's a low target in the context of government vehicles. The evidence the committee has heard from a number of different sites, including sites it's visited, that if you consider the operating costs of electric vehicles, with the price of the fuel less maintenance associated with them, and notwithstanding the initial purchase cost, it's actually a better proposition economically and from a productivity perspective. Have you done any modelling when setting those targets? They seem low. With the trucks that we saw we were told that after two years they pay for themselves, for a modification. Have you looked at that?

Ms Noonan: Again as I've outlined, this is work that's continually being refreshed. The short answer is no in terms of productivity. The Queensland government was very conscious in making its QFleet electric vehicle strategy good value for money for the Queensland taxpayers. Given that electric vehicles have a higher upfront cost at this point in time, that was an issue that required quite a bit of consideration to get to the point we are. From the evidence that you may have gathered elsewhere and you heard today, there is an expectation that, as different models come into the marketplace, that upfront cost will come down. That will definitely be quite a stimulating factor with respect to government purchase of electric vehicles.

Senator PATRICK: So that may trigger a reconsideration.

Ms Noonan: It is a factor that may trigger a reconsideration.

CHAIR: Thank you very much, Ms Noonan, for your witness responsibilities here today.

DALE, Dr Brett, Chief Executive Officer, Motor Trades Association of Queensland

[10:44]

CHAIR: Welcome. Information on parliamentary privilege and the protection of witnesses in giving evidence to Senate committees has been provided to you. MTA Queensland has lodged submission 41 with the committee. Would you like to make any amendments or additions to this submission?

Dr Dale: No, thank you.

CHAIR: I now invite you to make a short opening statement and, at the conclusion of your remarks, I will invite members of the committee to ask questions.

Dr Dale: Thank you, and good afternoon. I speak today on behalf of the Motor Trades Association of Queensland, which represents the retail service and repair sectors of the automotive value chain in Queensland. Many will know that our industry is about to face the greatest level of disruption since the inception of the motorcar itself. We will see a huge shift from combustion engines to electric vehicles, which will have a flow-on effect to all sectors of our industry. Additionally, the autonomous vehicle technology and the use of artificial intelligence will underpin the future of the automotive value chain, changing our entire industry. This technology is being developed exponentially, and forward planning is essential. The reality is that this is the beginning of a new future for our industry, and this immediate change is being led by the introduction of electric vehicle technology.

There is a growing consensus that 2022 will be the turning point when businesses as we know them today will have changed significantly to ensure their sustainability. The way in which consumers view transportation options will also change dramatically. On that basis, the consideration for an enabling regulatory framework that supports the uptake of electric vehicles is critical. The challenge for governments will be to develop frameworks that both enable the adoption of the most advanced formats of vehicle technology while at the same time ensuring that these frameworks have the competence to support existing fleets in those regions where the economic, commercial and social costs of the transition do not justify a rapid change from conventionally powered transportation.

The industry welcomes the initiatives proposed by the government to support the uptake of the electric vehicle but cautions that policy consideration will need to extend well beyond the sale and use of electric vehicles. The growth of electric vehicles will impact most areas of society, and all future planning will need to consider this. The MTA Queensland strongly urges the harmonisation of regulations of the automotive sector across the states and territories of the Commonwealth.

Finally, the opportunities that will arise from electric vehicles and other emerging technologies in our industry are significant and present economic, environmental and social benefits that will go well beyond what we currently consider possible. These will include alternate power generation sources, battery manufacturing, battery recycling, car parts recycling, car manufacturing and the use of 3D printing in ways only limited by our imagination. If we move quickly, there is time to establish Australia as a global manufacturing force—not to mention the substantial environmental benefits that will result from this technology. In closing, this will all depend on business and consumers having the confidence in the economy to either invest or purchase. That concludes my opening statement.

CHAIR: Thank you very much. What could the government, particularly the federal government, be doing to assist your members in this transformation?

Dr Dale: The transformation impact on business that supports our current fleet is going to be subject to a mass of expenses. If you talk about service centres—and we just heard from Queensland government representatives about the installation of charge facilities—you will see existing businesses and markets relating to those businesses grow and shrink according to changing technology. The repair sector is one of those spaces. If we look at current service requirements, it is every 10,000 kilometres. There are predictions of around up to 100,000 kilometres on electric vehicles, so that's a 90 per cent reduction in the demand for that servicing capability. If you look at the supply of service centres, just recently we've had state governments impose the selling of biofuels, which was not aligned with emerging technologies linked to fleet. It's great environmentally, but it certainly didn't align with where overseas manufacturers were taking the technology of vehicle fleets. First and foremost, governments need to engage with industry to align policy with emerging technologies. We tend to be the recipient and we tend to be reacting to the circumstances rather than leading those. It's business that suffers in the longer term and, where business suffers, the consumer wears that expense.

CHAIR: In your submission, you touch upon some of the federal government initiatives. I think you really stress that harmonisation is the key aspect. Is that correct?

Dr Dale: Absolutely. For a state the size of Queensland, if we look at some of the taxes that have just been imposed by the state government in addition to the luxury vehicle tax that the federal government has on the higher-end market, some of the electric vehicles coming into the country for sale are impacted by that. It's a deterrent for environmentally sensible decisions. It drives the market. Consumers will go across the border to states where they don't have that. We are buying. If you're talking about the way in which we sell, we have regulations that regulate the Queensland businesses under the Office of Fair Trade in Queensland. Those conditions mean, when consumers buy, they buy nationally. There are variations to the way in which sellers operate, and that has a huge disadvantage to business. Harmonisation is the only way to provide an equal playing field for businesses across the country.

Senator KIM CARR: Can I just follow through on that? There's clearly more required than that if you think about what's required to sustain manufacturing in this country—and you're clearly interested in that issue. Have your members given you any advice as to what they want to see from the Commonwealth? Let's take, for instance, investment attraction—a basic element. We know how hard it is to get money off the banks. What have they got to say about the Commonwealth's role in attracting investment to new manufacturing?

Dr Dale: That's absolutely a key point. We will have members presenting later this afternoon who are proposing to be manufacturers within the Australian market and within Queensland. It is a key issue. At the moment, the perception from members is that we have government at all levels talking the talk but, unfortunately, not walking the walk. There is a commitment by all governments—we see that—but we need to see some substantial action rather than spoken language about what it is. If you're talking about manufacturing, what we need to do as a nation is forget the barriers we once had that took us out of the market. Significant investment from government was needed to prop up manufacturers. Technology is going to make manufacturing a real thing.

I introduced the concept of 3D printing. With the way in which that's developing and the rate at which it's developing, there's a real possibility that, in the next five to 10 years, you'll custom print the car that you want. When you look at the components associated with electric vehicles, there are way fewer than the existing fleets on the road. Printing a fully electric vehicle, which will be autonomous by then, could be done custom; you would get a product comparative to an architecturally designed home or a spec home. So, manufacturing is the key, and governments need to support the investment into that, because it will be the technology that determines whether we are a competitive nation.

Senator KIM CARR: Your submission also speaks about the need to deal with the question of the residues of electrification—namely, batteries. There are many other components but let's just deal with the question of batteries. What do you think the Commonwealth can do in regard to the appropriate disposal of and recycling of batteries?

Dr Dale: When you talk about all the Advancing Queensland strategies, the investment in innovation by federal government, they would be the initiatives that I would be putting into existing business or start-ups that are interested in a prosperous future—transferring what I believe is about 80 per cent of the existing batteries to be reused in the manufacturing of new batteries. Environmentally, it makes perfect sense, but commercially it makes even more sense. If we can develop the technology to support businesses with that interest then that's where Australia will win in the longer term.

Senator PATRICK: I have some questions relating to motor trade workers. Nationally, there have been claims by Richard Dudley and indeed others about the lack of trades people. I presume you are experiencing the same problem in Queensland right now—that there aren't enough motor mechanics and so forth to service vehicles?

Dr Dale: That's correct. The statistics show that within Queensland alone I think we're about 5,000 short across the state.

Senator PATRICK: My question goes to when we switch across to a bunch of new technologies. You mentioned the fact that there will be capital investment in terms of equipment. Have you looked at what is going to happen from a trades perspective in relation to this current shortage? Is it going to make it worse or better? What will the outcome be?

Dr Dale: We have a particular interest in the workforce. In fact, in Queensland we are the largest provider of technical trades training for the state for automotive. We're working with some of the key manufacturers from overseas and with some of the universities to develop what might be the new workforce of the future. We do see some barriers to date to attracting a new workforce. The new generation isn't necessarily as interested in being dirty and playing with cars as the older generation once was. So, as cars become more technical and become more of a computer science rather than a mechanical engineering science, we will possibly attract new entrants from

that generation. The technology will be by far greater and will be more appealing to younger generations, so there are some advantages but we do accept that we're going to have two parallel worlds. We have opportunities to up-skill the workforce where it's relevant, and that's certainly key. We're working with the skills council, which is located in Melbourne, and is federally contracted. They will have skill sets developed to attach to a particular trade that will up-skill the existing workforce, where that business is interested and that individual wants to be up-skilled. Otherwise, we do see that over time there would be a complete transition from a mechanical technician to a more computerised one. Our automotive electrical guys are the ones we see as having a real future in the mechanical space. We're seeing that now. They're already merging the two. On graduation you will have a mechanic and an auto electrician duly qualified.

Senator PATRICK: Right now we've got a bunch of cars that have come to Queensland that are electric and you've got some infrastructure in place. Inside the service centres, is there a shortage amongst this new breed of electrical mechanics as opposed to the grease monkeys, which I think is the term you use for the motor trades? Are you seeing a difference now, where there's a more-critical shortage in one than in the other? Is that uptake occurring?

Dr Dale: The uptake is occurring. We've been talking about hybrid vehicles for 10 years, and we've certainly had skills and skill sets to train the existing workforce in that. But the market just hasn't existed within Australia, because the purchasing of electric vehicles by consumers has been incentivised, to be honest. So, the demand hasn't really existed. We've got some niche workshops that have a particular interest in that, but what we're doing as an industry body is talking up what technology is coming and trying to get business ready now for that change.

The number of vehicles was mentioned today. I think they don't exceed 4,000 at the moment, but we know that in three years we expect to see about 230,000 registered electric vehicles on the road and then, four years on from that, about a million electric vehicles. So the workforce requirements are serious, and that's a key agenda for us.

Senator PATRICK: So what does the federal government have to do—this is my last question—to play its part in getting ready for those 230,000 electric vehicles from a motor trades workforce perspective?

Dr Dale: Recognise that apprenticeships of the future are changing and there will need to be further investment into new trades, because existing workforce will need to be retrained or it will be a new workforce. The numbers to cater for the change that's coming will require an investment from federal government which goes on to support vocational education and training in the states.

Senator PATRICK: I wonder if, on notice, you could make a supplementary submission that says, 'This is what the federal government needs to do to assist our workforce over the next couple of years to deal with even the medium term.'

Dr Dale: Certainly.

Senator PATRICK: Thank you.

Senator RICE: Thanks, Dr Dale. Have you done an assessment of just the sheer numbers of the workforce? Obviously there are parts of your industry that are going to be slowly in decline, and there is big growth. So have you done that level of assessment?

Dr Dale: Yes. Nationally we did a complete analysis of the workforce, and I can make that report available to the committee. It was released late last year, but there's a copy available. It shows, state by state, the current shortfalls and the number within the trades. What we haven't done is match that against emerging technologies and where the gaps exist. We are working with PricewaterhouseCoopers, who currently have the contract for automotive skills.

Senator RICE: Do you have an approximate headline figure for workforce? Are we looking at having significantly fewer people employed, or is it much the same and just in different jobs?

Dr Dale: I don't know whether that's the approach we've been taking in Queensland. We're seeing it as opportunity. There will certainly be lost jobs, but there will be new jobs gained if we move quickly to take the opportunities that present with the likes of electric vehicles and autonomous vehicle technology. Some of those will be: what do we do where we once drove? There are statistics out globally that suggest there will be five trillion hours of productivity gain just from the autonomous vehicle itself. In Australia, what we need to be looking at is what we do with that time and that space where we were once committed to driving. They are new opportunities. So I talk to business about looking at their resources that they can redeploy. We're working in spaces around blockchain technology. As markets shrink and workforce demand changes so that people are at risk of being fired, they share or collaborate with other businesses to take on some of that workload under a blockchain arrangement.

Senator RICE: Okay. In your submission you describe regions where the economic, commercial and social costs of the transition don't justify a change from conventionally powered transport. Can you talk us through the details of those regions and what that's based on.

Dr Dale: Thank you. That's a good point that I would like to clarify, because certainly, as far as equity goes, we want to see this technology across the whole of Australia. The reality is that, if you think that businesses can respond to a small market to make their investment that makes the chains to support that technology, it's going to be a big ask. That's where government will need to invest or we need to accept that the uptake will be slower in those areas.

Senator RICE: So you're not saying that there's not a justification.

Dr Dale: Absolutely.

Senator RICE: You're just saying there will need to be government support for that.

Dr Dale: It's supply and demand. Population itself will determine the demand. Metropolitan areas have greater population, and therefore businesses can change their business model according to the demand for new products.

Senator RICE: There are many other parts of our society where we acknowledge that there's a need to be cross-subsidising our remote areas for equity reasons. Thank you.

CHAIR: Thank you very much, Dr Dale, for your presence today.

VOORTMAN, Mr James, Executive Director, Policy and Communications, Australian Automotive Dealer Association

[15:09]

CHAIR: Welcome. Information on parliamentary privilege and the protection of witnesses in giving evidence to Senate committees has been provided to you. The Australian Automotive Dealer Association has lodged submission 54 with the committee. Would you like to make any amendments or additions to this submission?

Mr Voortman: No, thank you.

CHAIR: I now invite you to make a short opening statement, and at the conclusion of your remarks I will invite members of the committee to ask questions.

Mr Voortman: Thank you for the opportunity to appear here today. The Australian Automotive Dealer Association represents franchised new car dealers in this country. Our members are Australian businesses with outlets located throughout the country who employ about 70,000 people and make a significant economic and social contribution. The reason we are keen to contribute to this inquiry is that we understand that electric vehicles will be a massive part of the future passenger vehicle fleet and we will be the people selling those vehicles and will be keen to make the introduction of these vehicles in Australia as easy and painless as possible.

I'd just like to make a few brief points in my opening statement. First, there've been participants in this inquiry who have accused new car dealers of not promoting electric vehicles to our customers. They've said that electric vehicles represent a threat to our business model—in particular, service and repair. I just want to make sure that the committee understands that this is patently wrong and it displays a misunderstanding of the franchised new car dealer model. Secondly, there are over 14.3 million passenger vehicles registered in Australia, and our members would dearly love to replace each and every one of those by selling them to a new consumer. However, demand in the market is soft at the moment and I'm sure the committee's heard all the reasons for that: the higher up-front cost of a vehicle, range anxiety and lack of consumer choice. We, the retailers of the vehicles, speak to our customers often, and they express dismay at the higher up-front cost of electric vehicles.

In our submission we've demonstrated that legacy industry taxes, such as the passenger vehicle import tariff and the luxury car tax, fall disproportionately on electric vehicles. Consumers also raise range anxiety with us, and we have called on the Commonwealth government to develop a strategy jointly with state and territory governments as well as with the private sector to address the rollout of charging infrastructure. I think a fact-based education campaign could also assist in alleviating range anxiety. Consumer choice in the electric vehicle segment is also an issue. When you look at the most popular-selling cars in our market, there are simply very few that can replace these. The government is currently looking at a fuel-efficiency standard for light vehicles. While industry is broadly supportive of a standard, we think any standard that is applied should be achievable and not come as too much of a shock to the industry and the consumers.

Finally, I'd just like to make one more point. It's been suggested by participants in this process that widening the scope for second-hand imports should be considered. This has been considered in a number of recent inquiries and reviews, and on all occasions the government has decided against it on grounds of safety and consumer welfare. As such, we would urge against such an approach. I'd now be happy to answer any questions you have for me.

CHAIR: Thank you very much. Just on that last point, you said that other inquiries, other discussions have said that. Which ones specifically do you mean—with regard to electric vehicles?

Mr Voortman: Not to electric vehicles, but we've had the inquiry into the future of the automotive industry, the Harper review, and most recently the Motor Vehicle Standards Act. In all three of those the government took a position, after a long consultation process, that allowing a wider sort of second-hand import regime would not be wise, based mainly on safety and consumer welfare benefits.

Senator KIM CARR: This is the 'grey imports' issue?

Mr Voortman: That's right.

CHAIR: So, New Zealand is skating on thin ice at the moment. Is that right?

Mr Voortman: Well, New Zealand has an older fleet than we do. We'd suggest that there is a direct link between the age of the fleet and road safety, and I think consumer advocates like ANCAP would back that up.

CHAIR: So, your point is as an example of being able to reduce the price of amending the luxury car tax and also the tariff regime and bringing Europe into the—European-make models. Is that correct?

Mr Voortman: Well, that's right. I think what we've demonstrated is that, of the 18 or so vehicles available on the market, a high proportion come from Europe. I think 13 of the 18 were listed in that document. If you look at all the vehicles in the market, both internal combustion and electric, only a third come from Europe. So, a third would be broadly subject to the tariff, but in the electric segment it's a much higher proportion.

CHAIR: I see. You make the case that the dealers are not providing the models of electric vehicles at the moment due to demand for them. Why would you say that your dealers are not providing more models?

Mr Voortman: The way we work is that we're franchised through international manufacturers. They will determine, to a large extent, which stock appears on our showroom floors. We can only sell what we have on the showroom floor. At the moment, there aren't very many models available in Australia, particularly at the lower price point and, as such, we haven't been able to sell as many.

Senator KIM CARR: Could I explore this idea. The dealers network is basically saying that the removal of the tariff and the luxury car tax, which is worth about—I'm going from memory—\$850 million a year—

Mr Voortman: A little bit more, I believe, Senator.

Senator KIM CARR: A little bit more? How much is it worth to the Commonwealth?

Mr Voortman: In the current financial year, the estimates have it for, I think, \$1.1 billion for the year.

Senator BUSHBY: That's for all cars or just the electric vehicles?

Mr Voortman: Sorry—for electric vehicles—

Senator KIM CARR: It can't be much.

Mr Voortman: It isn't much for electric—that's right.

Senator KIM CARR: If we sold less than 0.1 per cent—we sold over 1.2 million cars last year—

Mr Voortman: It was 0.2—

Senator KIM CARR: Whatever—a couple of thousand electric vehicles at most. On the average price of electric vehicles, with on-road costs, the cheapest is the Renault ZOE at \$47,000. That's under the—

Mr Voortman: Under the luxury car tax threshold.

Senator KIM CARR: The equivalent Renault vehicle on petrol is \$17,000.

Mr Voortman: That's right—the Clio.

Senator KIM CARR: It's not going to make much difference on that, is it?

Mr Voortman: No, not in that instance.

Senator KIM CARR: There's that issue for a start. You're actually asking the Commonwealth to subsidise incredibly wealthy people to buy incredibly wealthy cars. Where is the social justice in that?

Mr Voortman: We are not actually asking for subsidies. There is the removal of the LCT. We would argue that isn't a subsidy.

Senator KIM CARR: It's not.

Mr Voortman: We wouldn't argue it is.

Senator KIM CARR: It would be if you're removing a luxury car sales tax. It's a direct benefit to those who can afford luxury cars. This is not the average worker, is it?

Mr Voortman: We don't believe that some of the vehicles captured by the threshold these days, such as the Toyota Land Cruiser, are luxury cars.

Senator KIM CARR: No—it's only about 90 grand.

Mr Voortman: It could be just skating over the threshold.

Senator KIM CARR: Yes, just skating over it at \$90,000. I think it's a beautiful car—I can tell you that now—but it's not a car that ordinary folks can afford to buy, can they?

Mr Voortman: No. A lot of people would require a car like that for recreational purposes, but a lot of farmers and so on would buy it—

Senator KIM CARR: That's all true. I'm just making the point. You're asking the Commonwealth to subsidise wealthy people buying luxury cars.

Mr Voortman: In the absence of generous incentives, such as the ones applied in other like-minded markets, we're asking for a more modest contribution which could assist in the uptake of electric vehicles.

Senator KIM CARR: Let's take your argument through to its conclusion. It's over a billion dollars worth of revenue—because, essentially, it's a revenue measure now for the Commonwealth—and the effective rate of the tariff, given the free trade agreements and the like, is probably only about three per cent. The luxury car tax applies to the luxury cars. It's a revenue measure. Why shouldn't that measure be used to perhaps support some of the other things you want—for instance, the rollout of the charging infrastructure? My point is: you're asking the Commonwealth to subsidise the rollout of these various incentives to support the new industry. If you told me that you were also saying we should do it to support Australian industry, I would be much more sympathetic, but you're saying, 'You should roll out subsidies for imports from foreign manufacturers,' and you're saying that the Commonwealth should also lose a revenue stream.

Mr Voortman: I guess what we're saying is that excluding electric vehicles and new cars—and a lot of those cars in, as you call them, the luxury segments are fuel efficient, safe and green, and these are all government goals—

Senator KIM CARR: I know that. They're great cars—sensational cars. I agree with you. A Jaguar is a magnificent vehicle. But the point is: should we be subsidising wealthy people to own them?

Mr Voortman: We wouldn't characterise the luxury car tax removal as a subsidy.

Senator KIM CARR: No, you wouldn't see it as a social justice measure. I can see what you're saying there. But the point I'm making is that it's a revenue measure by the Commonwealth at the moment.

Mr Voortman: Yes.

Senator KIM CARR: Where does the revenue come from to replace that if we were to hand that over to the importers?

Mr Voortman: We haven't made any suggestions for an offset at this stage.

Senator KIM CARR: Well, I'm saying that your proposal might have a lot more strength to it if it did have some policy implications with some policy advice to us.

Mr Voortman: On how to replace the revenue?

Senator KIM CARR: Yes. I'm just wondering why you haven't done that.

Mr Voortman: Our position on the luxury car tax has been longstanding. We see it as a poorly designed tax which affects—

Senator KIM CARR: It's not poorly designed; it's very well designed. It's aimed at raising revenue.

Mr Voortman: Our view, and the view of a number of independent inquiries, is that it is a poorly designed tax which only falls on safe, efficient, clean vehicles.

Senator KIM CARR: It's designed to raise revenue. That's what it is.

Mr Voortman: We don't believe that taxes should be solely designed to raise revenue.

Senator KIM CARR: You don't believe that you should pay tax. That's what you're telling me. Lots of people come before the Senate and tell us, 'We shouldn't pay tax.' All I'm saying is: if you shouldn't pay tax, how do we replace the revenue? If you're saying you shouldn't pay tax, what does the Commonwealth get in terms of a response?

Mr Voortman: We'll go away and look at options to replace the revenue.

Senator KIM CARR: Thank you very much. I'm very pleased to hear that. That's very good. Thank you. I'm a former minister for innovation and industry, and I can tell you I've heard this argument for a long time. Some auto manufacturers say, 'Oh, we should remove it only for those who do R&D in Australia.' You're not even saying that. You're just saying, 'Give us a tax holiday.' What a wonderful idea! Thank you for your advice.

Mr Voortman: Thanks for yours.

Senator RICE: Thanks, Mr Voortman. I'm glad that you went in your submission and your statement to what you see as the conspiracy theory about dealers not wanting to stop electric vehicles, but I want to explore a bit more whether there's going to have to be a change to the current structure of dealerships if we are going to see greater sales of electric vehicle through dealers.

Mr Voortman: Yes. There will be reduction in profits in service and repair. We don't shy away from that. A recent example I saw at a presentation which looked at a Nissan Leaf in relation to a similar model shows that we'll only be making 60 per cent of the profits we would from the IC vehicle.

Senator RICE: Currently for a dealer, what percentage of their profits comes from that servicing and repair?

Mr Voortman: I'll have to take that on notice. We do have numbers on that, but I just can't recall them off the top of my head, and I'll definitely furnish you with those. The ACCC did some work on this in the last few years. But it has been a growing proportion. With the emergence of electric vehicles, we know that this profit centre will decline, but there will be other options. We'll potentially be replacing batteries every so often. We can involve ourselves in the installation of charging infrastructure in the home, for instance, or battery disposal. So we're not putting our head in the sand and then sort of hoping that the electric vehicles don't emerge; we're actively looking at alternatives that will make up for the lost profits.

Senator RICE: In terms of the dealerships and the dealers, are there incentives that flow through from the dealerships on the servicing and repair of vehicles as well?

Mr Voortman: Incentives from the manufacturer?

Senator RICE: Yes.

Mr Voortman: As authorised dealers, we obviously are authorised to service and repair those vehicles and, when a consumer purchases from us, we have a natural advantage in that many of them come back to us. But service and repair isn't incentivised in the same way, I don't believe, as new car sales is.

Senator RICE: So there's nothing that flows through from the manufacturers to you if you service and repair one of their vehicles?

Mr Voortman: I'll take that on notice but I don't think there's a financial incentive for every time we retain a customer.

Senator RICE: You're talking about the change to the dealerships and that you might end up selling different services. Are there any other things that you're looking at to maintain the viability of dealerships, or things that would actually encourage them to be selling more electric vehicles?

Mr Voortman: The first thing we need to do to sell more electric vehicles is to get them in the showroom. At the moment, we don't have that. As you've probably heard throughout this inquiry, Australia just doesn't have a lot of models at competitive price points.

Senator RICE: But they're available around the world, so why aren't they being sold in Australia?

Mr Voortman: I think there are a number of unique factors in the Australian market. Firstly, we are a far way away from the likes of Europe and the US. We have a lower petrol price compared to some of those countries, so the eagerness to move to electric vehicles is probably lower. We are a right-hand drive market, which plays a role. And we are a small market, so, when manufacturers overseas are making a decision on where to send their cars, we might be at the back of the queue in some instances.

Senator RICE: Is there anything that the Australian government should or could be doing to overcome some of those barriers—being a long way away, right-hand drive and low petrol prices? That's one.

Mr Voortman: The other thing, when manufacturers look at this market, is that there might be a perception that, in relation to like-minded markets, there isn't much being done to promote electric vehicles. Some of the suggestions we made were around addressing the up-front cost and assisting in developing a strategy for charging infrastructure. Those are probably some of the policy levers that would give confidence to people looking at our market.

Senator RICE: We've heard a lot today about confidence. Do you agree with evidence we've heard today that, if there were a government vision direction, that would encourage the vehicle manufacturers to bring more cars into Australia?

Mr Voortman: You only have to look in the media, and a number of the Australian manufacturers have made comments to that extent, so yes.

Senator RICE: In terms of the uptake of vehicles in Australia compared to comparable jurisdictions—say the US, where they've got two per cent of vehicle sales now compared to the 0.1 per cent or whatever it is here—what do you think explains that?

Mr Voortman: I think it's very simple. In the US you can get up to \$7½ thousand for the purchase of an electric vehicle.

Senator RICE: So it's just pure price differential?

Mr Voortman: Yes. I also think the US is a mass market, so economies of scale probably allow them to bring down the price.

Senator KIM CARR: That's being phased out, isn't it?

Mr Voortman: It is, I believe, yes.

Senator RICE: How about Australia and New Zealand?

Mr Voortman: In comparison to each other?

Senator RICE: Yes.

Mr Voortman: New Zealand has a higher proportion of electric vehicles.

Senator RICE: There are more electric vehicles in New Zealand than there are in Australia, despite their considerably smaller population.

Mr Voortman: That's right. I'm not across their policy, but they do have a target and they also get a lot of their electric vehicles second-hand from Japan, so they are a lot more affordable than a new vehicle would be.

Senator RICE: One of the other significant suggestions that has been consistent through the inquiry has been about the role of government and fleet uptake. Do you have a view on government fleet and procurement policies, for fleets having a proportion of electric vehicles?

Mr Voortman: That's the best chance for government to lead by example—by using electric vehicles in their fleets. Obviously it depends on the level of government. At the Commonwealth level I would suspect it's easier, because I would think they'd have fewer vehicles which would be involved in maintaining national parks. What I'm saying is the Commonwealth would have more drive-around-town vehicles; there would probably be lot more white-collar public servants making use of those. We'd be supportive of that if the vehicle suits the task.

Senator RICE: Would your dealerships be involved in supplying government fleet purchases?

Mr Voortman: The manufacturers often deal directly with fleet providers, and then we would play a delivery role and get a handling fee for completing the delivery.

Senator RICE: So it might also increase and help with the availability of models through dealerships if you had that government fleet procurement?

Mr Voortman: Yes, potentially.

CHAIR: I just wanted to quickly return to the luxury car tax issue and to focus on whether, rather than repealing it and removing it fully, it could be tightened more. I believe there's an exemption for seven-litre-per-hundred-kilometre cars at the moment.

Mr Voortman: There is. There's a fuel efficiency threshold, which as you said is seven litres per hundred kilometres.

CHAIR: And maybe if that was—

Mr Voortman: Brought down to better target lower-emission vehicles?

CHAIR: Yes.

Mr Voortman: Absolutely worth looking at, yes.

Senator KIM CARR: But it's also ripped off, isn't it, on the basis of that fuel efficiency measure? It's rorted by some international manufacturers.

Mr Voortman: Vehicle emissions testing is a pretty interesting topic.

Senator KIM CARR: Maybe we should fix that up. We could raise more revenue!

Senator PATRICK: Maybe this helps out as well—I'm trying to get you over the Senator Carr hump.

Mr Voortman: Any help would be appreciated.

Senator PATRICK: Are resale values for electric vehicles comparable to those for ICE vehicles?

Mr Voortman: Depreciation is a tricky area. It's still emerging, as the vehicles have only been on the market a short time. The experience is that they aren't, that electric vehicles don't have the resale value of ICE vehicles. But as information improves over time, some quarters are saying that battery life is holding up better than initially thought and that those values are starting to hold.

Senator PATRICK: Maybe that gives you the social equity that Senator Carr wants—you get a reduction at the start, but the second-hand market is a better market for the junior guys?

Mr Voortman: Exactly. We'll have to go and work on that.

Senator PATRICK: Interesting.

Senator KIM CARR: So the battery's clapped out—it's a great system for a used-car salesman. I can see this works!

Mr Voortman: We're only new-car salesmen!

Senator PATRICK: But it was a serious question, because some people will look to resale value as a factor in the purchase of a car.

Mr Voortman: Absolutely.

Senator PATRICK: You're saying there's not enough empirical data here in Australia. But is there any experience overseas that we can draw on to understand whether that's an inhibitor?

Mr Voortman: Not that I'm aware of, but we'll take that on notice and come back to you.

Senator PATRICK: Okay, thank you.

Senator KIM CARR: Can I ask you a serious question: what's the dealer network saying about hydrogen?

Mr Voortman: We were pretty clear in our submission that we're technology agnostic. We prepared the submission on the basis that this was an electric vehicle inquiry.

Senator KIM CARR: But it's a form of electric vehicle.

Mr Voortman: Yes, absolutely.

Senator KIM CARR: Clearly the Japanese manufacturers are keen on it, particularly Toyota, but also the Koreans. Do you think there's any prospect of other manufacturers distributing hydrogen vehicles here in Australia?

Mr Voortman: You're right: Toyota and Hyundai have been the two manufacturers who've been the keenest on that technology. I'm not aware of any others who are looking at it seriously, but there have been some breakthroughs in recent weeks. We also know that certain technologies might suit certain functions. I know there have been suggestions that more of the commercial type vehicles might be suited—

Senator KIM CARR: There's a commercial issue. There's a range anxiety issue, particularly in a state like this. It's also the capacity for domestic production—

Mr Voortman: Yes.

Senator KIM CARR: which also has some advantages for us in regard to the grid.

Mr Voortman: Yes. Our view is that we are recipients of standards, or recipients of vehicles; we'll sell anything. We used to sell LPGs when they were still being sold new. We'll sell petrol, diesel, electric, hydrogen. We aren't in the business of forecasting—in fact, we find this electric vehicle process very interesting because of the range of different forecasts—but we're prepared to sell anything that consumers would like to buy.

Senator KIM CARR: Thank you very much.

Senator BUSHBY: I have a couple of questions following up the discussion about the business model; in particular, in terms of servicing and repairs. In different fora to this one I've heard evidence that some of your members, not all, are reluctant to pass on to someone other than the dealers the necessary software and technical details in terms of how to repair cars. That's become more of a problem as cars have become more computerised and more electronics have been included, because it's very easy to keep it proprietary and not pass it on. I imagine that, as we go to electric vehicles, it potentially will become even more of a problem because it will be even harder to repair cars unless you have access to that sort of software. What approach will your members take to this particular issue?

Mr Voortman: I suspect it's going to be taken out of our hands.

Senator BUSHBY: I know the ACCC has been looking at it.

Mr Voortman: Yes, and I believe both the opposition and the government are very committed to implementing a regulation on access to service and repair information. We've come on board in recent times and we've supported it on the basis that we need to protect the safety, security and emissions information and we need to create a process for repairers to access that. We've also said that the information needs to be shared on fair and reasonable terms.

Senator BUSHBY: Yes, which I've got no argument with.

Mr Voortman: The third thing we've said is that we would like an independent automotive body with an independent chair administering this process. So it's quite similar to the model in the US. And we're almost at one with the aftermarket association on this.

Senator BUSHBY: The AAAA?

Mr Voortman: The AAAA, that's right. We've come on a journey in this regard. We're now supportive, but based on those conditions we've set—which are shared by the aftermarket, it should be said.

Senator BUSHBY: Thank you.

CHAIR: Thank you very much, Mr Voortman.

Mr Voortman: Thank you very much.

WHITEHEAD, Dr Jake, Research Fellow, School of Civil Engineering, University of Queensland

Evidence was taken via teleconference—

[15:38]

CHAIR: I now welcome, via international teleconference, Dr Jake Whitehead from the University of Queensland. Information on parliamentary privilege and the protection of witnesses in giving evidence to Senate committees has been provided to you. I note that, as this privilege applies only within Australia, a person outside of Australia will not be protected by parliamentary privilege. Do you have any comments to make on the capacity in which you appear today?

Dr Whitehead: I'm a research fellow at the University of Queensland's School of Civil Engineering; however, please note that my comments today and those listed in my submission represent my own opinion as a researcher and do not represent an official position of the University of Queensland.

CHAIR: Okay. Noting that we received a submission which has been termed as being from the University of Queensland and which has been lodged with the committee as submission No. 49, would you like to make any amendments or additions to that submission?

Dr Whitehead: There is just one minor amendment to page 18. In the final column of table 2, in the second last row, at the very bottom, it states that Australia 'consumes' approximately 250 terawatt hours of electricity per annum. It should actually be that Australia 'generates' approximately 250 terawatt hours of electricity per annum.

CHAIR: Thank you. I now invite you to make a short opening statement. At the conclusion of your remarks, I will invite members of the committee to ask questions.

Dr Whitehead: I apologise for not being able to attend this hearing in person today, but thank you for providing me with the opportunity to address the committee via phone from India. I'll start with a short statement.

Electric vehicles can deliver a wide range of benefits to Australia, including significant reduction in Australia's transport emissions, even when charged using electricity from the existing grid. Electric vehicles can reduce running costs by over 70 per cent, due to their high energy efficiency and minimal moving parts. Electric vehicles can also reduce noxious tailpipe emissions and, in turn, decrease the estimated 1,700 premature deaths that occur in Australia each year due to motor vehicle pollution, noting that this figure is 40 per cent higher than the number of annual road accident fatalities in Australia.

Additionally, in the future it may be possible to use electric vehicles as mobile batteries. In 2019 I will be leading a project at the University of Queensland that aims to launch a series of demonstration sites which will help us to better understand how electric vehicles can improve climate resilience by providing backup power to buildings during blackouts and natural disasters. In addition, this project will explore how the grid can leverage the enormous energy storage contained in electric vehicle batteries, how smart charging regimes can support the uptake of renewables by charging during sunny and windy periods of the day and how used EVs can have a second life application as stationary storage.

As detailed in my submission, I have four principal recommendations for the committee to consider. Firstly, Australian government should support a transition to electric vehicles in order to capitalise on the significant economic, environmental and social benefits associated with this innovative transport technology. Secondly, in order to support the uptake of electric vehicles, Australian government should consider the introduction of discounts on luxury car tax, stamp duty, import duty and goods and services tax. These discounts could be combined with behavioural incentives such as toll road discounts and bus and transit lane access as well as support for the rollout of public charging infrastructure and public awareness campaigns.

In addition to recommendation 2, Australian government should also work collaboratively towards the progressive introduction of a national road-pricing scheme. A national road-pricing scheme is required in order to manage road congestion in our major urban areas and provide a long-term mechanism for addressing the road tax revenue shortfall that will ultimately occur due to the uptake of shared, autonomous and electric vehicles. As I've suggested in my submission, a dynamic road-pricing scheme should price where and when road users drive, as opposed to simply how far they travel, which would unfairly disadvantage rural and remote communities. The dynamic road-pricing scheme that I have proposed could first be presented as a voluntary, opt-in scheme for electric vehicle owners, who in exchange would be exempt from existing road taxes, including luxury car tax, import duty, registration, stamp duty et cetera. The road-pricing rate would start low, and in this sense the scheme would initially be used to incentivise the uptake of electric vehicles. Over time, as the transition to electric vehicles matured, the road-pricing rate could be increased in order to ensure the future sustainability of road funding in Australia.

Fourthly and finally, I wish to address the issue of hydrogen fuel cell vehicles, given the number of submissions made directly related to this technology. Hydrogen fuel cell vehicles are energy and water intensive due to the process that is required to generate hydrogen in a zero-emissions manner. The amount of electricity required compared to electric vehicles is three to four times as high, and this difference will always remain, given that the laws of thermodynamics dictate that a significant amount of energy will always be required to split water molecules into hydrogen and oxygen and then compress that hydrogen to a volume that is feasible to transport. As such, I believe the committee should adopt the same terminology used overseas for electric vehicles, that being that electric vehicles are only those vehicles that can be plugged in to charge. This definition does not include standard hybrids such as the Prius. Nor does it include hydrogen fuel cell vehicles.

When thinking about the future of transport, it's particularly important to keep in mind that we have specific emissions reduction targets that we are aiming to reach in the next 10 years. However, the vehicles that are being purchased today are likely to remain in the Australian fleet for at least another 10 years. As such, it is vitally important that we act today in order to start the transition towards a lower and zero-emissions vehicle fleet. This applies to heavy vehicles, such as buses and trucks, as much as it does to light commercial and passenger vehicles.

Electric vehicle technology is the only—

Teleconference interrupted—

Dr Whitehead: Hello?

CHAIR: Yes, Dr Whitehead, please complete your statement if you recall where we were? If you could finish point 4, or definitely hydrogen? No, I think we'll go straight to questions if we may?

Dr Whitehead: Yes, that's fine.

CHAIR: Obviously, there'll be interest in your points about the road-pricing scheme. I'll just get myself together on this. You have done research into this scheme, correct? This is the determination of how you've come to this point, which is based on comparisons with overseas jurisdictions—or is it just an analysis done by yourself? Is that correct?

Dr Whitehead: This is the beginning of an Australia-focused project. The concept itself, yes, comes from a wide literature review of similar schemes that have been implemented overseas, not necessarily just for electric vehicles but for low- and zero-emission vehicle fleets. In particular, I lived in Sweden for five years and was able to experience firsthand the congestion-pricing scheme they have in place in that city. When they initially introduced that scheme, they put in place a full 100 per cent discount, or exemption, for low-emission vehicles, which was used as an incentive to drive the uptake of that category of vehicles. In fact, in that instance the policy was so successful that they had to phase it out prematurely.

CHAIR: And road users would be voluntarily opting into it—electric vehicle owners would be voluntarily opting in, rather than being automatically included in the scheme? Is that right?

Dr Whitehead: The premise here is that we've struggled for many, many years with the idea of introducing road pricing. This is by no means a new idea. I've been speaking about congestion pricing in Australia for a good 10 years. The main challenge is public resistance. I think that electric vehicles present us with this really unique opportunity where we can transition towards a usage based system by providing that opportunity for them to voluntarily opt in, but, in exchange for that, obviously they need to have a bit of a carrot, and that would be an exemption from those existing road taxes.

CHAIR: And then, as you characterise it, it would be where and when. They'll be taxed effectively on where and when, not on how far; is that correct?

Dr Whitehead: That's correct. At the moment we have fuel excise in terms of standard fossil fuel vehicles, and that effectively is a proxy for both how far people travel and how fuel-intensive their vehicles are. With electric vehicles, obviously they don't pay fuel excise, so there's been a lot of discussion about bringing in a per-kilometre charge. But what you see is that, in cases where that has been undertaken, you can have some pretty significant equity impacts. Obviously, in a country like Australia, where we have a significant population outside of urban areas, if we are charging them purely based on how far they travel, that's going to have a much more significant financial impact on them as opposed to those individuals who are driving in urban areas. The reality is, though, that it's those drivers in urban areas who are causing the greatest cost to society through congestion but also much higher emissions through that kind of stop-start-idle traffic.

CHAIR: Can I ask you a question about your opinion on hydrogen fuel cell vehicles. Are you categorical about them in terms of having a higher energy requirement to generate the benefits effectively? If we were able to

utilise renewable energy sources to provide the input into the creation of the hydrogen, would that not be providing a benefit which would be at a lower cost than battery electric vehicles?

Dr Whitehead: No.

CHAIR: Or are you categorical about it?

Dr Whitehead: Categorically no. We're talking about fundamental principles of chemistry here. This isn't a matter of debate; it's about having the facts on the table. One of my serious concerns is that, in this whole discussion, we're not actually putting those facts on the table and having a realistic, evidence based comparison of these different technologies. I'll be the first to say that there are limitations of electric vehicles. They're not the be-all and solution for every single mode of transport. But the reality is that, at this point in time, electric vehicles present us with the best opportunity for shifting a significant proportion of the transport fleet to a zero- or, in the case of a plug-in hybrid electric vehicle, a lower emission technology.

With hydrogen, it will always take a minimum of 40 kilowatt hours of electricity to produce one kilo of hydrogen. That is back to year 9 chemistry. That will never change. At the moment, we don't have 100 per cent efficient water electrolyzers, so we're much above that. The US Department of Energy is targeting something around 45 to 50 kilowatt hours per kilo, but that's still significantly higher—as I say, three to four times higher—than using electricity directly to charge an EV.

It's pretty simple if you think about it. Every time you change the molecules, you require energy, so in that process of extracting water, applying electricity to split it and compress it, transport it and run it through a hydrogen fuel cell vehicle, there are many more steps, and so, across those steps, there's a far greater loss. We talk about well-to-wheel efficiencies, and, with hydrogen fuel cell vehicles, they're a little bit better than petrol and diesel vehicles, but only by a magnitude of a couple of per cent, whereas electric vehicles are much higher. That's because you can use that electricity to directly charge a battery.

You mentioned cost as well. Based on the current projections of improvements in both technologies, we expect that EVs are going to stay around \$3 per 100 kilometres, whereas hydrogen fuel cell vehicles will be \$14 to \$16 per 100 kilometres, so that is a significant price differential for consumers as well.

Senator RICE: I'll continue on about the issue with hydrogen. One of the advantages of hydrogen, at least as one technology and not necessarily instead of battery electric, is in the context of the hydrogen economy and using electrolysis to soak up excess renewable generation to produce hydrogen. So do you see that, even though it requires more energy for the vehicles to be powered, there may be a role? If we've got hydrogen generation occurring across the country, there may be a role because of that?

Dr Whitehead: Don't get me wrong. Hydrogen in the energy space and in terms of export potential is definitely something that can be investigated. I still think that we have some major challenges in terms of the energy intensity and in terms of the actual efficiency of the technology, as well as the water consumption. Let's not forget that we're in a drought at the moment, and we're talking about advocating for a technology that does have a non-trivial impact in terms of water consumption. But I think in those other sectors it may play a role.

Let's just play out a hypothetical here where we're talking about 100 per cent of the passenger vehicle fleet in Australia being based on hydrogen. That's 14 million cars. That would result in about a 60 to 70 per cent increase in the national consumption of electricity. That's a major, major energy increase required for the country to be able to go through. If we compare that to EVs, we're talking about something around 15 per cent. I often get asked questions specifically around how EVs are going to impact on the grid. I say: certainly there'll be that impact. It will be fairly minimal in terms of 10 to 15 per cent; it's more important about how and when they charge. But, with hydrogen fuel cell vehicles, because of that energy intensity it's much higher.

There'll definitely be opportunities for storing hydrogen where there are excess renewables and it doesn't make sense to store it or use it at that time, but I don't think that it's going to be on a scale where it would make sense to be able to then use that to power transport. The energy intensity is just going to be too great.

Senator RICE: The other area where hydrogen has been suggested to us is in heavy vehicles, in trucks and in trains. Have you got any comments to make about the value of hydrogen for those types of vehicles?

Dr Whitehead: Yes. The passenger vehicle fleet, as I said, is based on mobility use in Australia. For a vast majority of those vehicles, it will be an EV transition in next few years. For heavy vehicles it's a little bit different. We've been doing a little bit of work around looking at short-haul heavy vehicles, so anything up to 200 kilometres a day. That's delivery and courier vehicles within cities. Even based on the current technology, we think that we're about three to four years away from price parity in terms of that total cost of ownership for them to be fully electric. So again I think, because of that operating cost advantage in terms of both the energy cost and the lower maintenance costs, for the electrification of drive trains the economics stack up much better for that

short haul. The big challenge, I'll openly admit, is longer-haul travel. When we're talking about semitrailers that do 2,500 kilometres at the moment, current battery technology is just not feasible for reaching that distance in terms of the energy density. So, that's where we've got to try to understand what other technology's out there. Hydrogen's one option that may make sense, recognising that it's going to have a pretty high cost for fuel but also for infrastructure.

The other option we shouldn't ignore is biofuels. There's actually quite a neat synergy between electrification and biofuels where we would be able to have a kind of plug-in hybrid heavy vehicle that would still have a battery and be able to drive in urban areas on zero emissions, 100 per cent electricity, and that way remove the emissions impact of that sector. And, outside of urban areas, on highways, there would be a highly efficient hybrid set-up with a biofuel generator producing electricity to power the vehicle. The big benefit of that is we already have a biofuels industry in Australia, particularly in Queensland, and biofuels can be stored and transported using existing fuelling infrastructure.

The big challenge of biofuels in the past has been that we've looked at it through the paradigm of: 'Let's convert everything to biofuels. Hang on a second: that volume is far too significant. That's going to have all sorts of ramifications for food crops.' The beauty of this is: we're really talking about a very niche segment of the transport sector being ultra long-haul freight and, through electrification, we can significantly reduce the biofuels. Another project that we're very much in the early stages of is trying to get a prototype in this space so we can get an understanding of how that might play out in Australia and how that stacks up against a hydrogen fuel cell vehicle drive train.

Senator RICE: Thank you. Finally, I loved your table of carrots, sticks and sermons, which is a very comprehensive list of all the things that governments and industry could be doing. In terms of government initiatives, what are priority things that government should be doing?

Dr Whitehead: First and foremost, I don't think any kind of direct subsidy or rebate makes sense in Australia. We've done a lot of work looking at overseas markets and found that it really only makes sense if you're manufacturing those vehicles locally. It causes all sorts of market distortions, and you actually find that the electric vehicle prices increase in terms of that difference between an electric vehicle and a comparable fossil fuel vehicle. So, I don't think we should go down that route. The main priority should be around what was being discussed earlier today: Australian governments collectively committing to increasing the uptake of EVs in their own fleets. That could have a significant impact in not only showing leadership but also having that flow-on effect of building a secondhand EV market. In the last discussion, there were a few questions around residual values of EVs, and that is an issue. In some segments we are seeing those residual values fall much quicker, and that's because we don't really have that strong secondhand market. So, the real big benefit of government taking that leadership is that in a couple of years time those vehicles will be sold to the public as new EVs and build confidence in that secondhand EV market to be able to boost the residual value.

Another priority is investment in public charging infrastructure. It's not to the same scale as petrol stations. We had that discussion earlier as well about public fast-charging infrastructure being about addressing range anxiety and also facilitating some of those longer distance trips, but the vast majority of charging will still take place at home or at workplaces.

In terms of those incentives, I think we're going to struggle to bring in any kind of massive financial incentive if we don't have an alternative mechanism to raise revenue. That's why I come back to my proposal around road pricing, because that gives us a mechanism that ensures that we can raise revenue in an effective way that deals with not only this issue but also the longer term issue of sustainability of road funding and congestion, and we can use that revenue to invest in other ways to support the uptake of EVs.

Senator RICE: On your road pricing, am I right in that you are saying that fuel tax would continue on throughout that transition—that is, opt in for electric vehicles? Under your model, would internal combustion vehicles also be able to opt in if they wanted to?

Dr Whitehead: That could certainly be a consideration. That is going to be part of the next step we take in this exercise in 2019—to explore what other ways this scheme could be expanded. It is always a challenge to get people to opt in. It is really about trying to understand what size of benefit we need to provide for them to want to make that switch. We certainly want to be able to encourage this transition to lower emissions technologies—in particular, electric vehicles—and that gives us that mechanism. We do want to have road pricing across every vehicle at some point in the future, but we are always going to be up against that barrier in terms of trying to introduce that. There have been a few brave politicians around the world who have taken that on—most have been successful, and some have not. It is certainly a massive challenge. In advocating a congestion pricing scheme over the last decade, I have experienced significant heat from the general public in terms of that concept. I

think we are really going to have a challenge in terms of expanding it broader. But we can explore how we might be able to incentivise people to opt in who might not necessarily have an EV.

CHAIR: I want to focus on your vehicle-to-grid pilot that is proposed in 2018. As I understand it, this utilises what we would effectively call 'a battery on four wheels' to provide power during extraordinary circumstances and with renewable energy powering it. Could you explain this a little bit for the *Hansard* record?

Dr Whitehead: The demonstration sites will consist of four principal components. You will have a solar-PV system, which will be your renewable energy generation. You will have some form of stationary battery storage. In this case, we are actually taking used electric-vehicle batteries and plugging them into buildings to demonstrate that kind of second-life application. You will have your grid connection and then you'll have an electric vehicle with a charger. And that charger is bi-directional—so the vehicle isn't only charged from the solar or the battery in the grid, it can also provide electricity back.

In the first instance, we are looking at this from a climate resilience perspective. In regional Queensland, we have quite a few natural disasters where there is a period of the grid going down. So we would effectively be able to power buildings—that could be all the way from a home up to a commercial building—using a vehicle or fleet of vehicles in tandem with solar and smaller battery storage. This is already being carried out overseas; we are certainly not leading in this space. Japan, in particular, has been doing a lot of work. The Netherlands and the UK are exploring this potential.

But the bigger concept here—of course, we only have natural disasters infrequently though that may increase in the future—is that, with that grid connection actually being on, we want to have the ability to leverage the additional energy capacity in the EVs to not only soak up renewables during that peak renewable period during the middle of the day but also provide electricity back to the grid during the evening peak. The basic premise would be that a utility would pay a consumer an amount of money to be able to access that service. So you would have your vehicle and be able to provide electricity back as required.

We've got to go through and understand all the various costs involved and the various levels of incentives that would need to be provided for consumers to opt in to performing this activity. In terms of the back-of-the-envelope numbers as to the scale in Australia, if we come back to 14 million cars, if all of them were electric and had a relatively low driving range of 250 to 300 kilometres, the aggregate energy storage in that fleet would be greater than the nation's entire electricity consumption over a year if you charged those vehicles every day. Of course, that energy has to be used for mobility as well, but that gives you a bit of insight into the kind of scale we have here.

California has done some really detailed modelling earlier this year looking at vehicle to grid technology, as opposed to investing in stationary storage. They have a 50 per cent renewable energy target by 2030 and they are very confident that they would be able to meet that 50 per cent renewable energy target using vehicle to grid technology and smart EV charging, without any investment in stationary storage, at a far lower cost. You get the dual benefit of not only electrifying the drivetrain but being able to use it for other purposes.

CHAIR: Thank you very much for your time.

Dr Whitehead: Thank you.

McGARVIE, Mr Gregory, Managing Director, Australian Clean Energy Electric Vehicle Group

QIANG, Mr Will, Director, International Business, Australian Clean Energy Electric Vehicle Group

[16:11]

CHAIR: Welcome. Information on parliamentary privilege and the protection of witnesses and giving evidence to Senate committees has been provided to you. ACE-EV Group has lodged a submission with the committee, which we have numbered 4. Would you like to make any amendments or additions to this submission?

Mr McGarvie: No. We are happy with the submission.

CHAIR: I now invite you to make a short opening statement and, at the conclusion of your remarks, I will invite members of the committee to ask questions.

Mr McGarvie: Thank you, Chair. I congratulate you on the initiative of getting this inquiry up and running in such a short time and we are pleased to present here. Our goal is to be a manufacturer in Australia. We have been working on the process for three years. I will give you a little bit of history and an insight into it so you understand where we are at. We are currently developing a 150 megawatt solar farm and we were introduced to an EV maker through one of the partnerships there. We did a little bit of due diligence—and our partner has a lot of credibility, a lot of credentials. They are currently spending about US\$300 million on setting up their own manufacturing plant. They have been working on this for about seven years. They have included German and Swiss design teams and technologists. We were just very fortunate to be introduced to them.

Charles Kung was quite impressed. He wanted to do something in Australia. So he flew out here and met with Will and me. He said: 'Greg, I'm surprised at vehicle ownership here in Australia. It is great'—around 1.28 million vehicles a year are purchased. 'The site you have picked out is simple. It'll work. But, once you get volume up, you'll need a bigger site. But that \$5 million I was going to pass to you as some seed capital to get it going is off the table. I said, 'Why?' He said: 'I've had a look at what's happening here in Australia. Your government has let the auto industry disappear, and I can't see anywhere policy that would support me risking my money with you two.' To give you a bit of an illustration: you know that Elon Musk was a nerd with PayPal. Well, we're not nerds with PayPal. I'm a marine biologist and Will's a journalist. So we think we're as qualified as Elon Musk.

We've got a very strong team—and it is the team that actually counts. Among our team we have a process engineer who worked on the Renault Kangoo; a drivetrain engineer who worked in the UK and also in Detroit; and a lot of other very skilled people. And we have paired that team up with Charles Kung's team. Charles Kung is the principal of Seymour Technology, who we have developed this relationship with. He was the chief engineer for the high-speed rail in Taiwan and he also manufactured componentry for Toyota. Ernst Thomke, the Swiss man who did the Swatch smart car, is involved in the design team. For Will and myself, knowing that, we feel very comfortable with what we're trying to do.

The other thing that's really different about our process is the manufacturing. It's very low capex—nothing like even Elon Musk's production line—so that we can set up our manufacturing plant to do 5,000 vehicles for around US\$35 million. The beauty of that is also that, with that manufacturing plant, we can have manufacturing pods in different sites, and those manufacturing pods can be set up for around \$5 million. A manufacturing pod is where we take the vehicle CKD, and then they're assembled, tested and put on the road. I'm sure I've simplified it a lot, but we've had three years of hard work—and three years of frustration, particularly with government policy—in getting things done. We have applied for every possible avenue for funding and funding support and we don't match any of the criteria. A good example is the Automotive Transformation Scheme. That's listed in the submission we made, so I won't go into it any further, but effectively it's a *Yes Minister* moment: someone's dreamt up the scheme, and you have to be building 30,000 vehicles to qualify.

Senator Kim Carr interjecting—

Mr McGarvie: Give me a break, Senator Carr; I'll just finish, can I? I've just come back from Batumi in Georgia. I was invited over there by the Asian Development Bank; they paid for me to go over. Their interest in our vehicle was the way it's manufactured. They want to be able to take our vehicle into the Asian market, because, believe it or not, Australia does have a very good reputation for quality, and that Australian branding makes it a less risky process for the involvement of investors in the Asian Development Bank. On Sunday I'm flying to London and meeting with investors over in there. Then I'm on to Norway with one of our partners there.

I'll explain our vehicle now. It's carbon fibre—plastic. It's a very simple process for manufacture, and we're looking at the business model of selling it, where the battery is a separate lease to the vehicle. You get into the vehicle for \$20, \$25 a week, and everything else is covered—insurance, roadside assist; the charging point is

supplied with the vehicle, so that fits into your house. We have an agreement with the battery, so that battery is ready to go straight to recycling. So we're looking at a cradle-to-grave solution with our process. That's where we are at the moment. We've got very strong interest. We had a meeting with Our Singapore Fund earlier this week. They're a substantial fund. I won't say too much more about it.

And so we're now looking, I guess, where there's a little bit of appetite from government to say, 'Let's support an Australian business starting up.' The process, as I said, is simple; it's low capex, and I can show more detail of that later on. Even though Charles wouldn't put that \$5 million up, we've convinced him to take 15 per cent equity in our manufacturing plant, and he'll take a percentage of each vehicle. We're purposely starting with vehicles that are light commercial, and we're purposely starting with vehicles that you charge at home. The average city trip is around 33 kilometres. Range anxiety, in a lot of cases, is a thing in the head. So our focus is urban light commercial. We've got a range of four vehicles. First is the cargo; second is the ute; third is an urban run-around vehicle, a five seater; and fourth is a sports car with gull wings. Whether we go ahead or not won't matter. Charles, with his production, will go ahead. He's just finishing off a production line now with the Germans—22,000 vehicles a year. We'd love to be able to do it here in Australia; we'd love to be able to do it here in Queensland. But the reality is, if the Philippines or some of the other Asian countries say to us, 'We'll help you out,' that's where we'll be. And it would be an embarrassment for me to be manufacturing an Australian designed vehicle in the Philippines and then bringing it back into the country.

Mr Qiang: And I will just make the point that we will have the IP for right-hand drive, not just for Australia but for the Commonwealth.

Mr McGarvie: That was part of the deal with Charles, and him getting the 15 per cent equity.

Senator KIM CARR: Have you sought registration for the ATS?

Mr McGarvie: Yes.

Senator KIM CARR: You have sought it?

Mr McGarvie: Yes.

Senator KIM CARR: And did you secure registration?

Mr McGarvie: Do you mean in terms of—

Senator KIM CARR: Did you get registered?

Mr McGarvie: Putting our name down?

Senator KIM CARR: Yes.

Mr McGarvie: No.

Senator KIM CARR: You've got to actually—do the Department of Industry acknowledge that you were a manufacturer or you were in the process of start-up?

Mr McGarvie: They acknowledged—I mean, I talked with various consultants in Canberra and talked to the ATS scheme people directly. It was just that there was no point registering or going through a registration process. We were told that the only way we might possibly get any funding support was if it was considered by the senator—I think it was Michaelia Cash at the time; I'm not sure whether she's still in charge of that area—and if she considered that it was a thing of national importance—

Senator KIM CARR: That's it: national interest test.

Mr McGarvie: Yes, national interest. And then the catch was that if it was really something of national interest we had to have a vehicle here in Australia that was sold. And to get a vehicle—

Senator KIM CARR: A prototype: have you got a prototype?

Mr McGarvie: Yes. There are 200 of them running around at the moment in beta test mode.

Senator KIM CARR: So, you have got a prototype such that you could meet that criteria.

Senator PATRICK: Here in Australia?

Mr McGarvie: No, not in Australia; they're running overseas at the moment.

Senator KIM CARR: Why couldn't you get one here?

Mr Qiang: It's left-hand drive.

Senator KIM CARR: We do have left-hand-drive vehicles here. I'm just wondering: have you got the right advice?

Mr McGarvie: Well, we've tried. We went to Frydenberg's office, when he was minister. We've talked and met with—

Senator KIM CARR: I noticed that in your submission you say there's no Commonwealth support, and that's true—that they're trying to wind the scheme down. But the scheme does exist. But there are rules and regulations. There are people who actually are taking legal action against the government because of the way in which they're seeking to behave. Maybe you should come and have a talk to me.

Mr McGarvie: Okay, I will. Thank you. I'd like to do that.

Senator KIM CARR: How much money are you looking for?

Mr McGarvie: Well, we're looking at \$5 million, just to get the first stage done.

Senator KIM CARR: That's what you want—you won't get that.

Mr McGarvie: No.

Senator KIM CARR: So, you want a capital grant of \$5 million. Is that what you're seeking?

Mr McGarvie: Yes. We're talking with investors now.

Senator KIM CARR: And you've applied for all other schemes in the Commonwealth. Is that what you're saying?

Mr McGarvie: Yes.

Senator KIM CARR: What about the state government?

Mr McGarvie: Yes—even their innovation scheme, yes. Our project's been sitting in the premier's office for the last three months, and they keep saying, 'Greg—patience.'

Senator KIM CARR: Because it's too big—\$5 million's too big for the state government.

Mr McGarvie: Effectively—if the government just had some skin in the game and said, 'Look, we support you with policy and other such things'—when Charles came out, if he'd seen that there was a policy setting here that was attractive for EV manufacture, we wouldn't even be here talking to you.

Senator PATRICK: What about the advanced manufacturing fund that was in—there have been two rounds; one's just closed, actually, with the condition that you have to set up in either South Australia or Victoria. Did you apply for that?

Mr McGarvie: No.

Senator KIM CARR: I think your advice needs a bit of development.

Senator PATRICK: If I can just ask a question: when you talk about manufacturing, it's not clear to me that you manufacture the carbon fibre components here or simply bring them to Australia and assemble.

Mr McGarvie: I'll clarify that. We're taking a low-risk approach. Initially we were looking at \$5 million to get the assembly plant. We've got an assembly facility available to get that set up and get their components in CKD and then, as soon as it looked like there was interest and appetite for more vehicles, to the second stage, which is full manufacturing here. In other words, we'd be doing carbon fibre structures here, their panels here, supply chain—we've been contacted by various lithium suppliers. We've got quite a few different supply chains wanting to link in with us. We've got research facilities wanting to link in with us. As you know, the carbon fibre research in Australia is quite advanced. As was mentioned before by Brett, printing will be the very next stage after that. We have a video that shows the assembly process, but that'll come to you as a link.

Senator KIM CARR: What are you looking for, in terms of a coherent policy? You've talked in generalities. What exactly do you need?

Mr McGarvie: I've listed some of the things in the report.

CHAIR: Could you explain 'EV Proclamations & Driver Rights'.

Mr McGarvie: Basically that's where anyone who has an EV might have access to a bus lane, or things like that.

CHAIR: Of course.

Mr McGarvie: Effectively, I guess what we're looking for is equity support. We've been working through the Clean Energy Finance Corporation. They're excited by the project, but they said, 'No, you have to have more of a Macquarie Street style funding structure in place.'

Senator RICE: I have a question about the leasing model and the battery leasing. Could you talk us through what that would look like?

Mr McGarvie: The idea of doing the battery separately from the vehicle is that the battery has a warranty life of five years, but it really depends on how the vehicle is used. We want to be able to let the owner of the vehicle swap the battery out and just take another battery on. So, it's separate from the vehicle. The car is almost like a mobile phone, and the objective down the track is the iPad; the vehicle is just an accessory to the iPad.

Senator PATRICK: Except, as we discussed, you can't take a battery out of an iPad!

Mr McGarvie: As battery technology changes it's just not a difficult job, because the battery pack drops from underneath.

Senator RICE: You were talking about the model for the car itself; most of those being leased at \$20 to \$25 a week, or whatever you said.

Mr McGarvie: Yes, the whole lot—battery and car. It's price point is under \$40,000.

Senator RICE: So it would be a different model to the outright sale of a vehicle.

Mr McGarvie: If you wanted one outright you could buy one outright. But we're just looking at the business model that is going to be easiest for people to take on. We want to see people adopting EVs as soon as possible. We've had meetings with Sydney City Council and the ACT government about pursuing fleet options. They've said that's not a worry, but they need to see an ANCAP 5 rating on it, so we have to go through that process as well.

Senator PATRICK: Looking at the different standards for the vehicle meeting Australian standards.

Mr McGarvie: The vehicle here will be ANCAP rated.

Senator PATRICK: Is that why you haven't got a prototype here at this point in time.

Mr McGarvie: Yes—one of the reasons.

Mr Qiang: To do this you need \$1 million. Basically, you have to destroy five cars—not just one car but five cars.

CHAIR: Thank you for your submission and your points and your sheer perseverance—

Mr Qiang: Encourage the government, please—carefully. How about 10 per cent EVs in the next five years? It would be a huge help.

Mr McGarvie: That's the most constructive [inaudible]. It's like a PPA for a solar farm. You've got your power already sold off. If we can demonstrate to investors that we've got a forward letter of intent from various government departments to take the vehicle on—it doesn't lock them in, but a letter of intent—that gives us a stronger case with fundraising, as well.

CHAIR: Thank you, Mr McGarvie and Mr Qiang. I would like to thank witnesses who have given evidence to the committee today. I now declare this meeting of the Senate Select Committee on Electric Vehicles adjourned.

Committee adjourned at 16:29