T R A N S C R I P T

STANDING COMMITTEE ON THE ECONOMY AND INFRASTRUCTURE

Inquiry into electric vehicles

Melbourne — 13 February 2018

Members

Mr Bernie Finn — Chair
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Mr Luke O'Sullivan

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Mr Cesar Melhem
Mr Gordon Rich-Phillips

Witnesses

Mr Dino Hadzic, Engineer, ABB Australia.

The CHAIR — This committee is hearing evidence today in relation to the inquiry into electric vehicles. The evidence is being recorded and is also being broadcast live on the Parliament's website. Welcome to the public hearing of the Economy and Infrastructure Committee. All evidence taken at this hearing is protected by parliamentary privilege. Therefore you are protected against any action for what you say here today, but if you go outside and repeat the same things, those comments may not be protected by this privilege. I would ask you to begin by stating your name, organisation, position and suburb or town in which you are based. Then you may go into a 5 or 10-minute overview, and we will take it from there.

Mr HADZIC — I am Dino Hadzic. I am from ABB Australia. We based in Notting Hill, just on Blackburn Road. I am going to take you through a bit of the infrastructure technology that is available currently around the world.

Visual presentation.

Mr HADZIC — ABB is a global company in over 100 countries. We are located locally in Australia as well. We have got 14 sites, and we work on all sorts of technology. This is just a bit of an introduction to the different forms of alternative fuels and the distance that can be travelled per metre squared. As you can see, there is quite a significant advantage in electric. ABB's history starts from 2010, when the first charging standard was developed — CHAdeMO, which is a standard that Asian car manufacturers' commonly use. From there we developed the first charger to suit that standard, and then in 2012 came the CCS standard. From there we then adapted to make a multi-standard charging station, and then in 2016 we developed bus charging, so opportunity charging. On the presentation you can also see the development of networks. The first DC charging station was in 2010 and the first nationwide network started in 2012–13.

In terms of the two standards, ABB is a member of both. We are a core member of CCS; its body is called CharIN. And from our experience it feels like that is going to be the dominant standard moving forward, because they have made the most progress. CHAdeMO is still limited to 50-kilowatt DC charging, where CCS can go up to 350 kilowatts. Then it has other features, such as auto charge.

We have got a wide range of global partnerships with different car manufacturers. It is quite a collaborative effort to create charging solutions.

This is kind of an example of each part of EV charging. You have got the car, and that is where the electronics communicate to the battery and ensure that the car does not overcharge and the battery does not explode. There is a lot of safety, and the charging standards also provide that communication to ensure the safety. Then you have got the charger, which is the actual hardware that gets connected to the grid to provide the power to the vehicle. Then you have also got remote services, which help monitor and talk to the grid and adjust demand, depending on what is available.

This is an outlook of the vehicles in Europe for the next four years, and you can see on the left of the line all the cars that are currently available, whereas in Australia there are only three currently available to purchase brand-new: the Tesla model X, the Tesla model S and the BMW i3. The Nissan Leaf and the Mitsubishi MiEV are no longer available to be purchased brand-new, so I think there are signs that so far Australia has been an unappealing market. When we talk about global sales, for Australia we already have to have specifically made vehicles for left-hand drive, so we are already looking at a niche portion of it. We need to try to stay attractive to at least allow these other options to be available.

Another thing you can see from this graph is the CCS standard — all the vehicles that are coming in are going to be charging using that standard. You can see AC and CHAdeMO falling away. The only significant one in the near future is the Nissan Leaf, when they reintroduce it.

The way we usually break down the charging service to the demand is by time. You have got your AC charging, and that is usually the places where you are looking at 4–16 hours to charge. So this is, for example, your home and overnight charge or at a resort, where you are going to leave a car overnight.

Then you have got DC destination, which is usually a wall-mounted DC charger. That is usually 1–3, so it can be used if you are visiting customers or you have got a lot of in-and-out traffic from your building. Having heard about experiences overseas, DC is quite an important one because if a colleague who does drive an

electric car day-to-day rocks up to a place and there is an AC charging solution, it is not enough for his car, so he might as well not plug it in.

Then you have got the higher power charging — the DC fast, which is 50 kilowatts. That is if on your casual run down to the shop, you are going to be in the shop for 20 or 30 minutes buying your groceries. There are some more examples. There is the DC high power, which is 150-plus kilowatts. They are more your 5 to 10-minute stopover, quick charging, and then you can be on your drive again, kind of replicating what you experience at a petrol station, times 10 minutes. They are the different options that are available to choose from when deciding what sort of station you want to use and what they are going to look like, mostly, going forward, including with other manufacturers.

We have not released an AC. We decided we did not want to be specific to DC, the fast-charging; we decided to complete the portfolio. The DC will usually be a wall-mounted system that you can plug in to. It will be either CCS or CHAdeMO. Then you have got your DC fast; they are the 50 kilowatts. We are starting to see a few pop up around Australia. Then DC high power is more overseas. There have been quite a large number of orders coming through, and that is the one that is kind of becoming what is used at present over there. As you can see, the power cabinet is starting to separate because you are going to need to draw more energy.

Mr O'SULLIVAN — If I could just jump in, is there a price difference between using the DC high power versus just the DC destination?

Mr HADZIC — Yes, there is.

Mr O'SULLIVAN — So you would have to pay more for the same power to charge faster?

Mr HADZIC — The DC high power is 150 kilowatts-plus; the DC destination is 20 kilowatts. That is more in terms of the rate of charge.

Mr O'SULLIVAN — But in terms of the cost of charging at one of those stations?

Mr HADZIC — The kilowatt hour stays the same.

Mr O'SULLIVAN — Okay.

Mr HADZIC — So it depends on the energy retailer. I was going to mention that one of the challenges faced is if you are using an EV charging station and let us say when installing you have got a payment terminal, there are rules and regulations on charging energy and you have to be a retailer of energy to be able to do that. So there are restrictions in terms of that. There are also discussions locally because there is a slow uptake. You are not going to install the chargers and all of a sudden sell a million EVs next year. It is going to take a while, so that return on investment is also quite heavy.

This is a bit more on the high power. You would all be familiar with some scenarios of emission scandals overseas. They have been required to invest, and part of it was to invest in a high-power network. A few manufacturers were failing to deliver. For example, this charger is meant to deliver 150 kilowatts to a vehicle that can accept 150 kilowatts. Car manufacturers limit their batteries to 400 volts. As you can see, the amperage here is 375, and that allows you to deliver at 150, whereas a lot of other charging stations would be 920 volts at 175 amps. So at the end of the day you are only delivering actually 75 kilowatts to the vehicle.

Then also there is fast-charging technology, and there are different standards for that as well. There is the opportunity charging and the TOSA system. The way those systems work is when the bus reaches the end of the line it stops under a pantograph, it drops down, and 3 to 6 minutes recharges the bus and it can keep making the journey.

Again with the bus technology there is also having to choose the right technology for the right journey, as you can have a heavy-duty bus that can travel 400 kilometres on one charge but they are going to be heavier and they are going to have less space in them because you have to store the battery somewhere. Then you have also got, for example, this one: the bus only has 20 kilometres range but it just recharges and keeps going, and therefore the vehicles are lighter and can carry more passengers. The other advantage of electric buses is the noise and the pollution and all that, and it is kind of the first opportunity people have to be exposed to it and experience it.

I have spoken to a few bus companies. A few of the challenges they are facing are that initial investment to transfer, obviously because over time there are going to be the savings in maintenance and all that, so there will be greater return, but a lot of them are having to invest their own savings and unfortunately all of the — we will say — subsidies go first to trains and trams. Then when everyone thinks about a bus, no-one really wants to talk about them as much.

There are other features that are out there. Technology is evolving, and part of ABB is pushing the digitisation of technology and changing that industry that way. These chargers are smart. They can integrate to the grid to judge the demand to not trip, and then also you can remote login and diagnose the charger. If these are installed in a rural area, someone sitting in Notting Hill or even in the Netherlands or in America can just login and check the status of the charger. Obviously there is privacy and confidentiality looking into it. You can find out what the issue is. Sixty per cent of the time it can be resolved without needing to attend the site. This is how the technology is evolving. If it is in a country area and you need to drive 50 kilometres, you can at least login and find out if it is a part that needs replacement. It might just be something where you just reset the circuit-breaker or something. These are all part of how things are changing. This is just a bit more about the whole integration between the charger management functionality, the grid functionality, but I will not go into too much because of the time limit.

Then also ABB has been involved in a wide range of other technology. We do look to the future, and it can be integrated with, for example, building automation and renewable integration. Looking at some of the other technology and projects that ABB has been involved in, Australia is the global centre of excellence for energy storage, and that is looking at how to integrate renewable with the grid to provide a stable source of energy. If there is great demand, it can provide some energy back into the grid to provide stability; if there is not enough demand and that causes the frequency to drop off, it can absorb that energy. With these kinds of technology advancements, naturally as people uptake more EV these things are going to be implemented into our grid and it will be able to withstand the uptake in electric vehicles.

The other thing ABB has been in globally is Formula E, which we have partnered up with. Formula E is held in a number of cities such as Hong Kong, New York, Berlin, Paris and Zurich. These are quite forward countries, and we are going to have our global lead coming down from Switzerland to ABB Customer World. People are welcome to come to and see. They are coming down to also discuss Formula E in Australia.

I probably skipped one more bit of information — for example, the eBus, to just give a reference case that it is technology that is out there. In Belgium there were 101 electric hybrid buses with 15 charging stations being ordered and currently in the progress of being deployed around. Also to add to that, in Australia there was an attempt to make an electric bus, but these things need to be planned a bit more, because after delving into it the supplier for the technology was not a reputable one, which caused serious issues. Then they scrapped it and went with a second supplier that did not conform with regulations, and that gave a bit of bad press for it all. Thank you.

The CHAIR — Thank you very much indeed. You said at the beginning of your presentation today that Australia is not an attractive market for overseas companies that are producing electric vehicles. What I would really like to know is how attractive is this product to Australians?

Mr HADZIC — Electric vehicles?

The CHAIR — Yes.

Mr HADZIC — From my experience they are very attractive. I think it is the convenience of charging your car rather than having to always go to the petrol station. I think it is going to be the same transition we have made with mobile phones. You used to have the phone that charged and you had it for seven days. Now you get through one day and you have to charge it overnight, but then you get to work and you plug it in there and you have got pop-up stations as well now to charge your phone. So I think the only reason it is unattractive is that, first of all, there is that lack of infrastructure, but then it flows onto the lack of options available. No-one is talking about it because the only car you can buy is a Tesla and no-one is looking to fork out $200 000 for that kind of vehicle.

The CHAIR — We saw an ongoing saga for many years with regard to the taxpayer propping up the former car industry in Australia. It seems to me that we might be getting back into that with the electric vehicle

industry. Can this be done without the taxpayer kicking in? We talk about incentives, we talk about subsidies, but can this be done without the taxpayer footing the bill in some way?

Mr HADZIC — I think it is hard to avoid taxpayers being involved. This is mostly due to the heavy initial investments. When you compare it, for example to other countries, other countries do have the advantage where the taxpayer does pay more and they can fork it out. Sorry, I have just lost my track of thought there. It will reduce the costing in your day-to-day drive, not having to take your car for service every year. I had to have my timing belt replaced and that service put me back $2000. If that was money I had pocketed, I would be able to spend that on a holiday or something. So it would be a bit of a short-term situation where we are using taxpayer money to create that transition, but in the long term we would be saving further on.

The CHAIR — Okay. You are clearly a practical man who is in hands-on this area, and I have asked a couple of our previous witnesses today this question. I have not got anywhere near to a satisfactory answer yet so I am very hopeful that you might be able to enlighten us. How much is this going to cost?

Mr HADZIC — How much? This depends, first of all, on the solution that is wanting to be achieved. It depends on how many charging stations you are looking to install and how dense you want the network. A charging station, a 50 kilowatt one, can range from $30 000 to $35 000 for just the unit alone. You still need to pay for installations and that can cost $5000 to $10 000, depending on the site and if a transformer needs to be upgraded to provide it. But again this is part of the whole collaboration. We have to talk to utility networks and they can provide some feedback on the ideal locations that can support the charger so you do not have to purchase a new transformer. Then you have got the higher power chargers — for example, a 150 kilowatt one can cost around $100 000 per unit. They are all ballpark figures. Depending on the size of the scope and everything, a lot of the factors would vary.

The CHAIR — Thank you for that, for giving us some sort of idea of the individual infrastructure that we are talking about. Are you aware of anybody who has actually done an overview of what this will cost across the state?

Mr LEANE — It depends what distance.

The CHAIR — That is what I want to know. This is what the inquiry is about, Mr Leane. We are being told that this is the future. This is the most wonderful thing that God has ever put on earth. What I want to know is how much is this going to cost?

Mr LEANE — It depends if that is a fair question for an engineer from ABB that is —

The CHAIR — Somebody has got to know, surely.

Mr HADZIC — Well, again, it depends also on the nature of how much we are doing. Are we talking about the long-run costs? Are we going to talk about the costs it is going to require for the network to upgrade? As you saw in the previous AEMO diagram, there was an increase in solar. We could include all those costs and figures as well, because, as you saw, the amount of solar has increased. That solar is not increasing because there is more sun; it is because we are installing more solar panels. There are the long-term costs and the extended facts. At the same time these are hard to judge. We can use reference cases — you know, in Estonia, the Netherlands, Sweden and Switzerland — and how much they have put into installing a network into their area. But that is as far as —

The CHAIR — They of course are much smaller than even Victoria.

Mr HADZIC — Yes.

Mr O'SULLIVAN — There is a question that I want to ask, and there is no doubt you are very knowledgeable on the subject. If you look at computers and where they come from and where have come to now, they used to be as big as this room once and now they are 10 times or 100 times more powerful just on your phone. In terms of the storage obviously with batteries, we have still got a long, long way to go in that space. If you look at where we have come with a whole range of other technologies, and you were talking about the bus example where the bus that has got to recharge every 20 minutes has got a small battery but one that does 400 has got a very big battery. In 20 or 30 years time is it realistic that we will have batteries as big as a mobile phone that will be able to do 600 to 1000 kilometres? Are we at that point in 20 or 30 years time?

Mr HADZIC — That one would be a bit out of my scope of knowledge. I am not from a battery technology background, but if we just look at the recent development in battery technology and we are looking at the cars themselves these days, if we use my EV as an example, I think that one only had a range of 50 kilometres and now you are starting to look at the next cars coming out with a range of around 100 kilometres. Naturally they are going to progress, but then at the same time, if you are comparing it to phones, like you just suggested, the batteries did not get bigger since back in the day; it was just more about accessibility to recharge. So we might not be needing a battery to have the capacity to drive 1200 kilometres, but maybe, as the technology increases and the power we can deliver to the vehicle increases, we might get to the stage where we only stop for a minute and beyond that.

Ms DUNN — Thank you for your submission today. I am interested that you are a worldwide company, but you have a base in Notting Hill. That base in Notting Hill, is that about R and D or manufacturing? What sorts of activities are there?

Mr HADZIC — We have got 14 sites across Australia. It does vary amongst the roles. The way ABB does work is it is a collaborative organisation, so in terms of the EV chargers the technical support is just there within getting people to understand technology, teach them to use it, maintenance, operation and that sort of thing. We do not manufacture the chargers here; they are done globally. But then, for example, as I mentioned, we are the global centre of excellence for the microgrids, so we do some manufacturing for that as well — the power conversion stations. Then we also do a lot of R and D. Depending on where you looking, and if you want to pick out on a specific role, at the same time I get involved with the EV charging and our head office for that is in the Netherlands. They developed the technology and that is where the technology started. We started using it here and then we looked at how we integrate it with the microgrids, so I started working with that team. It is quite unclear on the specific roles and it does mix and match between the products and items.

Ms DUNN — I am just interested, I guess, in terms of your operation in Australia whether there are any barriers or challenges that you face as an organisation just because of the environment in Australia — whether it is regulatory or whatever it is.

Mr HADZIC — They are the challenges faced being a global organisation, and this could be as simple as an answer to the amount you guys have questioned about bringing jobs, and since most of those in R and D are overseas it is not providing extra jobs in the case of R and D. It might be something else.

Ms DUNN — Yes.

Mr HADZIC — So these are the challenges. At the same time, as you would have seen in the earlier images, these things require collaborative efforts, — you know, talking to the car manufacturers. It is at the stage where we cannot just be Victoria; we are Australia. We have got to work with the other countries and they have got a lot of reference cases of things done, but at the same time there is a local manufacturer for the chargers and there has been a lot of push and subsidies for them to provide the charging, which does make it unappealing for, say, a global company. Being based in Australia, just like you guys, you have to worry about the financials —

Ms DUNN — You have still got to compete.

Mr HADZIC — And if money is not coming in, we just move over to what the next pressing matter is, whether I continue looking at EV and collaborating with the microgrids or do I just move to that sort of technology? They are the other challenges.

Ms DUNN — Yes, and that is a tension that exists there.

Mr HADZIC — Yes.

Ms DUNN — Okay, thank you.

The CHAIR — Mr Leane?

Mr LEANE — I think it is all covered, thanks.

Mr HADZIC — Easy!

Mr LEANE — I was going to ask you another question that probably was not fair —

Mr HADZIC — That is all right.

Mr LEANE — Because after having a go at Bernie I thought it would be a bit rich of me. You are talking about the charging stations costing about $35 000 — the suburban ones. What is that in comparison to traditional fuelling infrastructure like a bowser? That might be unfair to ask you.

Mr HADZIC — I have not dealt that much with the bowsers as well. Again, those charging units are rated to last a minimum 10 years. The maintenance schedule is quite straightforward. It is just a different —

Mr LEANE — Different technology.

Mr HADZIC — Yes.

Mr LEANE — Thanks.

Mr HADZIC — No worries.

The CHAIR — Thank you so much for coming in today. We will be sending you a copy of the transcript in the next week or two. If you could have a look at that and get back to us if needs be, that would be a marvellous thing. Thank you for your contribution today, much appreciated.

Mr HADZIC — Thanks.

Witness withdrew.