REPORT ON PROCEEDINGS BEFORE

LEGISLATIVE ASSEMBLY COMMITTEE ON TRANSPORT AND INFRASTRUCTURE

EMISSION FREE MODES OF PUBLIC TRANSPORT

At Macquarie Room, Parliament House, Sydney on Friday 19 August 2022

The Committee met at 9:35.

PRESENT

Mr Tim James (Chair)

Ms Jo Haylen
Dr Marjorie O'Neill
Mrs Melinda Pavey
Mr Mark Taylor

* Please note:
[inaudible] is used when audio words cannot be deciphered.
[audio malfunction] is used when words are lost due to a technical malfunction.
[disorder] is used when members or witnesses speak over one another.

The CHAIR: Welcome to today's public hearing of the Legislative Assembly Committee on Transport and Infrastructure. Today's hearing is part of our inquiry into emission free modes of public transport. We will be hearing evidence from a range of witnesses from across the transport sector and community. We thank them all for being with us. I'm Tim James, the member for Willoughby and Chair of this Committee. With me today are my fellow Committee members: Mark Taylor, Deputy Chair, the member for Seven Hills and Parliamentary Secretary for Infrastructure and Cities, Transport and Roads; Jo Haylen, the member for Summer Hill and shadow Minister for Transport; Dr Marjorie O'Neill, the member for Coogee; and Melinda Pavey, the member for Oxley and Parliamentary Secretary for Stronger Communities and Families, and the North Coast. I also thank the secretariat and team, Hansard and everyone involved here today. These things don't happen of their own accord, so thank you all.

This hearing is being broadcast to the public via the Parliament's website. I welcome everyone online. We have a combination of witnesses appearing in person as well as via videoconference. Before we commence, I acknowledge the Gadigal people, who are the traditional custodians of the land on which we meet. I pay my respects to Elders past, present and emerging. I extend that respect to other Aboriginal and Torres Strait Islander people who are present today or watching proceedings on the Parliament's website. I thank everyone who is appearing before the Committee today. I emphasise that time is tight. We have got five sessions and a large number of stakeholders. It has been a great response to this inquiry, and we thank everyone. Please, let's be efficient and succinct in working through it.

Mr SCOTT DUNN, Managing Director, Custom Denning, sworn and examined

Mr SID RALLAPALLI, Head of Global Partnerships, Nexport Pty Ltd, affirmed and examined

Mr YURI TESSARI, Chief Commercial Officer, Volgren Australia Pty Ltd, before the Committee via videoconference, affirmed and examined

Mr JON TOZER, Business Development Manager, Volgren Australia Pty Ltd, before the Committee via videoconference, affirmed and examined

The CHAIR: I declare the hearing open. Can you each confirm that you've been issued with the Committee's terms of reference, and information about the standing orders relating to the examination of witnesses?

SCOTT DUNN: Yes, we have.

JON TOZER: Yes.

The CHAIR: Would any witnesses like to make a brief opening statement before the commencement of questions?

SCOTT DUNN: I'd like to, please, if I could. Just a little bit of background—Custom Denning has been building vehicles in Sydney since 1955. Over the last two years, we've developed an electric vehicle, fully. We're the only ones in Australia, unlike our competitors, that does not build on imported chassis. If you put this in perspective, we import or purchase raw material, we bend, fold, weld it together and we create a vehicle from the ground up. It's quite unique. We're one of the very few in the world that does it, and this is happening today in Sydney.

Building our product is very important because, again, unlike other people in this meeting today—they either import the full product, which is built in China and Malaysia, or they import the chassis and then build a body on it. The body content is about 40 per cent of that; 60 per cent of it is actually the chassis. We build the whole product. That gives us a position where we've got this product. It means we create something we've got to export, and we're actually exporting our first product in November this year, to the UK. By creating the whole product, we create an export market, instead of just a bodybuilder based in Australia, which I think is very important.

The CHAIR: Thanks very much, Scott. Sid, would you like to?

SID RALLAPALLI: Thank you very much. Nexport is a proud Australian company. We are a zero emissions company. We do not have a non-zero emissions product. We already have 60 of our vehicles running in Sydney and western Sydney, as well as a small fleet in trial in other states. We have, over the last two years, also diversified our product portfolio to include other modes of public transport, not just the 12.5-metre bus. We are looking at other transport-use cases and bringing products that meet those use cases.

The CHAIR: Thanks very much indeed. Yuri or John, would you like to make an opening statement?

YURI TESSARI: Yes, thank you. Good morning, everybody. Volgren is the largest Australian bus bodybuilder. We have three factories across the country—one here in Melbourne, one in Perth and one in Brisbane—delivering about 400 units per year across the country. We employ over 270 people at this stage, using over 100 Australian suppliers to supply [inaudible] body content, which is over 90 per cent. That has been out of the body [inaudible], which is a global body that upholds the local industry.

The CHAIR: Let's get underway, then. We're going to come at this in a manner in which I, as Chair, kick things off with a few questions—perhaps one or two. I'm keen to make sure it's free-flowing and natural today. Every member of the Committee, obviously, will have questions. Please let me know when you'd like to dive in or, indeed, just dive in as you see fit, and we'll try to make sure that it flows well. Obviously, everyone needs to be heard. Without further ado, I'll start with a more broad question around the transition of what is essentially a diesel bus fleet to electric buses, by the stated target of 2030. I'm eager to have feedback and input on the major challenges involved in achieving this.

SCOTT DUNN: From our perspective, we're in a position to deliver vehicles. The issue for us is two things: We need to make sure that the depots have actually got the capacity to take the vehicles, which is, I believe, the biggest issue here—so the grid is upgraded and the power is in the bus depots. The second issue is that, at the moment, especially being a local manufacturer, the demand is too up and down. It's not a flat demand. You need to understand the demand ahead of time, for a few reasons—so you can skill your labour up, train your labour and make sure the quality is right.

The second thing is so that you can secure your supply chain. Supply chain is getting a bigger issue for all of us because, obviously, lead times are getting bigger. A lot of our major components come from Europe. Drive motors and axles come from Europe. There is lead time on those items of nine months, plus three months shipping. I'm guessing, as the owner, what we've got to order ahead. So, we need stable demand and power upgrade.

The CHAIR: I was at the local bus depot in Willoughby the other day, and that question of the state—or the readiness or the fitness, if you like—of the depot itself, to be able to make this happen was a central point of discussion. I do understand. Thoughts?

SID RALLAPALLI: Fundamentally, yes, the depot is important, but this is an opportunity to rethink how cities are shaped. In essence, if you're putting 300 buses into a single depot, you are creating a mini power station in a city. The implications to the grid, and the implications to the infrastructure, are critical. You have the opportunity then to go, "Do you really need 300 buses in a single depot in a single location? Is there the opportunity now to redistribute the depot locations around the suburbs?" That has two benefits. One, there's greater efficiency in their routes, but also you're really distributing the impact of the grid around the suburbs more equally across it, so that's one consideration.

I acknowledge and concur with Mr Dunn's comments around the supply chain. It's not just about surety, but it's also about competition. Australia is in competition with the world, and suppliers will defer to certainty. They will defer to where they can see a market, and unless Australia and New South Wales show that they are equally committed, we will continue to be put in the back of the queue in terms of suppliers. For us, like Mr Dunn, we can deliver, but what we need to understand is what the run rate is. How long is the run rate? And also, once the initial sort of peak of supply is finished, what next? There needs to be a constant procurement process. It can't just be a massive ramp-up of 3,500 over ten years and "Then what?" next.

The CHAIR: Fair enough. I understand. Gentlemen online?

JON TOZER: I'd just confirm with what Scott Dunn commented. The biggest issue in manufacturing—that's certainly the bus side of manufacturing—that we suffer is these ebbs and flows: We will go from a year of high orders to a year of low orders, and the effect on the business is incredible. You're either employing people or you're actually having to lay people off. While the whole industry would have the capacity to meet the requirements—the volume that is being discussed—the issue needs to be more around a level ordering process, not this huge uptake and then a cliff at the end. We have employees that are worried about their jobs, because all it would take is a lack of orders and we're having to downsize.

Consistency is probably the key to us, but I think the biggest challenge will be more the grid than the actual buses. I think a lot of people are putting the buses first when really the grid needs to be upgraded and the buses will follow. I think what's happening at the moment is people are procuring the buses before the grid's actually capable of charging them, so that's our view.

The CHAIR: Understood, thank you. Obviously local manufacturing is very desirable where it's economic and viable, and obviously there's a sort of range of views and positions across these enterprises. How can we in New South Wales build up local manufacturing capability in this space?

SCOTT DUNN: I believe we're already competitive. We're on the New South Wales panel. We just took an order for 99 vehicles off Transport for NSW at a price that's the same price as an imported product. So, we're already competitive, and we do that through using robots where we can for welding. We manufacture every part in-house, so we create value in every section of our production line. We create our own parts; we do everything in-house, and we do that because we create value then. And, because we're looking at the chassis and the body as a whole, we reduce the margin overall. So, that's where we are today.

The CHAIR: Congratulations. You've done well.

Mrs MELINDA PAVEY: But you're supplying to other states, all of you, aren't you?

SID RALLAPALLI: Yes.

SCOTT DUNN: If you're based in New South Wales, it's very hard to supply to other states because all the other states procure local, except for New South Wales. Ninety-nine per cent of our orders are with New South Wales for that reason. If you're based in Queensland or if you're based in Victoria, you've actually got an advantage over New South Wales.

SID RALLAPALLI: I'd like to pick up that point. The risk we have about the bias towards local manufacturing—there is absolutely no doubt that it's important, and COVID has shown that. COVID has shown the importance of building up local capability around key sectors, transport being absolutely one of them. In terms of local manufacturing, again, we have the ability to deliver, but we should not just be thinking about manufacturing of the whole product. We need to be looking about manufacturing of the—and what does that mean from an entire supply chain standpoint.

Why can't we indigenise the supply chain broader? Where is the defence industry? Where is the mining industry? The components that they build—why can't they be used for zero-emission technologies as well? We do have the legacy of an automotive industry, so there are the foundations there. There are the skills there. They may have been dormant for five years since the Victorian Government did what they did, but there is the opportunity.

That's one. The second is, the ecosystem of zero emissions is not just about manufacturing. It's about systems; it's about software. So, we need to stop thinking about manufacturing just from the hardware point of view. The digitalisation, the putting the entire value chain together—how does the grid talk to the charger, the charger talk to the bus?—are all critical skills and should be considered within the context of the term "manufacturing".

Mrs MELINDA PAVEY: Has there ever been an opportunity for you, as industry leaders, sectors, to come together as part of a national conversation, so that we can look at supply chain capacity and the order potential if we work across Australia to be able to build it that way—to the point that you're making, Mr Rallapalli, that there is a whole range of things we could be doing in defence and other things? I just think we appear at times to be in competition with each other, yet we could actually build an Australian manufacturing process if we actually had some national leadership, whether it's through COAG or some other organisation, so we can make some better decisions.

SID RALLAPALLI: In my opinion, not sufficiently enough. We are running the risk of almost creating a cottage industry within a cottage industry, if there is the continued dialogue around hyper-localisation of manufacturing. In different states the dialogue should be around value. What is the value chain? What is a supply chain? And what is the assistance needed at a national level? What is the support needed at a national level to drive—

Mrs MELINDA PAVEY: It doesn't mean money, does it?

SID RALLAPALLI: It doesn't have to mean money. It can be support capability. Let's say orders, incentives. All of those words that government likes to use, doesn't like to use, are critical in building out a national zero-emission capability, and that's what the focus should be: it's capability. The mining industry has shown that—even from an export standpoint—Australian skill, Australian labour, Australian manufacturing has an export value, and that's what we have as an opportunity today: to create a national capability that has an export value as well.

SCOTT DUNN: I believe we're already there, honestly. We've advanced this already because we developed a platform. What you have got to remember is that this is developed here in St Marys.

Mrs MELINDA PAVEY: Yet you're having trouble getting into other States though because you're based in New South Wales.

SCOTT DUNN: We are, and that's why we're exporting instead, because it's easier for us to export to the UK than to sell to Victoria.

Mrs MELINDA PAVEY: What about Asia?

SCOTT DUNN: It's a different market. It's a shorter life of vehicles. They change their vehicles every five or six years. The UK model is very similar to Australia. We build a full stainless steel structure, unlike any of our competitors again, that will last forever; it never corrodes. We can export that wherever we want to export it to, a market that will pay a relatively same price to Australia. We build a platform. That platform we can export, and that platform—we actually launch a truck next year on the same platform. So we're launching a truck in Q3 next year that puts us into a different market. We're already doing this. We're creating manufacturing in western Sydney with local suppliers and we've got the expertise. We already control the electronics. We control the electrical system. We're not dependent on anybody. Where everybody else is buying these parts in, we control it, which I think is a fundamental part here.

The CHAIR: I think there was a contribution online. Gentlemen?

JON TOZER: I suppose just a couple of points to answer your questions that you just had. As an industry we do actually get together, either be it suppliers or operators, through our national body, which is BIC—Bus Industry Confederation—which is based in Canberra. Just recently, we had a zero-emission two-day conference where leaders from all aspects, be it the grid, finance, manufacturers—we had a two-day conference which was very good for everyone, I think, even the operators. So as a national body, yes, we do get together to try and be a national voice and not an individual voice.

Regarding export, just on Volgren's side of things, we export to Asia—be it Singapore or Hong Kong. Recently we were building buses here in Melbourne for Japan for the Tokyo city government. They weren't zero emission but manufacturing a bus, whether it be zero emission or diesel, is no different. But one point I failed to say in my previous response was Volgren used to have a large manufacturing facility in Tomago, Newcastle, and the reason we had to close that was because of the high fluctuation of orders that is actually in New South Wales, to the point where it was unsustainable to maintain that business. So we had to actually close that down.

Mrs MELINDA PAVEY: What year was that?

JON TOZER: That was in 2010. This is just off the top of my head, I think it was around 2008-2012 we had a large plant capable of doing 400 buses a year in Tomago. And then, really, it was around the change in government—when it went from the Labor Party to the Liberal Party—that the orders just stopped. So, yes, unfortunately, we had to close the plant.

The CHAIR: We've covered a lot of ground there. Thank you, it's very helpful and instructive. Recognising this landscape across the country, where is the opportunity for New South Wales to lead? What are our relative competitive advantages or, indeed, what are the disadvantages that we can best seek to tackle here in this State? Without being parochial about it, our desire is to see New South Wales lead on the national stage and on the global stage, so we'd love your thoughts on that theme.

SID RALLAPALLI: I think the size of the market is something that's critical—the fact that New South Wales has the biggest population, the biggest fleet of buses, the most diverse forms of public transport. So we have the opportunity to almost set the standard for the national. If it's good for New South Wales—I say this very carefully—it could almost work for the country. We are a good test bed, because we will be representative of the population. The other piece is around the actual integration of the entire value chain, that piece I said at the beginning around reshaping the deployment of zero-emission buses across society—really thinking about where are we putting the depots, why are we putting those depots there, what does that mean for the grid and what does that mean for public spaces.

Because zero-emission buses are quieter, you don't need to have big walls around a depot, like they have in Leichhardt. They can almost be integrated with public spaces. That's where New South Wales can lead. Absolutely, in manufacturing, Custom Denning, Volgren and Nexport all have strong manufacturing presences and we will keep our manufacturing presences. So that is where we can absolutely lead. Skills—the foundational skills are there. Let's take this opportunity to build on them and then export those skills, firstly, nationally, and then internationally.

The CHAIR: Well said.

SCOTT DUNN: Yes. For me, I mean, you've got a unique situation because Transport for NSW contract out the whole of Sydney. Within that contract you can actually purchase those Transport for NSW vehicles. You can take control. You've got buying power, instead of the operators buying them. With that buying power you can then strategically deploy the vehicles how you see fit over the next 10 years. So you can deploy how you see fit and you can also get better buying power because you're buying in volume and strategically. So for me, it makes sense that that's the best way forward for you—you've got to take purchasing, and control the asset like other States do. That model is already being used in Perth and in Adelaide, and it works well for those States. Within that contract, they have to be built in Adelaide or Perth. Basically, they build the vehicles to a contract over a 10-year term, and they've got stability et cetera, and they deploy the assets how they see fit.

The CHAIR: Got it. Gents online?

JON TOZER: I suppose the way—the advantage that New South Wales has is volume. So if you were to look to compare markets like New South Wales versus Victoria, New South Wales has approximately 8,000 buses; Victoria has 4,000. So your strategic advantage is your volume that you have. It always has been. That's why New South Wales is such an attractive market to everyone. What you can do with that is if you were to establish a stable, level ordering process over a long term it would attract manufacturers to that, to New South Wales, whether it be in the CBD or outer metro areas. So if there was a stable, consistent volume, it would certainly attract manufacturing.

Mrs MELINDA PAVEY: I was just commenting to the Chair. Ideally, that would be a perfect world and Volgren wouldn't have left Tomago. But in an even better world, a national approach for all the States would give everyone some certainty.

JON TOZER: Yes, definitely. For us as a business, it's not ideal to have three manufacturing facilities. It's actually quite costly to have three different sites manufacturing buses and, hence, that's obviously in the price of the bus. But, more and more, the States are demanding local content and if you cannot meet that, like Scott mentioned earlier, you're at a disadvantage. So, yes, it's—

Mrs MELINDA PAVEY: Which brings the challenge, potentially, of cottage industries?

JON TOZER: Yes. Everyone seems to have blinkers on and not looking at the whole of Australia.

YURI TESSARI: I think we can potentially use the joint procurement panel as one example. Since the panel started and went live in April 2020, if you take the first, I would say, 18 to 24 months, the volume that came from the panel was definitely not enough to sustain one manufacturer in New South Wales, let alone three. So if we would take the risk of establishing a new manufacturing facility in Sydney or in New South Wales for the purpose of supplying to that panel, that gap in receiving orders will jeopardise the business's viability.

The CHAIR: On the panel, it's something we're interested in. We've had some discussions already on that score as we've been out to a manufacturer in regional New South Wales, for example. Other than volume or purchase power, what other issues or pieces of feedback would you have for the panel? Recognising that they're independent of us, what's your feedback in terms of how that panel could improve its work?

SCOTT DUNN: I mean, we believe panel four, a new panel of specifications, is coming out very soon—in the next few weeks. I'm speaking from my point of view. I mean, Jon's spent a lot more time in Australia than myself in this industry, but I believe you've already got the safest vehicles. We have a very high spec in New South Wales—more than any other state. That spec is much higher than anything in the UK in the materials and fire standards, which makes the vehicle more expensive. Now, I know that ourselves and Volgren would comply to the rules because we're Australian made. The trouble is we have imported products that probably say they comply but they're never tested, so we've got an unfair advantage straightaway on that. Okay?

The other issue is that those standards are now changing. On panel four, the standards are going to be even higher when there's no need to make them higher, which is going to make the product even more expensive, which I don't actually agree with. I think that's a problem, personally, but Jon would probably say the same as me.

JON TOZER: Yes, I'd certainly back that up, Scott. To give an example, the price of a bus in, say, Victoria or Queensland is significantly less than it is for New South Wales, and that is based on specifications. When we do the panel, we have to assume that we are going to sell a bus to an operator in Broken Hill and we have to service that bus in Broken Hill, whereas somebody like ComfortDelGro Corporation [CDC] or one of the metro operators is actually paying the same price as the guy in Broken Hill even though he is buying 100 of them, because you can't give a volume discount. So that's one disadvantage with the panel. In general, as Scott mentioned, the fire standards are well over what European requirements are. It's hard to source materials to comply because of the fire standards. The panel certainly has benefits. It gives some sort of surety if you're on the panel.

It can also destroy business if you're not on the panel, so there are pros and cons for every part of the panel. That's our point of view.

Mrs MELINDA PAVEY: What consultation did Transport for NSW have with industry, with your associations, in coming up with these standards? Was it done in consultation, or was it just given to you and this was going to be the new standard?

JON TOZER: Pretty much, yes, it was, "These are the new standards that we're meeting." Scott would probably back me up. The consultation we had—there certainly was pushback from the industry because, while it's nice to have it in rail and things like that, we also have the issue of weight with a bus. We have limited weight capacity, so every 60 kilos that we add to a bus is one less passenger. All these fire materials are actually a lot heavier than normal. There is a fire standard, which is a European standard, that we all followed. And now we've got to go to these higher standards.

Mrs MELINDA PAVEY: I'd like to thank Mr Rallapalli for his conversations in relation to the charging stations. If we've got 300 diesel buses in Willoughby, we're going to need a new substation. That was really good testimony to deal with some of the challenges we have, to meet the commitments we've made. But I would like to ask Volgren about the infrastructure needs around hydrogen buses. Are they a viable option as a wholesale public transport solution?

JON TOZER: We have our first hydrogen buses going into build early next year. If we were to look at the electric bus to the hydrogen, the hydrogen, for us, is probably three to four years behind where the electric is in regard to learnings. We and the industry are still learning—

Mrs MELINDA PAVEY: And they're silent and net zero?

JON TOZER: Yes. A hydrogen bus is an electric bus. The difference is that you have hydrogen tanks and a hydrogen fuel cell that converts hydrogen to power. That power charges the battery, which then runs the bus. A hydrogen bus is an electric bus. It's just where the power comes from. In an electric bus, you plug it in and charge it. In a hydrogen bus you have the hydrogen tanks, which feed a fuel cell which generates electricity, which then powers it. But you only need a small amount of batteries, so it's one for the other. In regard to infrastructure costs, the refuelling of a hydrogen bus or a refueller is quite expensive. It's certainly a lot more than a petrol bowser, and that's something that the industry is trying to get their head around. It's also lack of supply. There are hydrogen buses that have been manufactured now that are parked up because there's a shortage of hydrogen refuellers not just in Australia but globally. There is quite a waitlist, I believe, for refuellers.

The CHAIR: Thank you. I was going to ask that question, too, about the various technology options. I'm conscious that two of my Committee members might have questions. I'm conscious of time, as well; we've got about five more minutes, without wanting to rush you.

Mr MARK TAYLOR: Very quickly, then, you've said that consistency of orders would assist you in the future going forward. What about a lack of skill in the industry, a lack of trade skills? Is there some particular skill or trade that you're concerned may not be present or that we need to improve on?

SCOTT DUNN: If you take our business, we employ every skill, whether it's welders, sheet metalworkers on press brakes, electricians or mechanics. What we've done is, for example, taken a lot of diesel mechanics and upskilled them to high voltage. We've learned them the high-voltage side. We employ a lot of apprentices, so we have monthly visits from schools to encourage children from a young age, when they're leaving school, to come in as apprentices. We employ between 20 and 30 apprentices every year.

Mrs MELINDA PAVEY: What schools are you targeting, just out of interest? That's a really great program.

SCOTT DUNN: It's all the ones in the local area around St Marys. It's our HR department doing it, but it's all the ones, local. We want to be really important to local people. I purchased the business out of administration in 2018 and I moved it from Villawood to St Marys. The reason I moved to St Marys is because we could really be important to that western Sydney community. Our next stage is that we're going to move to Badgerys Creek in Q2 2026, and that's where we'll ramp up production with the trucks, the batteries et cetera. The people are there and we can train them with the skills. We've already done it.

Mr MARK TAYLOR: You're nodding your head?

SID RALLAPALLI: Yes. A similar thing—as an organisation our legacy did start off in diesel, so we had to retrain a lot of our staff from diesel when we made the conscious decision to move to zero emissions. That's one. We've also got a partnership with UNSW around engineers from their university being able to come into our factory and actually learn on the job what they learn in theory in the classroom. They get to put it into practice, so

there's an element of job readiness when they graduate. But the other piece we're also looking at is partnerships within the ecosystem, so that there is cross-collaboration and cross-pollination of skills and technologies. Nexport has a partnership with Quickstep, where we are learning where carbon-fibre composites can be applied in zero-emission vehicles and they're learning how to go from carbon-fibre composite manufacturing for aeroplanes down to more mass-produced vehicles. That's another program that we are doing to build up the skill base. The people are there. It's just the programs that are needed to develop the skills and the capabilities.

Mr MARK TAYLOR: Volgren, do you have the same confidence that the skill set will be there in the industry?

YURI TESSARI: I think our view is that the skill set will be here. We can retrain our staff. However, finding labour in Australia at the moment has proven to be very, very difficult. Everybody in the industry, not only the bus industry but the light vehicle, is looking for electric alternatives. Auto electricians, for instance, is a highly in-demand skill. It's extremely hard to find. We have been hiring since November last year for a ramp-up, and the job rotation is massive because it is basically the same people in the country just moving across from company to company. So the skills are here, but we have demand for more skills, and this is where I think if we have to ramp up at a very quick pace, we might struggle with finding the labour on time.

Mr MARK TAYLOR: But more of a labour demand issue rather than possessing the skill or the ability to teach those skills?

YURI TESSARI: Yes, correct.

The CHAIR: Anything further?

Mrs MELINDA PAVEY: Is there anything we have missed that you would like to add before we wrap up?

SID RALLAPALLI: One last point. There was a point made about national coordination. I think the biggest argument for that is energy security. The move to zero-emission transportation has a significant impact on our energy security. Depending on what kind of measure you use, there are studies out there that say that we've got three days of fuel on shore, 30 days of fuel sitting in the refineries that Australia has contracts with. Moving nationally to zero-emission transport, whether buses, cars or e-scooters—we generate our energy onshore, we distribute it onshore and we use it onshore. There are economic advantages to that; there are security advantages to that as well.

The CHAIR: Excellent point. Thank you, Mr Dunn, Mr Rallapalli, Mr Tozer and Mr Tessari. I appreciate your contributions, time and expertise. Thanks very much for being with us and appearing before the Committee today. We may also send you some further questions in writing. Your replies will form part of your evidence and will be made public. Are you happy to provide a written reply to any further questions we may send you?

SCOTT DUNN: Yes, no problem.

The CHAIR: Thanks very much and have a good day.

(The witnesses withdrew.)

Dr ELLIOT FISHMAN, Director, Institute for Sensible Transport, before the Committee via videoconference, affirmed and examined

Professor DAVID LEVINSON, Professor of Transport in the School of Civil Engineering, University of Sydney Net Zero Initiative, before the Committee via videoconference, affirmed and examined

Mr CAMERON RIMINGTON, Senior Project Manager, Transport, Climateworks Centre, before the Committee via videoconference, affirmed and examined

The CHAIR: Good morning. Thank you for being with us. Would any of you like to make a brief opening statement before the commencement of questions? I understand one of you had a PowerPoint. I am going to suggest—I hope you don't mind—in the interest of time that, if you wish, you might table that PowerPoint. But we are suggesting a two-minute opening statement, so let's try to move through that pretty swiftly. I am very happy to have your PowerPoint—please send it through—but let's try to keep it verbal in the interests of time and moving through the proceedings today. Who would like to go first with an opening statement?

ELLIOT FISHMAN: I might jump in. Elliot Fishman here. I am the one who sent you the PowerPoint presentation, which I am happy to have as part of the record of this inquiry. I will keep my opening statement very brief in the interests of time. I just wanted to first of all begin by saying that New South Wales has made great strides early on in this transition towards zero-emission public transport with the purchase of 100 buses. There will be 200 buses by the middle of next year, with the idea being that there will be 8,000 buses—the entire fleet will be transitioned to electric by 2047 in New South Wales, but sooner for Greater Sydney, so 2035, I think, for the full transition in Greater Sydney.

I also just wanted to refer people to figure 1 of our submission, which is colloquially known as the "footprints and balloons" diagram. It really highlights the importance not just of shifting to cleaner public transport but also mode shift from private motor vehicles—which are 99 per cent internal combustion engine cars—over to public transport. Even if that public transport wasn't zero emission, that is still a much better outcome from an emissions perspective than having the many millions of trips that happen in Sydney every day that are in a car. That, I think, is really important to highlight, but also, of course, the important role that the government has in transitioning to zero-emission vehicles for their public transport fleet, whether it be ferry, train or bus.

DAVID LEVINSON: Thank you for the opportunity. You have our submission. I just want to highlight our key recommendations. We recommend, to achieve the highest co-benefits with electrification, that electrification of the public transport sector be supported and encouraged; that buses in higher density urban corridors should be electrified first, as this will generate the greatest noise reduction and pollution intake reduction co-benefits; that the decarbonisation of the electric generation sector should be supported concurrently; and that policies that encourage the use of public transport be supported, as this will minimise the use of higher polluting internal combustion engine private vehicles. These policies include permitting higher density development near train stations, pricing policies that ensure the out-of-pocket cost of public transport is lower than that by automobile for comparable trips and that public transport fare structures don't penalise transfers between public transport modes.

In terms of access, we recommend that separated and protected bike paths for both bikes and micro-mobility devices should be constructed, supporting all public transport stations to enable more emissions-free access within a four-kilometre radius; that bike parking should be provided at all stations; that shared micro-mobility services should be permitted to have corrals at stations; and that all stops and stations should have footpath connections within a one-kilometre radius to enable people to safely walk to public transport stops and stations. We want to focus in particular on non-internal-combustion-engine access to public transport systems as part of the electrification and emission-free modes of public transport.

CAMERON RIMINGTON: Thank you to the whole Committee for the invitation today. I'm here representing Climateworks, which is not for profit but generally partners with decision-makers to tackle climate-related policy. But we do try to keep one foot in the academic space too. So it's a pleasure to be part of the academic panel today. Obviously we're all here today, talking about emission-free public transport in response to the unfolding climate crisis and to the enormous economic transition that New South Wales is facing. Can I take this opportunity as well to reiterate our support for just how seriously New South Wales is taking this issue, with some of the most ambitious and comprehensive policies in the nation when it comes to transport.

When we think about emission-free public transport, I think it's good to consider the costs, the opportunities around jobs, manufacturing, investment certainty, all of these things. But we also need to think about time, because we don't have a lot of it left. We can talk about targets. We can talk about different deadlines. We can play around with the time frames. But the one time frame that is not up for negotiation is the climate time

frame. We know what the science says. We know that we need to be at net zero emissions by 2050 at the absolute latest. We know that even without two or one and a half degrees of warming, the impacts are going to be devastating. I know that New South Wales has seen that firsthand in recent months.

So, decarbonising the New South Wales economy, including public transport, is getting more urgent by the day. We need to accept that any delays have a cost. Pushing back the rollout of a new fleet replacement, for example, has a cost. Waiting for the perfect investment framework or a policy that ticks every one of the boxes—all of this has a cost because every month of inaction raises the stakes even higher and makes the task even more urgent. You're going to hear from a lot of different people today with a lot of amazing ideas. If there's one thing I hope you'll take from our contribution today, it's to think about this question of time, the speed of delivery, how fast we can roll out some of these solutions and to make time one of the key principles with which you consider all the rest of the evidence that you hear today. Thanks again for the invitation. I hope I can be of some assistance during questions.

The CHAIR: Thank you all. I really appreciate those introductory remarks. I might just kick off with a few overarching questions. Then we'll let it flow naturally. I'm sure my fellow Committee members will have questions too. Can I start with this broad question: How do you think New South Wales compares to other Australian jurisdictions in terms of the rollout and development of emissions-free public transport? Also, looking beyond our fine shores, how do we compare with international jurisdictions? What can we do better in that context?

ELLIOT FISHMAN: I'm happy to start trying to answer that question. I think it's a great question. When you look at New South Wales transport emissions compared to other States, and not just talking about public transport but emissions in general, the emissions in New South Wales are the highest, but that's because you've got a greater population. The climate doesn't particularly care whether it's per capita or not per capita. The climate will only really care about total emissions. If you look at it on a per capita basis, you're in about the middle of the States and Territories in terms of per capita emissions. That's from the transport sector as a whole. I can't comment on the public transport specific part of that. Your public transport system is—for buses, it's largely diesel buses; ferries, it's largely diesel—it means that your emissions are going to be quite high. You're only starting that transition.

In terms of comparing to other countries and other cities, outside of Australia, there's a lot of cities that are worse and there are now a growing number of cities that are doing a better job. Scandinavian countries, with their ferries, have advanced a considerable way in terms of the electrification of their ferry network and also the electrification of their bus network. There are lots of cities in northern and western Europe that have much further advanced their acquisition of electric buses. Of course, China, where, I'm sure 80 or 90 per cent of all electric buses lie, have done amazing things over the last five to 10 years with growing their electric bus fleet.

That's a quick snapshot. The one thing that I would just say in conclusion as well: If you speak to bus operators—I'm sure you will be as part of this process—one of the things that they say is the electrification upgrades that are required in order to transition their depots to support electric buses, that task is just incredibly large and many millions of dollars—and probably billions of dollars—will need to be spent in Sydney alone to upgrade the electrical infrastructure network to supply enough electricity to these depots to ensure that those buses can be charged adequately to meet their needs. That gives you a scale of the challenge. Thank you.

The CHAIR: Thank you very much, Dr Fishman. I'll just note that your PowerPoints have been printed and handed to us all just now. I thank you for pulling that together. I'll give the others a chance to tackle that question, too, obviously.

DAVID LEVINSON: Just a couple of comments to add on that. The first is that, of the capital cities in Australia, Sydney has the highest public transport mode share. That's largely because of the excellent train system here, in particular, compared to the other States. If you were to compare it to, say, a North American city, Sydney would have the third highest public transport mode share if it were a North American city—significantly better than similarly sized cities in North America. In terms of the electrification of the vehicles, you compare Sydney to, say, Melbourne. We don't have the extensive tram system, which is already electrified, in Sydney, that exists in Melbourne. As a consequence, we have more pollutants from the surface public transport system than they do on a per capita or per rider basis. That's something to keep in mind. The international comparisons are that we're doing better than other Australian States and cities, I think, and better than North America, but not as good as European and Asian countries.

The CHAIR: Thank you. Noted. I heed the message in terms of Sydney and Melbourne. Obviously, a pretty big transformation of Sydney's public transport with this metro system coming in. It's fair to say we're playing catch-up. I think, in time, we'll be leading in that space. But thank you and heed the message. Mr Rimington.

CAMERON RIMINGTON: Probably not too much to add to what's already been said. Certainly, from our perspective, really encouraged to see just how advanced New South Wales is with the bus electrification. I think that probably is leading the nation, noting that, in the international context, there's a lot of other frontrunners. The only other comment that I'd make—perhaps this is something we'll unpack in due course—is around the emissions intensity of the grid, obviously everything that's powering your train system and light rail. A jurisdiction like Tasmania has, basically, a clean grid already. The ACT has managed to power its grid for the foreseeable future with additional renewable power. At a certain point, the faster that New South Wales decarbonises its grid, naturally, the faster that the public transport network becomes zero emission as well.

Dr MARJORIE O'NEILL: I've got a question specifically for Dr Fishman. Part of your submission and the presentation here is about a bigger conversation about getting people out of cars and into public transport. Ideally, it's clean and green. There's another inquiry that I've been a part of this year, which has shown that changes to transportation systems, particularly around the eastern suburbs, and changes to bus networks has resulted in now 82 per cent of people that did use public transport now using private vehicles. That's a report that's publicly available on New South Wales' parliamentary website. I'm interested to know your thoughts on that. How do we then again, change that behaviour to get people out of their cars and back into public transport and active transport?

ELLIOT FISHMAN: I'd be really interested in seeing that data on the 82 per cent reduction. It seems like a very steep reduction. Essentially, if I understood you correctly, eight out of 10 former bus passengers are now using a car. So if there were 10 people in the bus before, there's now only two and eight of them are now in a car. That seems like a very dramatic reduction. But if that is the case, then that's concerning. It would be really interesting to understand the reasons why that steep drop has occurred.

One of the things that I wanted to mention today—I think your question gives me the opportunity to mention this—is a situation I was in about four or five years ago. After we were finishing a job in Parramatta, my colleague and I got the ferry from Parramatta and were heading towards Circular Quay. At one of the stops on the way—we were about, probably, 700 metres away from the stop—I could see a bus at the ferry terminal. My colleague tapped me on the shoulder and said, "I bet you a schooner that that bus leaves before this ferry arrives at the wharf." Indeed, I ended up buying him a schooner later that day because the bus did leave just before the ferry had arrived at the wharf. So that's an example of very poor transport integration.

One of the points that is really necessary to consider here, is doing what Professor Levinson said, which is minimising the price penalty for transfer, but also having network and timetable integration so that the amount of delay between transport services is minimised. That would've been a very easy problem to solve but for one reason or another the bus driver felt there was no need to wait for the ferry even though it was clear that many people that disembarked the ferry were going to need to use the bus immediately afterwards.

The other point to your question that I think is important to address is that about 80 per cent of all trips in Sydney are done by car and that varies considerably depending upon the particular part of Sydney we're talking about. One of the reasons why so few people use public transport and active transport—walking and cycling—in middle and outer suburban Sydney is because the public transport services don't provide a compelling value proposition to the user compared to the car. So it's about making public transport, walking and cycling the obvious choice for many trips. That will end up leading people to feel comfortable about leaving their car at home and using public transport, walking or cycling.

Because, of course, whilst it's a mammoth task to convert the current bus fleet to zero emission, it's an even harder task to convert the private car fleet to zero emission, because they're all up to the financial decisions of individual households. There are so many millions of cars in Sydney that are all owned by private households, that that transition is expected to take at least 20 years, because there were about a million cars sold in Australia last year and almost none of them were zero-emission vehicles. We've got a huge task in that department and that's why it's so important to provide effective, fast, frequent public transport that captures all parts of the city and integrates between different modes of public transport and integrates with walking and cycling. If we don't tackle that problem, then we're not going to be able to tackle the climate emergency. Thank you.

Mrs MELINDA PAVEY: I just wonder what consultation you've actually had with industry and Transport for NSW. This is a very positive approach the government's taken with this target, but we've also had some pretty sobering evidence today about the challenges of actually getting the buses powered in the current depot systems. We also need to do, I think, a lot of work at a national level to boost our local manufacturing. What engagement have you all had with those delivering these ideals through the projects that the government is supporting? I'm talking about Transport for NSW bureaucracy—panel four. We heard evidence today that that is happening outside of industry itself. I'm talking about the bus manufacturers' association of Australia. I'm talking about those that are employing people to deliver these ideals and aspirations. I'm just wondering what engagement you've all had.

DAVID LEVINSON: I haven't talked to the bus depot operators, if that's the question.

Mrs MELINDA PAVEY: Bus manufacturers?

DAVID LEVINSON: We've had conversations with them. I think the key is that they will take direction from parliament and the government on these types of issues. If they're told that they need to do this, then they will find a way to do it. Other countries have found a way to do these things. Certainly, it's something that requires thought and planning and some resources, but it's not something that, if a decision were made to do it, would be impossible to do.

Mrs MELINDA PAVEY: I accept that. I'm just wondering. You're spokespeople in this sector towards net zero. I think the more people that are joined up in these conversations the better the conversations are going to be.

ELLIOT FISHMAN: Look, I agree with that. We even had a great deal to do with individual bus operators or manufacturers, but in general discussions that we've had with them they're very keen. The early experience from some of the electric buses that are running around Sydney at the moment is that drivers love them, passengers love them, the ride quality is better, there's less vibration. My understanding is none of the buses have run out of electricity halfway through their route. They've been conservative with the routes that they've chosen to electrify thus far but their experience has been very good.

The main thing is that they're going to need money because it costs more. It costs about half a million dollars for a regular bus. It costs about $750,000 for an electric bus and it costs about a million dollars for a fuel cell hydrogen bus. Now, hydrogen fuel cell buses aren't something that I want to get into here because, once you start talking about hydrogen, you never stop talking about hydrogen. Basically, the vehicles cost more. You need high-capacity electrical infrastructure to charge them and, in some cases, you may actually need more buses. Because if there are buses that do routes that are so long, that you can't do back-to-back shifts with, those buses because you need charging time—because it will always take more time to charge an electric battery than it will to fill up a diesel fuel tank—you may need to have a total quantum of buses greater than what you ran when you had a 100 per cent diesel fleet as well.

Essentially, the industry's keen. They're just going to need the money both for the vehicles, the charging infrastructure and—and this is a wider question—the electrical infrastructure upgrades. Because we're not just talking about public transport here; we're talking about all of the many millions of households that will be converting to electric vehicles for their own personal transport and the added burden on the electrical grid that will occur as a consequence. Also, of course, many households are now getting rid of their gas appliances and gas connection, which means that they'll start consuming more electricity at a domestic setting as well. The greatest thing that governments can do to ease this transition for the bus industry is to provide the financial incentives to convert the fleet, provide the charging infrastructure incentives and, most importantly, create the electrical grid upgrades required to deliver many more amps to each of the bus depots to enable that charging to occur.

Mrs MELINDA PAVEY: One of those challenges, is that currently in New South Wales the fare box is only providing around 23 per cent of the cost of running the service, so the taxpayer across New South Wales is providing the extra 77 per cent. Then you're suggesting, quite appropriately, more investment and that comes from taxpayers and you've got the whole grid to fix. It's a mighty challenge and I think it's a challenge that we have to be honest with the community about. Ultimately, that long-term investment is brilliant, but there's going to be quite a lot of pain on the way through. Our treasuries and our budgets across Australia and New South Wales are at full stretch post-COVID. It's just a worthy part of a conversation to be having.

ELLIOT FISHMAN: Yes, I agree. I know that David has something to say on this and I want to let him say it, but I just want to quickly say in response that the public transport fare box will never match the operational expenditure required to run the service in Australia. There are very few systems that operate in a way that's cost neutral.

Mrs MELINDA PAVEY: The UK does. London does but that's a population density that we wouldn't even imagine.

ELLIOT FISHMAN: I'd have to see those figures. That's not what I've been led to believe but, in any case, I think the important point here is that all transport costs money and there's public expense that goes into offering private motor vehicle travel and the infrastructure required to enable that to happen, and the user charges for those operating private vehicles do not cover the cost of the infrastructure provision. But the fact is the better your public transport system is, the more people use it, which means that the subsidy may be less than it would be with a poor service that runs empty or near-empty buses. David?

DAVID LEVINSON: So just two points—one, on the 23 per cent fare box, that's a system average. So there are, of course, bus routes that have a lower fare box recovery and bus routes that have a higher fare box recovery and some bus routes would be net profitable. We run these bus routes, particularly the ones with low fare box recovery, not because they are profitable but for other public service reasons that the government has decided upon. I think that should be kept in mind.

The second point gets back to the technology. We're fixated on battery-based buses or hydrogen fuel cell-based buses. A lot of the countries that have electrified their buses—and Australia historically used trolley buses, which is connecting buses to overhead wires, which has a different type of infrastructure requirement but doesn't have the same kind of charging, advanced timescale and those kinds of costs, so you can perhaps get a longer life out of the buses because you're not relying on the batteries. You can't do that everywhere, obviously, but there might be corridors that could be using overhead wires as a way of electrifying the bus fleet. I think that's just a comment that seems to have got lost and perhaps should be brought back.

CAMERON RIMINGTON: Just quickly, my two cents would be that I absolutely think this is a fully pertinent question around all of the details when it comes to actually delivering, once we have this overarching narrative of where we want to go. This is complicated stuff. You've rightly mentioned the grid. Something as simple as fitting the buses into the space currently given over to depots and trying to fit charging infrastructure—this is really the nitty-gritty that I think does get lost when we start to look at this overarching narrative. It's one of the reasons that in our submission we deliberately stopped short of proposing any specific targets for different modes of transport because these are things that necessarily need to get fleshed out with the people that will be delivering these services.

I think this is very complicated stuff, as you've pointed out, and I think that the time frames of the electrification of the New South Wales bus fleet going right out to 2047 is a testament just to how complicated this is once you start to look into the detail. It's an inevitable part of the process, but I think still shooting for the moon and then backcasting what needs to be done on a step-by-step basis is certainly the way forward. But it is a totally germane question.

Mrs MELINDA PAVEY: And there is nothing better than an electric bus going past you.

CAMERON RIMINGTON: Yes.

Mrs MELINDA PAVEY: It's so quiet!

The CHAIR: I will, in a sense, make a comment but I'll follow up with a question. Dr Fishman, I've just been looking through your slides. Thank you. They're very instructive. I particularly want to point to slide four, which shows transport emissions by State. You can see, obviously, with New South Wales being the most populous State that it is at the top. But what it shows across each State, but perhaps most particularly for New South Wales, is the shift downwards in overall emissions, which commences around about 2018, I think, if my chart lines up correctly. That paints a positive picture. I guess the question is how best we continue on that trajectory. Have you done any forecasting or future modelling in terms of how the decisions we take today will best impact those emissions looking ahead?

ELLIOT FISHMAN: Thanks very much for the questions. For the benefit of those that don't have the slide, it's a slide that tracks transport emissions for all the different States and Territories in Australia. It shows that New South Wales is at the top but there is a downturn from about 2018-19. This is pre-COVID so it's a little bit perplexing as to why that might be. I don't think we can assume that that is a long-term trend in and of itself. It could be a one- or two-year blip, because what you can also see in the graph is that it goes right back to the year 2000. What it shows is that there has been a fairly gradual increase in emissions in total between the year 2000 and 2018.

I think the long-term trend is probably the one that will end up prevailing, although COVID-19 may throw a few spanners in that with what looks to be a fairly common "work from home one or two days a week" experience that may help to reduce commuting emissions. But it's important to recognise that commuting only constitutes about 25 per cent of all travel. Some 75 per cent of travel is for non-commuting purposes. I wouldn't expect there to be a super sharp drop in emissions even if we do sustain a work-from-home culture for some part of the week.

Getting directly to your question about what we need to do in order to try and sustain that emissions reduction, we've done that work for the inner part of Melbourne. We haven't done it for Sydney yet. But the key things that you need to consider are thinking much more carefully about major intraurban motorway upgrades, duplications and developments. All that does is send a signal to motorists that it's okay to drive at any time of the day or night.

The average occupancy rate in a car in Sydney at peak hour is about 1.1 people per vehicle. You need to be really careful about the messages we are sending through the transport infrastructure decisions that are being made, especially for that point raised earlier by one of the Committee members about the economics of this. The economics of this is that every dollar that you spend on those road infrastructure upgrades, especially in middle and outer suburban Sydney, is one less dollar that you're able to spend on upgrades to the public transport network and active transport network.

I'll just conclude on this point. The other thing that I think is really low-hanging fruit here is to recognise that there are about 4.5 million car trips that happen every day in Sydney that are under four kilometres. Yes, there are some really long trips that people make every day but there are also lots of really short trips that people make every day by car. Shifting those trips to walking and cycling will provide tremendous benefit and rapid benefit.

We're talking a lot about timescale here, and Cameron has mentioned that a couple of times. That is something that can be rolled out much quicker: walking and cycling infrastructure that is high-quality protective bike infrastructure. It helps many of those people that are making those decisions—those 4.5 million people that are making the decisions to get in their car for trips under four kilometres, which happens every day in Sydney—to reconsider that choice by creating a compelling value proposition to walk or to cycle, or to use that walk or cycle trip to connect to high-quality public transport.

That's where you'll start to get some really quick gains in terms of trying to drop those emissions down, so that the changes that we saw in 2018 and 2019 are sustained and we can have some hope of reaching that 43 per cent reduction on 2005 emissions levels by 2030. That is a mammoth task and one that I think will really challenge the way that we think about transport decision-making in order to try and get that goal.

The CHAIR: If there are no other members wishing to ask questions, I will chime in. I'm conscious of time; we've got about eight minutes or so remaining. Thank you, it has been very helpful. What would you say are the biggest barriers to getting this job done, recognising that obviously there is time, money, sentiment and a range of dynamics here? Put yourself in the shoes of policymakers. What are the biggest barriers and how do we seek to break through them?

DAVID LEVINSON: I would argue that there's a will question and there's a cost question. The cost is significant, and it has to be a high enough priority that it actually happens. The will question I think we see when we're talking about 2050 or 2047 as a target rather than 2030 as a target. I don't think that the political establishment is quite taking this as seriously as the environmental establishment is in terms of the urgency of the problem. It's obviously easier to finance something over 30 years than over 10 years, but there are costs to that. I think that's part of the issue that we face. There are a lot of challenges ahead of us, but we've somehow come to accept that 2 degrees Celsius of warming or 1½ degrees Celsius of warming is an acceptable outcome, and we hope that the models are accurate and there are no feedback effects we've missed, and we'll just go with that.

The CHAIR: Any others?

ELLIOT FISHMAN: I think that's a great question. There's a lot of material in there; it's hard to really distil what are the key elements that are required in terms of overcoming the barriers that are preventing us from achieving not just a zero-emission public transport system but a zero-emission transport system, because ultimately that's the thing. I think there's a danger in looking very narrowly. I know that this inquiry is looking very narrowly at public transport, but there is a much more important—or at least equally important—broader question about transport emissions in general. If you look at the pie of transport emissions, public transport is a very small part of that pie. There are much bigger parts in terms of freight, in terms of passenger vehicles and light commercial vehicles.

In terms of what is required, we've already talked about the need for massive electrical system upgrades. That's not just in New South Wales but right across the country. We need to also look at the service quality of public transport, because if the service quality in terms of frequency, the coverage of our public transport system and the integration of our public transport services doesn't meet people's minimum standards then people won't use it. There's not much point running a zero-emission electric bus if most people aren't in that bus; they're in their private cars that are diesel or petrol powered.

This goes to a really important point which I haven't talked about today, and that's the importance of recognising that people don't make transport choices in isolation. They weigh up the pros and the cons of the different modes of transport that are available to them and then will make decisions based on time, cost, convenience, safety and also the social position that that transport service offers. But the most important thing is if you can compete in terms of time, service quality, convenience and safety, you'll be doing a great job.

In order for that to occur, one of the things that is required—and this is another really big barrier that needs to be overcome—is the allocation of road space. When you look out on a road, the picture of that road tells

you how to travel. If you see a road with four or five general traffic lanes then that road is telling you that driving is the way to travel on that road. When you look out on many roads in Sydney, that's essentially the message that you get. It's about having a framework—and I know the Movement and Place Framework in New South Wales does this to some degree, but it's the implementation of it, that's really important. It is reallocating road space to align with your ambition for how you want people to travel in the future.

If you've got a misalignment there, then it doesn't matter what you do in some other areas. If the way the road space is allocated is telling people how to travel, it will be very difficult to get them out of cars. Prioritising space for walking, cycling and public transport is really important. It's especially important at peak hour, and one of the Committee members said that there's nothing more powerful than seeing an electric bus whizzing past you. If you can get to a situation where you're dedicating enough key transport corridors for dedicated rights of way, and you can get people along that corridor faster by public transport than you can in a car, that is an excellent advertisement for public transport. Thank you.

The CHAIR: Thank you, and well said.

CAMERON RIMINGTON: Sorry, just to carry on with something that Elliot said there around the allocation of road space, we need to look at allocation of funding as well. If it's a question of trying to identify the number one obstacle to shifting to lower emission transport, I think it's this question around how we decide what gets funding—how do we decide what gets invested in? That really goes to the real plumbing of the transport system—how organisations like Infrastructure NSW assess new project proposals, how the State transport departments assess that in a really internal way. It's this idea of internalising the true cost of carbon, the true cost of greenhouse gas emissions, into the methodology with which governments make decisions about—we've got a small pie for transport funding. Are we actually costing the different proposals to reflect the broader environmental costs, particularly associated with emissions? That would be my number one thing.

Ms JO HAYLEN: Thank you all so much for your time today. Firstly, I think you've put forward a range of really interesting and innovative ways to move us to the place we need to be, but there's a fundamental question here about why there is broad goodwill but the outcomes are not moving at the pace that we want them to. I'm interested in your quick responses around how other jurisdictions are going. What are the models that we should be looking to? When you talk about things like Movement and Place, there are good programs initiated by this government and others. But how do we get that overall approach that moves us faster? Is it a mode shift target? Is it a benchmark across all government funding? What are some of the effective levers that we should be considering here in New South Wales?

DAVID LEVINSON: If I might answer with something that's a little bit out of the box, I think it's a governance question. If you look at places that have made rapid changes in the last few years—just as an example, London and Paris—they have mayors. They're not governed by large States, and so there is an urban population voting for things that are important for an urban population. New South Wales is obviously dominated by Sydney, or the six cities, but it's proportional at a fifth-eighth ratio rather than at a 100 per cent ratio of the voting. I think if you were to have, as an example, a strong Sydney mayor—not just for the CBD, but for the Greater Sydney region—then you would have a different set of political outcomes than you do now.

ELLIOT FISHMAN: I very much agree with the point that's just been made—so recognising that Sydney is a very large metropolitan area, and having a mayor and a transport department that focused on the transport needs of Sydney. We've suffered in the past from having transport Ministers at a Commonwealth level as part of the Coalition that have been from the National Party, and so their priorities are very different to the priorities of people that need to move around a dense urban environment like Sydney.

I think the question that you've asked is a big one that is hard to give a comprehensive answer to very quickly, so I'm not going to attempt to give a comprehensive answer. What I will say is one of the big problems is that very often from a political perspective—and it's quite understandable—if 85 per cent or 90 per cent of all trips are done by car, it's very easy for politicians to think people care about the car, that they really care about the speed at which people travel by car and we don't want to do anything to upset that.

But what the international experience has shown is that when you provide compelling, attractive alternatives to the car, people are happy to be able to leave their car at home, because you're giving them a reason for why they should. That needs to occur, and so I wouldn't be too afraid of the fact that 80 per cent or 90 per cent of trips are done by car in some parts of Sydney. You need to be willing to take risks in doing things differently to how they've been done in the past. If we keep doing the same thing over and over again and expecting a different result, that would be Einstein's definition of insanity.

One final practical thing that I think needs to be on the cards in the future, just in terms of this broader question of transport emissions, is road user pricing, with the idea being that it's a distance-based road user price

that means that people that travel less by car pay less; people that travel more by car pay more. That's a very strong price signal to help people make better transport choices. It can still be revenue neutral, so it might not necessarily be this tax grab that a lot of people might say it is. It could still be revenue neutral, but it's providing a variable cost rather than a fixed cost. That cost is variable dependent upon how much you use the road. That, we feel, is a much more equitable way of charging for what is essentially the use of an important resource and a resource that costs a lot of money to provide. That would be my final point. Thanks.

The CHAIR: Thank you. If there's nothing further on the agenda, let's leave it there. Thank you for appearing before the Committee today, Dr Fishman, Professor Levinson and Mr Rimington. We appreciate your time, your presence and your expertise. We may also send you some further questions in writing. Your replies will form part of your evidence and be made public. Would you be happy to provide a written reply to any further questions?

DAVID LEVINSON: I'd be happy to.

ELLIOT FISHMAN: Yes.

CAMERON RIMINGTON: Yes.

The CHAIR: With that, thank you and good day. We really appreciate your time, once again.

(The witnesses withdrew.)

(Short adjournment)

Ms TERRI BENSON, Managing Director, Birdon Pty Ltd, before the Committee via videoconference, affirmed and examined

Mr TIM CURTIS, Capture Manager, Birdon Pty Ltd, before the Committee via videoconference, affirmed and examined

Mr ANDREW MALCOLM, Chief Digital Officer and VP Strategy and Commercial Development, Austal, before the Committee via videoconference, affirmed and examined

The CHAIR: This is the Birdon and Austal panel. All of the witnesses for this panel are attending via video link and I welcome our witnesses. Ms Terri Benson, Managing Director, Birdon, good to see you again and thank you again for having us the other week. You too, Tim Curtis, the Capture Manager at Birdon. And we welcome Mr Andrew Malcolm, Chief Digital Officer and VP Strategy and Commercial Development at Austal. Can each of you please confirm that you've been issued with the Committee's terms of reference, and information about the standing orders relating to the examination of witnesses?

TERRI BENSON: Yes, I've received that.

TIM CURTIS: Yes.

ANDREW MALCOLM: Yes.

The CHAIR: Would any of you like to make a brief opening statement before the commencement of questions?

ANDREW MALCOLM: Yes, I'd like to make one on behalf of Austal. I'll keep that to two minutes. Thank you for the opportunity to present and to take questions from the Committee. Austal is a proud Australian company with a long history of building ferries for Australia but, importantly, for export around the world. We have recognised the incredible challenge that decarbonisation of transport, in general, and the ferry market, in particular, presents. We've been working at length with customers, particularly in Europe, who are very focused on these issues, to provide designs and concepts that will meet their emission requirements and completely zero-emission ferry transport. We are increasingly confident that, wherever these technologies are now technically possible—and we are at the limits of what is technically possible in many of the routes and operations that we are investigating—it is now extremely commercially attractive, from a cost and maintainability perspective, to convert these vessels or to build new vessels that are fully electric.

We are very encouraged by what we are seeing in the market and what we are seeing in other transport sectors. We recognise that ferries in particular—marine vessels—have extremely demanding energy requirements and challenging operating conditions that make each particular route and particular situation a unique challenge and unique opportunity, but one that the Australian ferry-building industry, which has been at the forefront of high-speed vessel design and build for many years, is uniquely positioned to meet and serve the requirements of, not just in Australia but in export markets as well.

The CHAIR: Thank you, and well said. Would you like to make an opening statement?

TERRI BENSON: Yes, please, if I could. I'll just make it brief because we really did appreciate having the Committee be able to visit us in Port Macquarie, and share some of the capacity and capability that is available at Port Macquarie, but also drawing on our global experience. To summarise what we'd spoken to you about then, Birdon is a New South Wales based company competing globally, with proven capability in the maritime sector, contracting with defence, military, government and commercial clients. We were established in 1977. We are a privately-owned Australian company, with vested and active ownership, ensuring continued and global capability.

We're active, as I said, globally. We have got $860 million contracted globally, and head office from New South Wales in Australia. Our annual turnover is approximately $150 million, and we're delivering over 100 defence watercraft every year to nations on the front line. So we have broad design, build and maintain capability. It started in New South Wales but has become a global endeavour, in terms of engineering. In terms of ferries, we recently delivered, with design partner Incat Crowther, the ferries to New South Wales that have just arrived in the harbour and are operating on the harbour now. And we think there's a great opportunity to take that base investment and watch this journey into electrification—a combination of building new electric as well as converting. The investment has already been made. We look forward to being able to share that and hopefully answer some questions today. Thank you.

The CHAIR: Thanks very much indeed. I might kick things off and then will invite my fellow Committee members to ask questions, and we'll keep it free flowing and make sure everyone is heard. Can I start in the big picture context? Both of your businesses operate across Australia and indeed across the globe. How do

you see the present status and progress of New South Wales, including in a policy sense, towards emissions-free ferries? How are we tracking relative, to other jurisdictions in Australia, but also having regard to the international landscape, and what are some of the key learnings, insights and opportunities from other jurisdictions?

ANDREW MALCOLM: I'm happy to take that question, initially. We see, with the progress towards zero-emission vessels and lower emission vessels, Europe has by far taken the leading position, and Norway in particular. When we look across the current vessels in operation, as well as vessels in construction, the Norwegian market has been leading for many years now. But the progress towards faster vessels, and larger vessels, has proven challenging. So, there are still not yet clear reference cases for larger, faster vessels, whether they are to be battery or to be hydrogen, as fully electric vessels.

I would say that New South Wales and Australia, in general, are not yet lagging in terms of deployment of the type of vessels that are currently operating, either on the riverine systems or in the harbour and coastal water. But based upon vessels that are already under construction or design, we'll see the equivalent vessels starting to come into operation within the next one to three years. Therefore, I think that there's a window of opportunity to still take a leading position in this space in Australia, but we'll see equivalent operations starting to appear.

When it comes to regulations and the opportunity around incentives or other mechanisms to promote this, again, I think the policies that New South Wales has been adopting, more broadly, around overall decarbonisation targets, clean electricity and transport, in general, are very supportive and equivalent to or in fact leading other states in Australia. But we have, as I said, limited examples of these vessels within Australia. If we look across to New Zealand, they have, already, the first vessels of this type either in operation or under design and construction. So, again, the pilot example is necessary in many cases.

In the European Union, we've seen programs funded and consortia put together to demonstrate the technology and to bring industry players together under a consortium for a reference vessel that the industry can then learn from. Operators and customers can be part of that, and then progress into more commercial applications. I think that is something where there would be an opportunity in New South Wales, with some of the riverine vessels in particular, which would be quite challenging to electrify, and therefore also an opportunity to promote the Australian industry, and technology, in solving that problem and deploying a vessel on a riverine operation.

TERRI BENSON: I would like to make a comment on the customised policy position where we see the opportunity. I might get Tim to share what we are seeing across other industries, as people grapple with the decision of electrifying their fleet and what the right path is. From a policy position, we are seeing some targets being taken in our whole-of-public-transport approach. Ferries is probably a larger problem to solve in the public transport sense than, say, buses or trains. That's just the reality of the nature of those assets. It is probably the reason it has lagged the other public transport investments. But that's probably appropriate, too, I would say. If we look at what's happening around the globe, and you look at what's happening now in the UK on the Thames river, an approach has been taken with hybrids, just so they can transition their onshore charging development.

The reality is no-one has fully electrified their fleets, and lots of people are at that point where they're looking at technology, and looking at the curve of technology, and knowing when the right time to invest is. I think that's what we are seeing as well. It not just alone to New South Wales, as you think about public transport; I think that is also what we are seeing with commercial clients with their fleets, whether it be port operators or oil and gas. So, I don't know if you want to comment on other comments you've had, with other clients?

TIM CURTIS: Yes, I agree with all the comments that have been said so far. The issue with ferries is that they are large, they are power hungry and they require a lot of batteries. If you look at electric ferries as a whole, the systems are all mature, except for the batteries in large quantities. Battery technology is changing almost daily. Costs are starting to come down and the quantities required—it is a huge number. But beyond that, it is the charging infrastructure that's required to put a meaningful charge into the ferry to meet timetables. A ferry's job is to meet a timetable. You have massive batteries that are still mostly developmental, or on the cusp of technology; it's not a really great commercial place to step into.

So we see there are some fully electric demonstration vessels out there and they are the novelty which somebody has to fund, somebody has to do to start building that learning curve. But the ones that are going into more commercial operation are hybrid. The ferry fleet on the Thames river in London, that Terri just mentioned, is going hybrid because there isn't charging infrastructure available. Maybe in five or 10 years when that infrastructure is available, they will start converting to purely electric and, at that point, battery technology will be more readily available and lower cost.

The CHAIR: To bring it home, if you like, to the New South Wales public transport system, what's your understanding, point of view or advice, insofar as the moving of the Transport for NSW ferry fleet to the

emission-free vessels, in the foreseeable future? What's the timeline, as far as you can ascertain, and some of the key steps and measures and, in particular, are we broadly on track? What else do we need to do?

Mrs MELINDA PAVEY: Further to that, Tim, as Terri just pointed out, it's about where everyone jumps in on the curve, and when that investment is right—not everyone knows exactly when that is. From one of our previous witnesses, it might be interesting to understand—I think Sweden now has a fully emission-free fleet.

The CHAIR: Was it Norway or Sweden?

Mrs MELINDA PAVEY: Same difference. Can we get some context around that? One of the things that came out in our evidence earlier on buses, is that we actually simply don't have the infrastructure for the charging stations to enable it to happen at this point. It is a very hard question, isn't it?

The CHAIR: Yes, it is.

Mrs MELINDA PAVEY: I'm just trying to contextualise it with those comments we had earlier.

TIM CURTIS: That is correct. In my opinion, the charging infrastructure, and the battery cost and technology, are the two biggest hurdles. You can fund your way through that, but is it commercially sensible? That's a decision for somebody. Noting that a typical ferry uses an order of magnitude more power than a bus does, which means you have a lot more charging to do. Your batteries are much larger because you carry more people, and so the problem you can solve with buses is easier than you can solve with ferries. You have to take the bus solution and add an order of magnitude to get to the ferry solution, if you are going purely electric.

ANDREW MALCOLM: The concepts that we've been developing with customers are mostly point-to-point ferry services. I do differentiate between a riverine, where you have multiple stops along the journey, and point-to-point primarily because there are challenges around charging at point-to-point. You've got two charging installations that you need to put in place. In most cases, as was just stated, the energy requirement is so large for a journey, and a ferry hull—if it is a fast ferry—is very constrained in space and weight that it can carry. What we are seeing is we can fit enough battery on board, but only for one journey, which means we need to recharge each time the ferry stops to take on passengers. That means a high-powered charger, so multiple megawatts of charging during a 10- or 15-minute berthing. The shorter the time at berth, the higher power required.

The implication is that the batteries also age very quickly. An electric car or an electric bus may charge once or maybe two times per day, or it might receive some smaller top-up charges. A ferry is fully depleting a battery to the limits that the technology allows, and then fully recharging each journey. That means many cycles per day and the battery will age more quickly, and need to be replaced. Part of the challenge here is for an operator to see the battery as a consumable—it's no longer a fixed asset; it's a consumable part of their business—and might be financed in a similar way, rather than the vessel itself, which is a 25-year asset in many cases. The battery may last five years, and in some cases, it may last seven or 10. But you need to think of it as a consumable, in the same way diesel is a consumable.

TERRI BENSON: Just thinking about the time frame, which is part of the question, as you transition. If you think about the examples overseas, where they are going fully electric, and they might have charging points—they might be point-to-point, so the rev ups they do and the charging points are available to them, whereas the consideration for New South Wales is they are generally short, brief, multiple stops which, in some ways, are a great benefit. So, if you have shorter journeys, the high speeds probably don't matter as much, because you only hit those high speeds infrequently. You are not doing long journeys so it gives you capacity—what's a compromise over battery, speed and weight of the vessel. So, the trade-off decisions probably aren't as dramatic for New South Wales as they might be for a longer journey.

Our thinking for the time frame is if you wait for the onshore charging to be in place before you think about electric ferries, you lose the opportunity to evolve the technology while you are doing that. So, our thinking would be you have already invested in a new fleet of the 10 24-metre River class ferries. You could convert one to an electric as a start to prove that it works, to prove you can charge to use it on those shorter runs and start to integrate it.

Then, procuring your hybrids at the same time. Your hybrids don't have to be contingent on onshore charging, so if you have mixed suite of hybrid and start to convert to electric while you are building the charging infrastructure, you can create, you know, the 10-year view and start to invest in both things. That then gives industry visibility of that investment pipeline. I think the time line is how we would think about it. You've got two parallel paths, to manage that transition and you haven't overinvested in purely electric and you have got a pathway to convert to fully electric via hybrids.

TIM CURTIS: And that, instead of saying you have an emission-free ferry route, you could say that Circular Quay is emission-free. Or you can pick the more sensitive locations and make them all emissions-free

for the ferries so that they operate in purely electric mode, coming in and out of Circular Quay, as an example, and then they run their diesel engines to operate and recharge their batteries. Then, potentially, when they're going into dock at the next location, they become emission-free again and they charge in the meantime. So you don't need the charging infrastructure to have that happen. Then, as the charging infrastructure makes it to each of the ferry wharves over time, which I'm sure it will, then you can start plugging in and decreasing your reliance on diesel engines until you can convert entirely to electric operations.

The CHAIR: It is a transition, that mapping out, as you've pointed to, from diesel to hybrid to electric. Are these conversations underway? Are they happening between yourselves, people in government, Transport for NSW and wharf operators, workers et cetera? Where are we at, in terms of having that conversation, and being able to map this out?

TERRI BENSON: As part of the ferry procurement contract that we've delivered ferries under, it was considered, and that's how we thought through the design of the 24.9-metre ferries that are operating on the harbour now, with a deliberate strategy to be able to convert. It has been discussed. It is technology dependent, and battery life was one of the considerations. So those conversations are ongoing.

Also there is that discussion around how do you parallel invest in the onshore charging capacity? So, there are just decision points. Which order do you make the decision points in is, probably, what I see. But, yes, there's an active discussion going on, but there is no real procurement model for this yet. When we saw this inquiry announced, we saw that as a great opportunity for some key recommendations to come out that maybe create some certainty around the ideas that are obviously being discussed.

TIM CURTIS: It is key to note, to reinforce Terri's point, that these ferries that we delivered were designed as futureproof ferries be able to be converted to hybrid, and to be able to be converted to electric. That analysis was done several years ago during the design phase, and we revisit that, periodically, as technology improves and changes. The hull form was designed for all of that. The space claim was designed for all of that. The thermal loads and ventilation requirements were designed for all of that. So, it would be a seamless progression, because we never believed that diesel ferries would be in operation on Sydney Harbour for the next 25 years. So, we futureproofed that design and that hull form, accordingly.

ANDREW MALCOLM: If I could comment, perhaps, more on some of the other benefits and thinking about an investment in a fleet of vessels, and the infrastructure across the whole of life cycle. There is clearly a significantly higher up-front cost associated with a battery electric ferry, compared to a diesel counterpart. In combination with the battery and the charging infrastructure, that is additional cost. However, what we're seeing from the analysis we're doing with fully electric vessels is that, even accounting for that cost and the replacement costs of batteries through life, the overall operating cost of the vessel will be significantly lower, based upon current diesel prices, even before the Russia-Ukraine crisis and the impact that has had on diesel and gas prices.

The relative movement in electricity price and diesel price means that there is an operational saving, in addition. This is proven out through some of the analysis of the vessels that have been operating in Norway for some years. There is a lower maintenance burden on the vessels, which improves the availability—the number of vessels that are available to operate—and the maintenance cost. There's an absolute cost saving, but there's also a significant change in the variability of cost. A ferry is, by its nature, a very predictable demand for energy in that, give or take some weather and tides, the amount of energy it consumes point to point, or on the journey, day to day, week to week, is very rateable.

If it sticks to schedule, you can essentially know the energy demand and, therefore, the power that you're going to need to buy—the electricity that you would need to buy—out over many years, which allows for long-term purchase agreements and stability, in a way an operator that is currently running on diesel and exposed to the very dramatic fluctuations in diesel pricing does not have, unless they spend money on hedging that exposure. The nature of procurement also needs to consider long-term purchase of green electricity to allow for zero emissions. That, in itself, makes it a very commercially attractive proposition, in terms of reduced cost and greater certainty of cost and earnings.

Ms JO HAYLEN: Thanks, everybody, for your contributions this morning. I think there's a real excitement and innovation about the possibilities. Thank you for all the time you've given to presenting those to us really clearly. I would like to know a little bit more about how the New South Wales Government could support the manufacture of emissions-free vessels here—not only support that, but potentially fast-track it. What do you think are the next key steps to see that occur? And what's missing from the current framework to realise that quickly?

TERRI BENSON: I'll jump in first, Jo. I guess the next key steps we see are if there's a clear procurement strategy for the next replacement fleet. There is a stage two of ferries to be replaced, as an additional

24-metre to the vessels that are already flagged. There will be the replacement of the fleet. As the population grows, it was always the earmark of that fleet and there are some vessels that need to be replaced. If that replacement strategy indicated how electric ferries would play a role in that, then that procurement model could be responded to. If there was, say, a five- or 10-year timeline around that, then it would definitely be achievable to build locally, if that's the question around Australian manufacture. That would give us the timeframes to build. I think that's currently the most certain thing, is to procure in line with infrastructure, because I think one of the risks for us is we worry about solving the electric charging problem without thinking around how we can be reducing emissions in parallel.

Hybrid is a really valid solution to be reducing emissions. It might not get to zero, but it's better than where we are. If we can be reducing emissions, in parallel to introducing a fully electric fleet, then you do start to transition in an emissions sense and a technology sense, because batteries will improve and their weights will come down. I think, as Tim touched on, weight is one of the challenges, because of the size of the battery required, and it will improve. If you went just electric to start with, I think you would not necessarily see the most efficient investment. So, is it time to hybrid them to electric, is my point? If the next phase in the ferry procurement model for New South Wales was showing that pathway of what we're investing, in terms of ferries, then that would create, I think, from a maritime perspective and from a ferry-build perspective, certainty in the Australian market to respond to that.

ANDREW MALCOLM: If I could suggest an alternative approach. With these vessels and the faster vessels, they are extremely weight and space constrained. What we have seen around hybrid designs is that it is, in some ways, a compromise that doesn't lead to the most efficient use of energy overall. It also continues to create a maintenance burden through having engines, lubricants and other moving parts in the vessel that you can eliminate through a fully electric design. Another way to think of a hybrid solution is actually hybrid across your fleet, which is that vessels on the longer routes, or where the charging infrastructure is not in place, remain diesel, and that you selectively make routes fully electric, where you've got access to higher voltage connections at lower cost into the jetties, and then consider the overall operation as hybrid.

That can also, when done with evaluation of the schedule and when charging is most convenient, allow for improved ageing of the battery, by slower charging of the battery in certain vessels, and having a diesel vessel operating in tandem on the route. It really has to be a solution that looks at the overall schedule, and it may need changes in schedule and the number of vessels on route. A hybrid solution can be one where there are diesel vessels and electric vessels, rather than a boat that combines both diesel and electric in a single boat.

Mrs MELINDA PAVEY: I was going to ask Birdon about the ferry fleet that you've been involved in the construction of, and that we've just received, in New South Wales. I think about 70 per cent of it was built within your facilities in New South Wales. Could you talk us through the partnerships you've had and why you needed to have partnerships outside of Australia? Just so we better understand some of the manufacturing challenges we have.

TERRI BENSON: It's really driven by time frame—to deliver that many ferries in the time frame that we had. We've delivered 14 ferries in the space of two-and-a-bit years, three years, including design. To manufacture that many large vessels in one yard would be not achievable for Australian manufacturing. The approach we took is that we would maximise Australian content. As you touched on, 70 per cent of the value is Australian content. That number was driven by design—100 per cent design in Australia. All of the componentry, as much as we could find in Australian components, is Australian. There are some things that just aren't manufactured in Australia. Engines aren't manufactured in Australia, so that would come from overseas. Seats and windows and things that you could have from Australia, we've put into the vessels. We maximised the Australian content.

Reasons for maintainability, as you touched on, the whole-of-life-cycle cost of these vessels, the actual build of a hull is quite a small part of the overall cost of the vessel, for its life cycle. All of the components and all of the systems engineering that goes into a vessel, if all of that is local, and if all of the componentry that goes to all of that systems engineering and fit-out is as local as you can make it, the maintenance effort locally is retained just as high as if it had been built locally. It was really a timescale of how do we do this in an efficient way, and still maximise the Australian content from a point of maintenance ongoing? And also making sure that the whole-of-life-cycle cost still makes sense for an Australian-based asset. Does that answer your question? That's the approach we took.

Really, if we'd had longer and you could have built them in Australia, then they would have been 100 per cent, apart from the imported parts. The numbers probably move by around 10 per cent. It's not lots, though. There is still an element of imported componentry that goes into anything we build—engines and transmissions. We're always looking to change out for an Australian supply chain for us. Our supply chain is over

90 per cent Australian companies. If you look at who we buy off, it's all Australian companies. Even when we can't buy an Australian-made component, we will buy through the Australian agent. We will make sure that the transaction happens in Australia, even if it has been imported. Unless we have to, we won't go directly overseas.

Mrs MELINDA PAVEY: You touched on something that was really important in terms of procurement. You were given a tight timetable to tender to. In a perfect world, in terms of Australian governments—we're a federated nation—if we were to be able to come up with some sort of a program through COAG, for example, where we actually had a better idea of what was coming from each jurisdiction or each state, do you think that could enhance local manufacturing, better competition and better results?

TERRI BENSON: I think there is something similar happening in the construction sector. Infrastructure Partnerships Australia tries to pull together a pipeline view of what's happening in the construction sector. I know that gets lots of positive comments from people. Something in the same vein in the maritime sector would be interesting. The further visibility you can have, and the more engagement and discussion that can happen on trade-offs along those timeframes, would be good. If defence started to dominate, does that affect the ability of other sectors to get access to the capacity? If I just think about maritime construction—but, yes, it would be helpful.

ANDREW MALCOLM: I would certainly encourage that. Austal has no facilities in New South Wales currently, but we do have shipyards in both Western Australia and Queensland. The defence shipbuilding market is another key call on the capabilities and resources, but it's also a customer who is very focused on Australian content. As you were stating, maximising supply from local suppliers across the country is a key part of all defence contracts in shipbuilding. They are improving their own outlook and certainty around future build programs. I think there is an opportunity to dovetail with the civilian market. It's not just ferries; it's vessels for marine policing, fisheries and a range of other smaller craft that can easily be manufactured within the shipyard capability that the country has.

Individually, one jurisdiction or one class of vessels tends to be cyclical or lumpy, and that is not something that helps industry make long-term investments or maintain a workforce, particularly where there are competing calls on a lot of those skill sets from the resources sector, whether it's in fabrication, electrical, engineering, mechanical or other trades and disciplines. The continuity that shipbuilding struggles with often, it is really important to maintain the workforce capability as well as to maximise the utilisation of the shipyards themselves. Each individual ferry operation only replaces vessels at a certain time and has a certain requirement. You don't all want to fall on top of the same peak period, where a defence shipbuilding program is active as well. Planning that through and working in collaboration with defence, as well as other states, would be very helpful.

Mrs MELINDA PAVEY: They are really good answers. I like that idea of the Infrastructure Partnerships Australia-type pipeline for both, as you've said, Andrew—defence as well as public transport. What's your engagement like with the public transport agencies, more generally, across the country? Do they collaborate with each other? Are we joined up? Are we efficient?

ANDREW MALCOLM: From an Austal perspective, it is very limited. Historically, we have been more focused on the export market and the European market, than we have been on ferries within Australia. It is something that we are increasingly keen to be a part of, as the shift to renewable energy and green vessels makes this a technically challenging problem that we believe is a good fit for our capabilities. The smaller vessel market is one in Australia that we've not done significant work in and had that engagement with the different transport authorities.

TERRI BENSON: I can't comment. I couldn't give you a good answer on that. I haven't had visibility of it. I don't know, Tim, if you have, but—

TIM CURTIS: No, just New South Wales.

Mrs MELINDA PAVEY: Wrapping that in, if we were able to create some better alignments, more efficiencies and more opportunities, what could that look like for export into our region, into Asia?

TERRI BENSON: It's a great opportunity. The experience we've had overseas has all come from an Australian-based contract. If we look at the work we're doing in the US with defence, it has come from the experience we've had in doing Australian work. It did start with the New South Wales government. It started with us retrofitting vehicle ferries for New South Wales. That's the way the slipway came to be. We then had a contract for 24 bridge erection boats for the Australian Army, and that has grown to almost 500 in the US. The thousands of watercraft we're delivering now, that I mentioned earlier, have come off the back of New South Wales government contracts. If you think about ferries, this is a specialised application, and if we can make this transition and show the capacity that is possible, it is exportable. It is another opportunity that we see for an export into Asia.

TIM CURTIS: I think it's an opportunity to export technology and intellectual property [IP], more so than a vessel hull. Going back to what I said earlier, where the job of a ferry is to meet its timetable, to get the ferry design right for Sydney Harbour is a lot of studying of timetables and that may or may not fit with another country or region's or city's timetables, and personnel requirements and ferry requirements. But, gaining the knowledge and gaining the experience of diesel, and stepping into hybrid and stepping into electric and all that, comes along with that and the required infrastructure, if we can learn it at home, then we can certainly take advantage of that and maintain that IP within Australia but export internationally.

Mrs MELINDA PAVEY: Good answer.

ANDREW MALCOLM: I would broaden the horizon beyond Asia, to Europe, as well. We've had many years as an Australian industry, and I would extend that to Incat Crowther and Incat Tasmania as well, together with Austal. The large fast ferry market historically has been Australian led, even though most of these vessels do not operate in Australia, and it is quite remarkable how many of the largest, fastest RoPax vessels in Europe were built in Australia, or designed in Australia and built in combination with partner yards. There is a significant amount of expertise that resides in both those companies and their supply chains in Australia, which can be at the forefront of this next generation of vessels, and Europe is very, very awake to this now.

The change in taxation that will apply to marine fuels, the change in exemptions that were previously in place for the emissions trading scheme relating to carbon will be phased out very soon for maritime operators and their costs are going to increase very significantly, and therefore the need to replace their existing fleets of vessels, many of which were Australian designed or built, with new vessels is coming in the next few years. And again, any experience with those even smaller vessels as fully electric, that we can demonstrate here in Australia, puts us in a good position to win those contracts internationally.

The CHAIR: It's always good to hear about expanding our horizons past Asia and into the world.

Mr MARK TAYLOR: I have to say, Chair, I assist with the bus industry as well, so I'm assuming it would be similar. Are you confident that we have the skill sets and the ability, coming through, to achieve what you want to achieve on your journey? Are you building those skill sets internally or is there something that you'll be looking at government to do to help that supply line?

ANDREW MALCOLM: Austal has one of the largest naval architecture teams in the country, and that's a broad, multidiscipline design and engineering capability, not just naval architecture, but all of the underlying systems and elements that comprise a vessel. Electrical engineering, and control and monitoring, and mechatronics skill sets are in high demand, and it's a very challenging market to recruit into, because it does overlap, as I said, with the resources sector, and a resources sector that is also very focused on decarbonisation and the same sort of sets of challenges that exist for land vehicles. So, I would say that we can develop some of these capabilities internally, but the overall supply of students and both trade apprentices as well, with the relevant skill sets, is something that needs government support and cross-industry collaboration to ensure we can pull on that resource in this market.

Mrs MELINDA PAVEY: Just a follow-up on that, Mark, and Birdon might want to participate in this answer, we've just got some challenges on the mid North Coast with, I think, a fitter and turning sort of TAFE component that was at Coffs Harbour, and now it's closed, making students have to travel to Newcastle or Tweed, I think. Do you have any experiences with TAFE trades or some positive relationships you've got with any other VET provider there, in Port Macquarie, that you might like to share with us, that could be incorporated into our knowledge?

TERRI BENSON: Yes, in terms of the trade, traditionally it wasn't an area that we struggled to recruit in. People are attracted in our region to Birdon because of the nature of the work we do, the interesting work that happens. You're building something different all the time, but just in the last two years that trades base has become particularly harder to attract. We're really investing at both ends. We're investing in our recruitment. Retention is becoming more important than recruitment, in my mind, and then also the training and development, the apprenticeships.

We'll commit to 10 apprenticeships in this coming year. That will be our biggest intake, because growing our own is becoming increasingly important, and I think you make a really interesting point, Mel, around the TAFEs and the trades. We're lucky in the mid North Coast; we have a great network of regional high schools that feed students into trades. School placement programs are very active, and the transition into TAFE and apprenticeships is working, but you're right—Kempsey and Taree we send most of our trades to. So, it is an area that we'll need to make sure is adequately resourced, because there's definitely an increasing need for that drawing on trade-based training.

Mrs MELINDA PAVEY: You have an exceptional example there in Port Macquarie with—

TERRI BENSON: Newman College.

Mrs MELINDA PAVEY: It's a Catholic VET college, isn't it? It's quite unique.

TERRI BENSON: Yes. They have a very good trades-based alignment to all industries. There would be many employers in Port Macquarie who would use that linkage and the trade school, and the equipment they have at that school, really helps them too. They're well resourced, and they've got great pathways into employment.

Mrs MELINDA PAVEY: It's quite like the Victorian model, isn't it?

TERRI BENSON: Yes.

Mrs MELINDA PAVEY: You have that direction to get a trade from doing your HSC.

TERRI BENSON: Yes, and the transition from trades through to the engineering fraternity—I think we're blessed in Australia. There's the naval maritime college, and there's lots of good training going on in that engineering space. We'd like to see more numbers going in. That's our job as industry, I think, to create interest in what we do. I think a lot of people complain that no-one is going into sectors, but it's our job to create interest in what we're doing and get people enrolling in those courses, and we've had some success at that, and we'll transition people out of those and invest the time in letting them grow.

If you want to wait for everyone to have already developed all their skills and you wait to recruit, you haven't done your job as industry either, so I think there's a role for us to keep on taking the graduates from those colleges, and training them up. We've taken on more than 15, in the last two years, relatively new graduates. Some with different industry experiences. Some have come through aeronautical. Some have come through automotive, but they're transitioning into maritime. So, finding ways to bring the skills in is important, and also growing the trade-based experience up into those engineering opportunities, is another way that we think we have to come at this at all angles. So, maintaining the rage on the naval college, making sure it's still there and funded and making sure we've got the TAFE support, I think is critical.

Mrs MELINDA PAVEY: It's an incredible training experience, that military one, isn't it? Do you pay above award for your apprentices?

TERRI BENSON: Yes, we do.

Mrs MELINDA PAVEY: It's an important component to it, because it's less than subsistence, the award wage.

The CHAIR: Good discussion.

ANDREW MALCOLM: Also, just a quick comment on recruitment and retention, but particularly with apprentices and young engineers, that the topic of the day is actually one that is, I think, part of building that interest and enthusiasm for this industry, which is when we talk to our graduate intake. We actually had a graduate intake start this week and, almost, the topic that they most wanted to hear about was the work we are doing on electric ferries and zero emission. So, I think it is part of creating that excitement and enthusiasm, and then bringing that down, as you said, into high school groups and talking about the progression they can have, either through engineering or through trade disciplines, into this type of work.

The CHAIR: How many new graduates?

ANDREW MALCOLM: This was a midyear intake. We have a graduate program, overall, that runs about 20 engineering graduates. This was a smaller intake at the moment. But we try to keep a two- to three-year rotation period for our engineering graduates, through all parts of the business and a cohort of about 20 at any one time.

The CHAIR: Good to know. Please wish them well.

ANDREW MALCOLM: Thank you.

The CHAIR: Comments, queries, otherwise? I think that's been a really fruitful discussion. We do thank you very much, indeed. Is there anything further you'd like to add before we might wrap up this session?

TERRI BENSON: No. Thank you for the opportunity. It's good to be able to participate in forming—hopefully, help inform the next steps. That's great. Thank you.

The CHAIR: It's a big help. Ms Benson, Mr Curtis, Mr Malcolm, thank you again for appearing before the Committee today. We may also send you some further questions in writing. Your replies will form part of your evidence and be made public. Would you be happy to provide a written reply to any further questions?

TERRI BENSON: Yes, not a problem.

ANDREW MALCOLM: Certainly.

TIM CURTIS: Yes.

The CHAIR: Great. Thank you so much. With that, have a good day and we thank you once again.

(The witnesses withdrew.)

(Short adjournment)

Mr JASON HART, Industrial Officer, Australian Rail, Tram and Bus Industry Union (NSW Branch), before the Committee via videoconference, affirmed and examined

Mr JOHN KING, President, BusNSW, before the Committee via videoconference, affirmed and examined

Mr MATT THRELKELD, Executive Director, BusNSW, before the Committee via videoconference, affirmed and examined

Mr RHYS PATTON, Intern, Australian Rail, Tram and Bus Industry Union (NSW Branch), before the Committee via videoconference, affirmed and examined

Ms MARIJA MARSIC, Assistant State Secretary, Director of WHS and Education, Transport Workers' Union of NSW, before the Committee via videoconference, affirmed and examined

Ms EMILY ARMSTRONG, WHS and Research Official, Transport Workers' Union of NSW, before the Committee via videoconference, affirmed and examined

Mr MICHAEL TIMMS, Deputy Chair, New South Wales Chapter, Australasian College of Road Safety, sworn and examined

The CHAIR: Welcome. Thanks for being with us. We'll get underway now. I'd like to welcome our witnesses. I want to particularly call-out Mr Rhys Patton, who is an intern at the Australian Rail, Tram and Bus Industry Union and, I understand, authored their submission. That's very good work as an intern. Thank you and well done to you, Mr Patton. We have a good healthy attendance. We'll obviously need to move through this relatively efficiently, given the number of people we have with us. But, again, we're delighted you are all with us. Can we just move through the formalities? Can you each please confirm that you have been issued with the Committee's terms of reference and information about the standing orders relating to the examination of witnesses?

MICHAEL TIMMS: Yes.

JOHN KING: Yes.

JASON HART: Yes.

The CHAIR: Thank you. That's the formalities taken care of. Would any of the many witnesses in front of us like to make a brief opening statement, ideally about two minutes, before we commence questions? First in, first served.

MICHAEL TIMMS: I'm happy to start. The Australasian College of Road Safety is the region's peak membership association for road safety, with a vision of eliminating death and serious injury on the road. The New South Wales chapter appreciates the opportunity to appear today, especially as an inquiry on emission-free modes of public transport may not seem to be something immediately about road safety. But because the United Nations Sustainable Development Goals and the second Decade of Action for Road Safety are now aligned, emission-free public transport is an area that ACRS sees as a priority.

ACRS has just released an interim policy statement on climate change and road safety. The statement identifies public transport as the safest and most energy-efficient form of transportation, and a modal shift from private vehicles to public transport would also reduce crashes and crash severity. For example, we know the risk of alcohol-related crashes is greater at certain times of the day and week. Courtesy buses operated by licensed premises reduce community exposure to alcohol-related crashes involving vehicles and pedestrians.

I note the interest in emission-free large buses, yet the current courtesy bus fleet and the community transport, aged care, NDIS, maxi-taxi and wheelchair-accessible taxi fleets as well as the humble police booze bus almost seem to be entirely diesel powered. Courageous local manufacturers could enter the market with modern, safe, zero-emission small buses and create a pathway towards connected and autonomous vehicle operations. This is in line with the New South Wales Government's Future Mobility strategy and the 2026 Road Safety Action Plan.

The success of emission-free public transport also relies on non-motorised transport, such as walking and cycling, as a feeder to other transport and shopping options. Is crossing the highway to get to the bus stop the riskiest part of the trip, particularly for seniors and people with a disability? The lack of safe walking, cycling and public transport infrastructure is a barrier to that modal shift towards sustainable transport. Hopefully we can help overcome this barrier here today.

The CHAIR: Thanks very much, Mr Timms. Who'd like to go next in terms of a brief opening statement?

MARIJA MARSIC: I will, thank you. I thank the Committee for the invitation to participate today. I acknowledge the Dharawal people, who are the traditional owners of the land that I am joining this hearing from. The TWU is a trade union representing bus drivers employed by private operators in New South Wales. Our submission to this Committee includes the voices, stories and experience of those bus drivers, and we extend our gratitude to our members for sharing their experience.

The Transport Workers' Union does not oppose change in transport, and we are aware of the environmental benefits of electric buses. The focus of our submission is that of other matters specifically relating to the health and safety of bus drivers in relation to the electric bus rollout and a lack of training for our drivers. We believe the New South Wales Government, through Transport for NSW, is obligated both legally and morally to play the leading role in addressing all work health and safety issues. The TWU believes that the existing systems and processes in place for managing work health and safety by Transport for NSW and operators is currently grossly inadequate. We again thank the Committee for the opportunity to participate today. Thank you.

The CHAIR: Please, Mr Hart.

JASON HART: Thank you. I also would like to acknowledge the Dharawal people, on whose lands I am currently working today in my hometown of Towradgi on the South Coast, near Wollongong. I'd also like to pick up on what you've said in acknowledging the work of our intern, Mr Rhys Patton, also for contributing and writing the submission that has been presented today. The Australian Rail, Tram and Bus Industry Union represents more than 14,000 members working across public and private infrastructure and assets across the state of New South Wales, which is one of the largest public transport systems in the world.

We think that the adoption of emission-free passenger services is a welcome opportunity to decarbonise our current global footprint in relation to emissions. Even in today's *Australian Financial Review*, the talk of reducing carbon emissions from new vehicles is welcomed by the Australian Government, noting that European emissions standards are much lower than what exist here in Australia and in New South Wales. We say that, as part of the recommendation from our submission, not only do we welcome the decarbonisation of the bus fleet as it transpires across the next couple of years, but also that the Committee should make recommendations with respect to lowering the emissions of fleet transport vehicles across the state. Thank you, Chair.

The CHAIR: Thank you, Mr Hart. Can I just draw everyone's attention to the need to assist us and Hansard? There are two parties in which we have two people together on screen. If you could just assist by giving your name before you might speak, that would help. Are there opening statements still to come?

MATT THRELKELD: Good afternoon. I'm the Executive Director of BusNSW. I'm joined by our president, John King, who is also a bus operator and has had experience in operating zero-emission buses. BusNSW is the peak body for the New South Wales private bus and coach industry and represents around 400 bus and coach operators across the State and over 100 industry suppliers, including bus manufacturers. BusNSW's mission is to foster the efficient and sustainable growth of public transport in New South Wales and to promote the benefits of bus and coach travel.

The bus industry views battery electric and hydrogen fuel cell vehicle technologies as a way for governments to address environmental concerns associated with pollution and emissions from existing diesel fleets. This, in turn, has broader economic and social benefits. The cleaner and quieter vehicles resulting from this technology create more livable communities and better health outcomes. They also have the potential to improve public perceptions of bus travel and thereby grow public transport patronage and mode share. A move to zero-emission transport technologies has the potential to provide job opportunities, particularly for bus manufacturing. These jobs will involve a range of new skills that are associated with electric vehicles.

BusNSW acknowledges that the New South Wales Government has published a Zero Emission Bus Transition Strategy to reflect its commitment to reaching net-zero greenhouse gas emissions by 2050. More recently, the New South Wales Government has released a rollout plan for the 8,000-bus fleet, which involves the transition to zero emissions by 2035 in Greater Sydney, outer metropolitan regions by 2040 and regional New South Wales by 2047. BusNSW generally supports the transition plan, though we also recognise that it will involve a significant financial investment for fleet, depot infrastructure, charging equipment and staff training over the next 25 years. We look forward to ongoing consultation with the industry on zero-emission buses and emerging technologies and thank the Committee for the opportunity to participate in this inquiry. We are happy to take any questions. Thank you.

The CHAIR: Thanks very much indeed. Mr Patton, any opening remarks from you, or has your colleague covered that?

RHYS PATTON: That's fine, thanks. Just leave it to Jason.

The CHAIR: Very good. Let's get underway then with questions. I'll get underway and then invite my colleagues to follow. We're here until about one o'clock, so it's a pretty neat half an hour or so. We'll try to move through it. I'll just get underway with a broader question, which a number of you have touched on, but it's good to walk across it all together. In the context of employment and training, which is obviously a significant theme of many of your submissions, what are the key challenges and opportunities that we, as policymakers, ought to be focused upon, as we look ahead to a zero-emissions public transport system? Who'd like to go first?

JASON HART: Chair, if I can lead in relation to the response for the RTBU and our membership, one of the things we would see as being one of the challenges but also one of the opportunities for transitioning is that depot workers, in relation to the emerging way that the fleet will become battery operated, will be unique to the current model where they're refuelled with diesel terminals. That would entail ongoing training to assist depot operators either taking cartridges out of the battery fleet of the vehicles or some other mechanised way to recharge the vehicles in a timely manner to keep the transport systems operating. We see that there is great opportunity and potential for upskilling and ongoing training without any job losses, which is obviously quite important to an industry organisation representing working people across the bus and transport fleet.

MARIJA MARSIC: One of the big challenges that we see regarding the rollout of electric buses—what we have actually seen, and we have spoken to workers about this and actually seen physically at an operator's site, is a complete lack of WHS implications in the yard. What I mean by that is the compliance that is required for the person conducting a business or undertaking [PCBU] when it comes to consultation with their workforce, training their workforce and risk assessments of their workforce seems to be completely inadequate in some of these operators' yards. We are really concerned about what that means for drivers, particularly where we have been able to get our hands on injury registers that show that the rollout of the electric buses have caused significant injuries to workers over the last 24 months, I understand. If I could also please pass on to my colleague, Ms Emily Armstrong, as she actually physically has been on one of the operator's sites.

EMILY ARMSTRONG: I conducted a WHS right of entry with one of the officials here at the Transport Workers' Union and we actually got to see the new direct—the conducting of the electric buses and the charging stations in the actual yard at one of the bus yards in Leichhardt. The major concern that we noticed was not only the structure of how they actually rolled out the charging stations, but the lack of consultation with the workers and training with the electric buses. One of the workers had actually spoken to us and, to quote the worker, the yard people had actually said to the workers, "Just jump in, turn on the bus and drive the bus." The training that had not been conducted is our major concern and the lack of consultation with the workers.

MARIJA MARSIC: What appears to happen is, they've got documents that state, "Look at this new beaut training package we have; look at these risk assessments that we have conducted." What we have discovered, however, is those risk assessments are done in isolation, without the input of workers, as required by legislation; without the input of health and safety representatives [HSRs], as required by legislation; and without the actual training package being rolled out, as per the requirements of the WHS Act. These are the ongoing shortcomings that we have seen throughout the rollout. Again, we have actually seen evidence of this through our right of entry. If I can also add, the documents that we have viewed were a result of getting the safety regulator involved to actually get the operator to produce these documents to us.

The CHAIR: I am just going to state the bleeding obvious and say that if you've got evidence of a breach of regulations or law, of course that should be reported, and I am assume that that has been done. But can I just ask, for clarity's sake, was this in relation to training of bus drivers or is it mechanics or workers? Just help us to understand a bit more about that.

Mrs MELINDA PAVEY: And was it a private company or government? You said Leichhardt.

MARIJA MARSIC: I understand they've got the government contract in Leichhardt region 6. Does that make sense?

The CHAIR: Sorry, can you repeat that?

Ms JO HAYLEN: They are all private.

Mrs MELINDA PAVEY: So they are people doing public bus runs. I understand where you are coming from now.

MARIJA MARSIC: That is correct.

EMILY ARMSTRONG: Yes.

The CHAIR: Can I just get that repeated? Sorry, I did not hear it and I beg your pardon. Can you just repeat what you said?

MARIJA MARSIC: Sure, I understand that it is an operator that is contracted to the government.

The CHAIR: To my question, was it drivers who were not being trained adequately or mechanics? What was the nature of the work?

MARIJA MARSIC: What we found was that drivers aren't being trained on the actual electric buses or on the issues of the electric buses actually being on site, so it is twofold. You have hazards that have presented themselves in the yard versus hazards that have presented themselves while they are driving the buses on the road. For example, while they are on the road there has been no training regarding emergency evacuation procedures. When we are looking at what is actually happening in the yard with the electric vehicles, it is the same thing—we've got no traffic management plan, we've got no safe evacuation were there to be an incident with the buses. Regarding the lack of training, it is not only about the drivers being on the road and what to do if they need to react but also what is happening while they are actually on site as well.

Mrs MELINDA PAVEY: Could I put a series of questions to the bus and coach association and to Michael Timms? We had evidence earlier today from some bus and coach manufacturers around the panel 4 and some changes within panel 4. There seemed to be a view that we now have standards that have not been created in any consultation with industry, and they are way above any standard throughout the world. Have you had any consultation, or do you have any views on this issue, Matt, John or Michael?

MATT THRELKELD: There has been some fairly minimal consultation in regard to the fire mitigation requirements associated with the specifications for bus panel 4, which we understand will be going through a request-for-tender process in the coming weeks or months with the intent for that new generation of bus panel to commence sometime next year. I am not sure that we can provide you with any detail at this point in time, but I am more than happy to take that on notice should you require any particular details around those requirements that Transport for NSW have indicated.

Mrs MELINDA PAVEY: Did you have anything to add, Mr Timms?

MICHAEL TIMMS: I did hear one of the speakers at the first session as I was coming in. The increase in standards—and I understand they say every 60 kilograms of weight was the removal of one passenger. I think we have seen over the pandemic the reduced capacity on the transport network. Transurban released their latest statement yesterday, which said that their traffic on their network was higher than it was pre-pandemic. I think that we need to do everything that we can to ensure that we maximise capacity on the public transport network.

Mrs MELINDA PAVEY: The reason for my question is that we are here to look at the future of public transport through emission-free technology. If we are going to reach that goal as quickly as we can, it is going to be a partnership with all sectors—those that are manufacturing, those that are running companies and academics, and everybody involved in that space. We have also had some testimony today from another manufacturer in the marine space, suggesting that a way forward might also be to look at a version of Infrastructure Australia where we actually have all of those that are manufacturing in transport and public transport working together so that we can maximise the benefits across the states in terms of procurement. We have quite a hotchpotch arrangement, but if we actually understood what all jurisdictions were planning on, we could actually build up our capacity in manufacturing in Australia, and particularly with the changes that net zero is also bringing to us. Do you have views on that, gentlemen?

MATT THRELKELD: Yes. We have seen over the years that New South Wales has set standards for buses which are over and above those standards that are required within the other states, so that has created some issues for manufacturers in terms of efficiency given that they have to produce a particular type of vehicle for the New South Wales market that is different to those other states. Generally, this has been around technical specifications that apply in New South Wales for things like bus door safety systems and also school bus flashing lights. Just in reference to the previous comment, it appears that the requirements for fire mitigation for buses under panel 4 may even be exceeding European standards. That then, I guess, not only increases the price of the vehicle but also takes away those efficiencies that local manufacturers and also international manufacturers could otherwise have in terms of producing a standard vehicle for the Australian market rather than for the New South Wales market.

Dr MARJORIE O'NEILL: There has been quite significant trials already in Sydney with electric buses. Significant concerns have already been raised regarding lack of training of drivers and staff in the depots. Is there any other feedback that has come from drivers from these trials? I frame that as well in the context that we have at different times heard from disability advocacy groups around challenges of having big silent buses moving around. Have any of these concerns ever been raised from bus drivers as well?

JOHN KING: We trialled the first electric bus to come into Australia on a rural and regional operation. There is some training involved outside of a diesel bus. But typically, driving the bus is no different than driving

a diesel bus. We're talking really in relation to the community at large. There are products that go onto these buses that actually make noise under certain kilometres an hour. So I don't see it being a major challenge other than that we present to the communities the change. I think that's the most important factor of what we've got to achieve in our industry.

MATT THRELKELD: If I could just add there that there has been some significant work done by TAFE NSW in relation to preparing the industry for the transition to zero-emission buses. That training is based on three levels. The first of those levels is training for all persons working around zero-emission buses and includes four modules. There's also a second level of training, which is for maintenance operations staff. That involves two nationally recognised units of competency: one in relation to de-powering and re-initialising battery electric vehicles, and a second in relation to servicing and maintaining battery electric vehicles. There's some work being undertaken at the moment in regard to a third level of training, which will be a master service technician for electric vehicles. There is a fair amount being done in this space for staff.

Further to that, I might just add that we are talking about a highly regulated industry here. I can't comment in relation to the previous remarks from the Transport Workers' Union in regard to an individual operator who is not a member of BusNSW. In terms of the bus operator accreditation scheme, all accredited operators in New South Wales must have a safety management system which involves a risk register. That, obviously, involves identifying risks associated with battery electric buses and providing training that is necessary to mitigate those risks.

MICHAEL TIMMS: Just in terms of the disability advocates' concerns, we did touch a bit on this in our report. The European Union, for example, has mandated that all electric vehicles be fitted with what they call acoustic vehicle-alerting systems. That's because at very low speeds it's hard to hear electric vehicles. They're silent. People that are hard of hearing and people without hearing difficulties might not have the ability to hear them. They mimic the sound of, for example, a vehicle travelling over gravel or just emit like a "ssshhh" sound. That just helps people with difficulties to hear the vehicles. I'm sure that's probably something that they could test and do locally here. I know we've got the ingenuity.

JASON HART: An ancillary issue—I think it's endemic across the current diesel fleet but also as it transitions to the battery-powered fleet—would be issues associated with passenger and driver comfort, in certain instances where buses are idling between trips they're powered off and that affects the use of the air-conditioning system. On hot summer days that can heat the buses up very quickly. I think that is part of the issue that should be addressed going forward, particularly with the use of electric vehicles—the way that the systems can be engaged to ensure that customer comfort as well as driver comfort is maintained through the ongoing use of air-conditioning systems. I think that would be something that we touched on in respect of our submission that we provided to the Committee earlier.

The CHAIR: Can I just ask about employment impacts. Having seen, as the Committee did the other week, two buses being manufactured—one an electric bus, one a diesel bus—and having seen the difference in appearance, recognising our lack of particular expertise in that space, but just looking at them from a layman's point of view, the electric engine bus, the engine—that is, the mechanics—look much smaller, cleaner, neater, tighter, easier to maintain et cetera. I'm generalising, but can I just invite people's comments in terms of what are the anticipated employment implications as we make this transition.

JOHN KING: A bus is a bus. I understand the changes that we'll see from the electric or hydrogen environment, transitioning away from the diesel, but you will still find that the employment opportunities are there across the board. If you take the later model bus, 06, most of them are now computerised, anyway, which is what will be on an electric bus; it just won't have a combustion engine. But all other componentry of that bus is identical: you will still have a steering wheel, you will still have a braking system. So employment opportunity will grow but in a different format. There will be more technicians than 'grease monkeys'—that was used this morning. At the end of the day, the employment opportunities will be there and they will grow.

JASON HART: I agree with the testimony just given a moment ago, that the opportunities will continue to grow. The challenges may well present in terms of the different type of work that's needed to be done or the specialty that depot crews are required to upskill to. Notwithstanding the upskilling and the training that's provided, and providing that there's a commitment by both private and public operators to invest into those jobs and those skills trainings, we see this as a fantastic opportunity for our state, as I say, to decarbonise and move forward in this matter.

Mrs MELINDA PAVEY: Could I ask Mr Hart, the commitment from industry and from you to actually rebuild the manufacturing base in New South Wales and Australia, how best do you think that can be achieved? I mentioned earlier I'm of a view—we've had some evidence as well—that taking a more national approach to understand what state government purchases need to be made in vehicles—coaches, buses or ferries—that there

is a real opportunity for us to be more strategic as a nation in building that up. Do you have any thoughts on that, the need to invest in being emission-free could be a point in time for Australia to actually work together collaboratively to make this happen?

JASON HART: Absolutely. We put it this way, from the RTBU's perspective, noting that there's the Australian Renewable Energy Agency (ARENA) that has invested more than $1.8 billion in a range of projects across the country. We see that in a similar way as you've indicated—that Infrastructure NSW, as an umbrella organisation or a new agency akin to or working in tandem with ARENA, could deliver the similar types of investment opportunities, research and development and manufacturing. Notwithstanding those sorts of arrangements, representing workers as we do for the RTBU, we would see that collaboration with industry and government in partnership, to ensure that the success of these schemes is paramount—but also to ensure that there are further growth and job opportunities for all of our members. That's how I would characterise any type of investment going forward—in a similar vein as the ARENA agency. Thank you.

Mrs MELINDA PAVEY: John King, did you have anything as president of your association—how we can better collaborate. I know some of the frustrations you have as an association just dealing with our own state bureaucracy but, if we had a better sense of collaboration, what more could we be doing?

MATT THRELKELD: I'll answer this one. I think this issue comes down to the supply pipeline. What we've seen in New South Wales over the last 10 to 12 years is quite a significant variation from year to year in terms of the number of buses that have been procured by the New South Wales Government. That has ranged from around 700 vehicles in a year down to 250 vehicles in a year. That obviously has a major impact on the local manufacturers but also on those suppliers that are bringing vehicles in from overseas in terms of having enough security and enough numbers of buses to manufacture to support workforces. Unfortunately, we've seen cases where manufacturers have had to increase their staff numbers and upskill people but then let them go within a number of years because of that change in the number of vehicles being procured. At the end of the day, it comes down to needing to have a smooth supply pipeline and providing some assurance to the manufacturing industry in terms of the next 10 to 20 years. This transition to zero-emission buses does give government the opportunity to resolve this issue. We're hopeful it will.

Ms JO HAYLEN: Further to Mel's questions here—predominantly to BusNSW but I welcome others' comments—I think there have been some moves towards emissions-free and I recognise the partnerships with the Federal Government that have realised some of those buses in the Leichhardt depot, for example, that the TWU raised. What are the impediments, though, to fast-tracking this transition? I am particularly interested about the arrangements with the tendering processes and the occupation of depots and licences there. We've heard from manufacturers about the need for certainty to produce the buses that we need but what about, for example, Matt and John, your members' experiences when it comes to the investment that's going to be required for the electrical works on those depots?

JOHN KING: The investment typically would be a huge impost not just to the bus depot but to the outlying areas of the estates, because we just don't have the suppliers coming in for—if you were to talk about renewables on battery alone and notwithstanding that if you were going to put electrolysers into depots for hydrogen, then you would need composite amounts of water and power. I think what we've got to do is—coming back to what Melinda was saying earlier about how do we collaborate in the sense of the country, we need to actually come up with a better plan to move forward so we can actually share our resources.

A partnership approach is probably the biggest word that we can put on the table, I believe, because where we would buy a bus depot and run it ourselves, now we have to partner. We can't afford to go and invest. Who owns the asset? How are we going to control that asset going forward? As an industry we are up for that and we really have to be the pioneers to our next generation of supply. We won't get there otherwise and that's our problem. Coming back to Matt's point, we have huge industrial relations [IR] issues in the sense of being able to employ professional people in this country. They're not there anymore. We're on a wind-down, not a wind-up, and we need to actually get a national approach to how we actually deal with immigration at the same time.

Mrs MELINDA PAVEY: Can I just ask another question because I know Matt and John are also committed to regional New South Wales. Could you give us some thoughts on the characteristics of regional New South Wales and how we need to consider some of that distance and travel and charging as part of the plan going forward?

MATT THRELKELD: Sure. I'll start. The regional New South Wales operation of bus services is predominantly to transport students to and from school, which makes up around 90 per cent of the task. That's obviously much different to Greater Sydney and currently the focus for zero-emission buses is on city buses, so two-door, low-floor, wheelchair-accessible buses. At the moment, there are no zero-emission battery electric or hydrogen fuel cell high-floor school buses available through the procurement panel, so that's certainly something

that needs to be considered in the future. If I can just add to that in terms of the number of operators, because there are over 500 bus operators with Transport for NSW, rural and regional bus service contracts—a lot of those operators are small to medium enterprises. Some of them only operate one bus. A lot of them operate between one and five buses, so there is a need to ensure that, in moving to this new technology, there is going to be after-sales support for those operators in regional areas. We have experienced some issues in the past with the need to get those manufacturers to support our operators, particularly in remote areas.

Mr MARK TAYLOR: Could I just give Ms Marsic and Ms Armstrong an opportunity—I just want to clarify the record quite squarely that you're not saying there's any inherent danger with electric buses. The issues you were raising, if I could use those terms, were more along the lines of any type of bus. It was just a training and consultation issue around a change-of-work practice. I just want to clearly for your benefit put on record that you don't have an inherent issue with electric or hydrogen buses.

MARIJA MARSIC: No, we don't oppose electric or hydrogen buses under any circumstance and understand the positive impact they do have on our environment; however, we do oppose lack of training for those buses and lack of information provided to workers. I'll just give you a couple of examples, if I may. I know this is something—that driving an electric bus is the same as driving a diesel bus. But from our members—and I've just got a couple of points here that they informed us of. Drivers must brake earlier than they usually would in a standard bus due to the braking system and there's been absolutely no information, framing or instruction provided to those drivers on how to do that effectively. Electric buses have smaller tyres than diesel buses. Therefore, extra care needs to be taken with roundabouts, gutters and kerbs. We know there's been no training or information or instruction or monitoring or supervision of drivers in those electric buses. So this is what we're alluding to. Does that make sense—to make it a little bit clearer as to where we're coming from?

Mr MARK TAYLOR: Yes.

The CHAIR: There being no further questions from Committee members, are there any final remarks—anything we've missed, anything you'd like to share with us before we wrap up this panel? No? Silence is golden. Well, thank you all very much indeed. We are grateful to you, Ms Marsic, Ms Armstrong, Mr Hart, Mr Patton, Mr Timms, Mr Threlkeld and Mr King. Thank you all for appearing before the Committee today. We may also send you some further questions in writing. Your replies will form part of your evidence and be made public. Would you be happy to provide a written reply to any further questions?

MICHAEL TIMMS: Yes.

The CHAIR: With that, good day and we thank you for your time, energy and expertise here today and we wish you well.

(The witnesses withdrew.)

(Luncheon adjournment)

Ms REBECCA McPHEE, Deputy Chief Executive, Sydney Metro, Transport for NSW, affirmed and examined

Mr HOWARD COLLINS, Chief Operations Officer, Greater Sydney, Transport for NSW, sworn and examined

Ms GILLIAN GERAGHTY, Chief Development Officer, Infrastructure and Place, Transport for NSW, sworn and examined

Ms JULIE MORGAN, Executive Director, Environment and Sustainability, Safety Environment and Regulation, Transport for NSW, affirmed and examined

The CHAIR: Let's resume this hearing of the Committee on Transport and Infrastructure. This is the fifth and final panel, with witnesses from Transport for NSW and Sydney Metro with us this afternoon. Can you each please confirm that you've been issued with the Committee's terms of reference and information about the standing orders relating to the examination of witnesses?

HOWARD COLLINS: Yes.

JULIE MORGAN: Yes.

REBECCA McPHEE: Yes.

GILLIAN GERAGHTY: Yes.

The CHAIR: I might also ask, without putting you on the spot, whether I can get a sense of who has been in touch with the proceedings of the hearing so far today?

HOWARD COLLINS: Glued from start to finish, actually. I did manage to watch most of it.

The CHAIR: Good. I note some other witnesses said no. We understand you're busy people so it's no problem. I don't mean to put you on the spot. It has actually been very fruitful. Would any of you like to make a brief opening statement? We suggest a duration of about two minutes, if you could keep it to that time frame, before the commencement of questions.

JULIE MORGAN: I'll be making the opening statement on behalf of the witnesses. I thank the Committee for the invitation to appear as a witness today. My name is Julie Morgan. I am the Executive Director of Environment and Sustainability at Transport for NSW. Moving to an environmentally, economically and socially sustainable transport system is important in addressing climate change, creating liveable places and supporting a productive economy, all of which enable better health and wellbeing for our communities. The transport sector accounts for just over 20 per cent of greenhouse gas emissions in New South Wales. That 20 per cent includes emissions from cars, light trucks, heavy vehicles and freight, aviation, shipping, and public transport. As operators and deliverers of public transport systems, Transport for NSW and Sydney Metro have an important role to play in reducing the carbon emissions associated with the transport sector.

Our strategy in transitioning to net zero is to identify and reduce the emissions under our direct control—that is, the carbon emissions associated with our operations—while also working to support and enable the transition of the transport sector. We are really proud that as of 1 July 2021, Sydney Trains achieved 100 per cent net zero emissions from electricity through agreements to power the system with renewable energy until at least the end of 2030—four years ahead of schedule. In doing so, we're removing close to 700,000 tonnes of carbon dioxide-equivalent emissions annually and have reduced the emissions associated with transport operations by 51 per cent. We are also working to reduce the carbon emissions associated with delivering transport infrastructure and we are actively engaging with the industry on lower carbon materials and delivery methods. Sydney Metro has been using zero-emission electricity since operations commenced and has a net zero emissions pathway for construction and operations.

In August 2021, we released the *Zero Emission Bus Transition Strategy*. The purpose of that strategy was to seek feedback from industry to inform a road map for the transition to zero-emission buses. We received strong and overwhelmingly positive interest from industry on the strategy, and we have used the feedback and more recent engagements with industry to inform our technical planning and project development. We understand that transitioning to zero-emission buses will require cross-jurisdiction collaboration. We are already working with our counterparts in other states and territories, and we are committed to working with transport providers and industry across state and territory borders to position New South Wales and Australia as a leader in zero-emission transport.

Encouraging the transition from trips completed by car to public transport is crucial for lowering transport emissions. The network has faced some headwinds to this transition in the past couple of years due to COVID-19, which saw public transport patronage fall in Greater Sydney by 41.6 per cent in 2020-21 compared with the

2018-19 figures. But moving customers onto public transport is key to achieving our sustainability goals. Our city-shaping plans commit us to increasing population densities around public transport nodes, reducing travel distances and the need to use a car, and using micro mobility, such e-scooters, to help ensure the safest, most practical and effective measures are in place.

Equally, we are working on developing Mobility as a Service as a fully integrated public transport service, allowing travel across all modes in an easy and integrated way. We are here today to discuss our work in this space. To assist you in directing questions, representing Transport today we have Howard Collins, Chief Operations Officer for Greater Sydney, who can speak to Greater Sydney operations; Gillian Geraghty, Chief Development Officer for Transport for NSW, who can speak to transport infrastructure projects; Rebecca McPhee, Deputy Chief Executive, and Head of Customer Operations and Outcomes, who can speak to Sydney Metro questions; and myself for any questions on our emissions profile and environment and sustainability initiatives. Thank you.

The CHAIR: Thank you very much indeed. I might get us underway. Let's start big picture. I know you have dealt with this in your submissions, and we thank you for those. What do you see as being the most pressing challenges that are inhibiting a move to zero-emissions public transport?

HOWARD COLLINS: I'll start, if I may, and then I've got the experts next to me, which is important. Obviously, as we've heard this morning, there are a number of challenges. But I do think New South Wales is leading the way in many of those challenges we face. We are really delighted and pleased with metro taking the lead, but also now with Sydney Trains having green energy to power our electrical systems on our railways. Thanks to Bradfield in the 1920s, we started off with electrical railway, unlike many others around the world. My experience, you may or may not know, is that I had 35 years in London. I keep in contact with London. I see European cities progressing well. But I also do see the technology and the ability for us to locally manufacture and work through some of these issues, really being a way forward for Australia; I say "Australia" as opposed to individual states.

One of our challenges is that I think we're a car city still, if I'm practical about it. In London, 70 per cent of the people who commuted or worked in London went by public transport. I worked with mayors who made it quite obvious that if you wanted to use your car, you paid dearly. If you left it for two minutes on a street corner it was towed away and you had to spend £2,000 to get it back. However, here it's almost the reverse. It's 16 per cent or 17 per cent of people that use public transport. We start from a tough base, but I think as a number of people spoke this morning, I really do believe—and my colleagues can probably emphasise this more—that we do have a great opportunity, particularly for Sydney but for other of the six cities and regional areas, to encourage people to leave their car at home and use public transport—more importantly, now, public transport which is not creating hundreds and thousands of tonnes of carbon because of the step we've made forward. I don't know whether my colleagues would like to add a more specific view.

GILLIAN GERAGHTY: I'm happy to provide a bit more specificity, if that's okay. I might talk to the zero-emission buses program that we're currently looking at delivering. In my 30 years of delivering infrastructure and planning infrastructure, I think we can only deliver something like this in very close collaboration with industry, our operators and our customers.

We started in 2021, as Ms Morgan outlined in her opening statement, with industry on how we would work and deliver a zero-emission bus program, especially in the order of the size of the 8,000 buses that we're talking about. We received a considerable amount of submissions to that, and over 80 per cent of them were favourable and were supportive of the program. We also did some further, very specific consultation earlier this year with some specific groups to develop a little bit more detail, and in June this year, the government—

Mrs MELINDA PAVEY: Sorry, what were those groups?

GILLIAN GERAGHTY: I can tell you, Mrs Pavey. There were 32 suppliers across eight sectors. I can provide more detail on notice.

Mrs MELINDA PAVEY: That would be great, thanks.

GILLIAN GERAGHTY: In June of this year, that led into a three-tranche program of delivering the zero-emission buses, with a commitment of 2035 for Greater Sydney, 2040 for the outer metropolitan and 2047 for regional and rural New South Wales. That planned rollout really recognises the challenges that have been put forward. There were some put forward this morning about manufacture, supply of labour, supply of a series of different availability of fuel et cetera. We believe that that program enables our industry partners and our operators to start gearing up around that. Most importantly, we've looked at Greater Sydney first because we think that in Greater Sydney we can probably understand those constraints a little bit better. We've identified there'll be some

trials in regional New South Wales to inform when the rollout happens in outer metropolitan and regional, and we're already looking at some trials in our outer metro spaces.

HOWARD COLLINS: I think the interesting discussion is about ferries and the conversion of ferries which are diesel powered. I think the technology—and we've worked very closely with the industry. I'm very proud of Australia. I used to travel on Australian ferries in London because they were built by Australian manufacturers. I think the challenge at the moment is if you search hard and wide, you won't be able to provide a fully electric ferry to do what the task is in Sydney yet.

I've seen the demonstration of the New Zealand product; it's fantastic. It's one of the only high-volume, high-speed ferries. But it's made of carbon fibre, it's quite a specialist product and it's quite expensive. But I think they will come with time. From a ferry point of view, the capacity and manufacturing I do think is a challenge. We have relatively small yards which build these ferries. But there are strategies—standardisation of product, parallel manufacturing of a standard product—that could allow us to build ferries more quickly, rather than wait for one to be built at a time and the next one arrive next year. That's certainly a challenge for us, but I do think Sydney would benefit from a change in the type of propulsion in the harbour. It would be fantastic if we could do that.

JULIE MORGAN: Chair, if I could just add, too, we've done a lot of work recently to understand the emissions profile of our operation—so our scope one emissions, which are the emissions we directly produce, and our scope two emissions; that's the energy that's associated with running the operations. Moving the trains to renewable energy dealt with 51 per cent. The next biggest chunk is the buses, sitting at about 33 per cent, 22 per cent of which is in Sydney. You can see that would be why it's our priority to bring that on more quickly. Then it falls away quite rapidly, with other services only adding relatively small amounts of emissions. If we deal with the trains, which we've done, and the buses, we've dealt with nearly 85 per cent of the emissions associated with public transport in New South Wales.

The CHAIR: That's very good work.

Mrs MELINDA PAVEY: The biggest challenge for us all to deal with seems to be where the charging stations will be. We were told that if you had a 300-bus depot, you'd need to put in a substation to enable the charging of those vehicles. We had some really good evidence from the private sector about their thinking and that because it is silent, it doesn't necessarily have to have walls around it et cetera. Could you tell us how your journey is going on, what seems to be the biggest challenge, which is the charging points?

HOWARD COLLINS: If I open up, we have a lot of expertise in this area because, in a group at Transport for NSW, we are one of the only other regulated distribution networks in New South Wales in our electrical network for Sydney Trains—lots of substations, lots of bulk supply points. What we believe is—whilst it is true that if you look into 2035, we will need a new and an enhanced distribution network to deal with the total fleet conversion—we're already looking at and working with the suppliers of the electricity to choose the first locations, of which we have a number now in design and will support the next 100 vehicles, which I know was mentioned this morning, with relatively low cost and relatively low impact on the network. And then we will match and work with the distribution network and the technology, which we will see evolving further to allow us to ensure we match what is the critical part of the rollout—the infrastructure, the supply network, the substations.

But we have taken on board a lot of lessons learnt from New Zealand, who are much more advanced in terms of running out some of their bigger depots, and the UK and Europe. It's about planning this. It's important to recognise that many of our depots will have some fleet conversion with some draw on the supply side, but eventually we will have to plan for further infrastructure works. It's important to recognise working with industry is our number one priority. It's also understanding things are going to change. Where today we're charging huge batteries with a lot of demand for the supply, I do believe in the next few years—like we've all found that since we started with mobile phones, they've become more efficient—certainly vehicles are starting to see smaller, higher capacity batteries.

The other piece of technology that, Gillian, I know you're keen to get to is the charging en route and superchargers like we use for the light rail in Newcastle. What we've seen in Europe, with high-capacity vehicles which pull into a bus station, pick up a big charge and then go off again, is another way of perhaps securing the future. It's not parking your bus in a depot overnight. It is going to be the strategy for the next 35 years, and we must be open-minded, I think, to that. Gillian?

GILLIAN GERAGHTY: The only thing I would add, Mr Collins, is that I think the tranche approach that we've taken further supports the constraint around the transmission network. We have identified a number of depots, as Mr Collins outlined, for upgrades, and we have specifically picked those looking at where they don't have those constraints as much. Yes, I think it's part of the planning, and being very cognisant of the challenges.

The CHAIR: Thank you, much appreciated. I know from my visit to the Willoughby bus depot just last week that it is an old tannery, and it has somewhere in the order of about 300 buses. The requirements to enable charging and servicing and the like of electric buses are very significant, so I got a sense for that. I've seen it at a local level, but we appreciate in the broader context just how substantial this is.

Dr MARJORIE O'NEILL: Just staying on buses for a second, can I get a bit of a better understanding of the demarcation of responsibility with the upgrading of the depots and the grid? What is the responsibility of Transport for NSW versus the private providers? Is there a homogeneous approach? You've got different providers operating out of different depots all across Sydney now, as well.

HOWARD COLLINS: Thank you for the question, and I will ask Ms Geraghty to assist me with this question. We do have a view that where we retain either the freehold or responsibility within Transport for those bus depots, we wish to continue that. Obviously, with the changeover from one franchise to another, otherwise you end up with the bus depot and the buses disappearing—so that is important to us as a strategy.

I do think the point about accountability—we do see Transport for NSW critically as being the policymaker driving this agenda forward. There's no doubt the government has announced a very aggressive—and is actually leading Australia in the conversion of buses to zero emission. I don't know whether Ms Geraghty will be able to explain a little bit more detail of how we work together with our partners. Some of these players like Keolis Downer are global leaders who have spent five years ahead of us converting a lot of their facilities in other countries, so we're learning a lot from their experience. Ms Geraghty.

GILLIAN GERAGHTY: I am very happy to contribute. We have done, as part of our planning, a definition design around the depot conversions and that was really to inform constructability assessment and what works, and what is standard across most depots but what would be bespoke elements. It has been very important that we've engaged with operators through that design process. We've also done a series of sessions with suppliers to discuss the zero emission bus [ZEB] fleet and the charger supply capabilities and what the requirements are. We have identified those first number of depots where we would do those upgrades. We'll use that not necessarily just as a pilot, but it will inform our ongoing planning for the remaining of the bus depots.

Dr MARJORIE O'NEILL: Are the contracts with the private providers homogenous or do they differ?

HOWARD COLLINS: They're pretty homogenous. We've carried out the last three contracts from State Transit [STA], but we are going through the next phase of tendering for the next series of contracts. What we have certainly put in, with those, is that we're looking for tenderers to give us ideas about electrification, expertise and supporting us in understanding that. We've been delighted with the industry's response, not only manufacturers but bus franchise operators, about sharing that information. The first 11 locations, 10 of which are greenfield sites, we are now spending $84 million upgrading and getting that ready. The sites we have at the moment—we've got about 100 vehicles outs there at the moment. We've got another 99 as you heard from Custom Denning on order, which will be delivered, and we want to be ready for those to come into a service with a good infrastructure available to them.

GILLIAN GERAGHTY: The only thing I would add to that is about safety. The safety attached to the depot conversions is very important to transport because the operators are obviously of a variable nature, as you've identified, and some have much better organisational capability around safety. We are working with the operators very closely to make sure that the safety is first, and how we support them, because we see that there are lots of risks attached to the depot conversions.

Ms JO HAYLEN: Can I ask further about the bus electrification program? Just to be very clear, the depots stay in the hands of Transport for NSW?

HOWARD COLLINS: The majority, yes. There are some exceptions, but the majority do.

Ms JO HAYLEN: And you're working with the providers as to that program of conversion?

HOWARD COLLINS: Yes.

GILLIAN GERAGHTY: Yes.

Ms JO HAYLEN: You indicated you're looking at different options in different places. Does that include some of the opportunities we've seen overseas with redevelopment of depots, given they're now going to be quiet places potentially to live on top of or near to? I'm also interested in the technology opportunities of having, as we've heard this morning, effectively a big battery.

HOWARD COLLINS: Yes.

Ms JO HAYLEN: There are going to be big batteries. Do the confines of the current tendering arrangements preclude some of these opportunities being taken up and are you looking at whether those need to change?

HOWARD COLLINS: I'll try and answer the questions backwards because I can remember them. I do not believe that the way we are tendering actually constrains—in fact, I think it facilitates—that. We have a lot of shared contact. We've had a two-day conference recently with UITP [Union Internationale des Transports Publics]. The industry is fully engaged. We see and hear things. For example, your point, which I think was a very good point, here we are with a bus depot that could have 600 buses in the future or 300. It sits there as a battery. We know within Europe that feeds back into the grid and provides that balance. I think as a number of the people providing submissions this morning suggested, it's not just buying a bus, plugging it in and using it, and we've saved a whole ton of carbon.

There's a lot of sophisticated electronics and a lot of sophisticated ideas for the future of utilising what is individual batteries which can combine together, and also how we utilise the fleet. As was said this morning, there is lot of science behind optimising that electrical use with our vehicles. The good news for buses is their range and how we use them today is ideally suited for a single charge or a couple of top-ups. I'm hoping there won't be range fears for bus drivers because they've got plenty of capacity and we've seen this already within the bus fleet. The issue for regional fleets is looking at the opportunity to use carbon or other forms of zero-emission propulsion because there is a different challenge and a different type of vehicle out in regional locations.

Ms JO HAYLEN: Following up on that, you've identified the current arrangements are beneficial to taking up these opportunities—technology and otherwise. What about the arrangements that we have with our manufacturers and securing a supply of emissions-free buses? Are you looking at whether or not the current settings can ensure that we deliver that fleet within the time frame and that that fleet is Australian made?

HOWARD COLLINS: Another good question. I want to just comment briefly on some concerns our manufacturers had and were mentioned this morning. There is no doubt, in the previous life before—Rebecca will know because she worked in a similar area that I do now—we ordered several hundred diesel buses a year and it was like a production line. But the government took a brave decision to say no more diesel vehicles. So since 2019 or 2020 we haven't ordered a single vehicle and therefore the supply market has been impacted by that. But we now, with our strategy going forward, want to clearly lay out—and the government has set aside $2 billion. We're working on that final business case to ensure that we now convert over a production line that is sustainable for Australian manufacturers, over a period of time that will be 10, 20 or even 30 years.

The reduction in diesel fleet and the loss, perhaps, of those skills will be progressive. It's not as if overnight we're going to change. Unlike the steam locomotives in 1972, they didn't all switch off overnight and everyone had to drive a diesel loco. It's going to be done in a planned way, and the strategy, which I'm sure Ms Geraghty will talk about, is all designed about that. We've got more lessons to learn. There's no doubt we haven't got it perfect. But our intention is to have that strategy rolling forward, which does give continuous supply, an order book full for a number of organisations who wish to participate and a range of procurement options. Do you lease, buy, pay for the electricity and the bus at the same time? All those are things we're exploring in our strategy.

GILLIAN GERAGHTY: I am happy to add. The current procurement panel is looking to how do we optimise that for procurement of zero-emission buses. One of the things that we're looking at, and Mr Collins talked about, is the final business case that we're working on at the moment for the first tranche. And that is the different options attached to local content and how we can work with industry because there's probably enough capacity at the moment to deliver our current demand, but it's not going to be able to support us even in the short to medium term. So what we are looking at is there componentry, is it a local assembly? How do we make sure we're working across the supply chain to deliver on the supply that we're going to be looking at, which is in the order of 8,000 buses, which is considerable. Custom Denning, where both Mr Collins and I have been to is an amazing benchmark, but we would need to look at alternate strategies to be able to deliver on demand.

Ms JO HAYLEN: Alternate strategies being—

HOWARD COLLINS: Other manufacturers coming to the market. It is quite interesting to hear from Nexport, Volgren, other organisations. We will be delighted to have a competitive market with a number of manufacturers, and certainly I know my Minister is super keen to ensure that we get local manufacturing wherever possible. I think it is pleasing to see that what we're hearing is a competitive product if you have a long-term investment strategy.

GILLIAN GERAGHTY: And a plan. I think importantly that we're enabling through planning and being transparent with the tranches and the numbers—that we can enable industry to start tooling up and really being able to work with them on the packaging and all those sorts of things.

The CHAIR: That is very helpful. In a sense we have had two years of no ordering of diesel buses, obviously a lot of planning, preparing homework done. So when does the roadmap to the future come out for us all to see?

Mrs MELINDA PAVEY: Can I butt in and make a point there? You mightn't be ordering diesel buses for the Sydney New South Wales transport network but there are still buses being purchased that have diesel capacity for school bus runs et cetera which are also paid for essentially through state government contracts.

The CHAIR: True.

Mrs MELINDA PAVEY: As a country-based MP, with a bus manufacturer that does it tough, to transition and be part of the future, I just think it's an important part of that. If we are not going to be doing regional until 2047 we're going to need a hybrid model potentially—and because that company in my electorate is probably the biggest private sector employer in that town and they're probably only doing about 60 buses a year, which they could do more. There ends my advertisement.

The CHAIR: Indeed, we visited them, and it was a really valuable exercise. I think we heard during that visit, from stakeholders this morning and in submissions too, there is a sense of what is the roadmap forward. When will that become rather more clear, public and open and we can proceed with more certainty and clarity?

GILLIAN GERAGHTY: The final business case we're working on at the moment is around the Greater Sydney 2035 commitment and that will have much more detail in terms of how we're getting there. But we have been working with industry and the operators to inform that road map.

HOWARD COLLINS: Certainly, we are well advanced in that business case. I would say it is obviously dependent on funding, support and government policy. Minister Kean in June talked about setting aside $2 billion. As everyone knows, it's about how we smooth that draw on government funding, but I think this is quite an exciting area. I do believe New South Wales is leading the pack, although we're all Australian at the end of the day. As we said earlier, we have 8,000 buses and certainly several thousands in the regions. We do want to make sure we give people enough notice and we do want to ensure that it's sustainable over a long period of time. We hope the strategy will be out certainly within the next few months to understand what that means and what we can then go forward with government to say what the funding requirements are.

Mrs MELINDA PAVEY: I seek comment from you, Mr Collins, particularly in relation to some of the evidence today not only from the Bus & Coach Association but also Custom Denning to the new standards of panel four. Was it news to you that there didn't seem to be, from the evidence, collaboration? We have set a benchmark that is beyond any other country in the world.

HOWARD COLLINS: Yes.

Mrs MELINDA PAVEY: And I am actually from the government.

HOWARD COLLINS: I do understand that. Let me explain to you where we are with panel four. We do consult, and we have spoken to a number of people who contribute towards that. In effect, it is sort of a list of manufacturers who get on that panel. Panel three allowed us to move forward with Custom Denning joining that fleet. We look forward to others joining, if they can, panel four. The specific points which I recall this morning were about some of the changes which have been discussed about whether we use different types of materials for the buses. I understand that we are allowing more time for further feedback on whether panel four includes those requirements or not. I don't think it is going to actually be part of that panel four.

Let me explain because I think as I watched I was keen to contribute even this morning to say, "What is this all about?" There is no doubt that we have all witnessed the older traditional buses. We put in a lot of fire suppression for good reason, after people remember some bus engine fires—one, I think, dramatically on the harbour bridge—and the importance and insistence of a former transport Minister that every single vehicle had fire suppression for the engine. I can speak because obviously from my experience on the rail network in the London Underground, there are considerations that we like to look at about the make-up of the vehicle in other contexts—that is, the material used to construct.

We had, in the inner west, I think, a fire maybe a year or so ago, and a recent one in Liverpool where we just want to ensure that we are applying industry best-practice standards. This doesn't mean to say we're going to build a bus which can hardly move and only take three people because it has got different products. But I do think the rail industry, where fire suppressant materials are used nowadays, where we can still keep weight levels down, where we can look at the best practice design as we're procuring these vehicles for many years—that is this something we should consider. We might find it suitable. We may not find that it is actually necessary but the support we've had from our safety, environment and risk team has helped us understand what best practice is. That gives you, I think, the context.

People might say, "We've designed a New South Wales bus different to a Victorian bus". I think some of these things are simple things like—we did believe that those school flashing lights do help motorists understand when there are kids about. I think it's a great idea. I have never seen it before. We didn't have it in the UK and it's great to see that product. And some other things like handrails and some of the other specifications, I don't think are out of line with best practice. I am very keen—and I have been quoted on the rail industry as well as the bus industry—to see a more generic product that we can manufacture across Australia. But it is interesting to note the challenge often, as Custom Denning found, is that there seems to be a larger brick wall between states than there are between countries when it comes to who buys what. It's got to be a Victorian bus or a Western Australian bus rather than one made in Australia, which is surprising for me.

Mrs MELINDA PAVEY: It leads me to my next question because you have only got Scotland, Wales and Ireland to worry about.

HOWARD COLLINS: I'm Australian, don't forget.

Mrs MELINDA PAVEY: What conversations are being had with your agencies in some other states given this perfect moment in time where you have a desire of the whole country to increase our local manufacturing coinciding with a desire to be emission-free? What conversations are you having with other jurisdictions? How should those conversations be led? There was an example, as you heard, this morning from Birdon where potentially we should be looking at a transport construction Australia like an Infrastructure Australia? I am seeking your thoughts on that.

HOWARD COLLINS: I will ask my colleagues because I think we had a recent two-day conference on this area. I think even this morning some of the participants talked about the value that has for operators, manufacturers and grid suppliers. I don't know whether any of my colleagues would like to comment on the discussion.

GILLIAN GERAGHTY: I think Mr Collins is talking about the UITP organisation. I think the round table in particular on zero emissions—

Mrs MELINDA PAVEY: This is for Hansard, not me. I know what UITP is.

HOWARD COLLINS: It's a French name, UITP. We'll give Hansard the full definition, but it's not English.

GILLIAN GERAGHTY: There is a round table that they convene. They are an international body but they have a specific body for Australia and New Zealand. They convened a round table in 2021, which Transport for NSW actually sponsored, I found out today. That actually has all the agencies across Australia and New Zealand specifically looking at ZEBs, how they're being rolled out and looking at how do we manage it from a more common perspective rather than competitive perspective? Ms Morgan, would you like to add anything further to that?

JULIE MORGAN: No, that's spot on. I think it's important to note too that it's more than just buses.

GILLIAN GERAGHTY: Ferries.

JULIE MORGAN: It's actually seeing all the opportunities that could flow from this transformation, whether that's in terms of manufacturers, energy changes, changes to the grid, more renewable energy, the training and opportunities for people who work on these buses, and new skills and new industries.

Mrs MELINDA PAVEY: One of the challenges is our population, isn't it, in terms of the procurement and the supply chain going forward? It's having enough capacity to actually do the manufacturing.

JULIE MORGAN: That's right. It will really only work if we do it on a national level because of the size of the customer base.

Mrs MELINDA PAVEY: And potentially some export.

The CHAIR: Can I take you to the earlier statement around Sydney Trains achieving net-zero emissions—and congratulations on that—on 1 July 2021 under a number of agreements. Help us to understand, what does that cost the taxpayers of New South Wales relative to the alternative, in which there may be no agreements? Bear in mind the context you spoke of, in that 51 per cent of emissions are borne out of the train network. Help us to understand that picture and some of the costs of achieving net-zero emissions.

HOWARD COLLINS: I won't repeat myself too much, but we are delighted to be the first in the country to have 100 per cent renewable energy since July last year. We've partnered with an organisation which sees Sydney Trains purchase renewable energy certificates from that company to the end of 2030. We are linked with a solar farm. I would say Metro were ahead of us. My colleague here can obviously talk about the

procurement of complete green energy for Metro. Pricing, I would have to be very cautious about the commercial sensitivity of procuring electricity. But I would say that it is comparative and I do not believe it is a burden on the taxpayer for changing it. I think there's a huge benefit. It may not be directly on price, but there's a huge benefit of going down this green energy route, which is fantastic. I do think we need to do more for New South Wales users to understand that benefit, that every time you get on Sydney Trains or a Metro, you are actually now utilising the fact that it is green energy. Rebecca McPhee, I'm sure you'll be able to tell us a little bit about Metro and how you led the way on that one.

REBECCA McPHEE: Yes, I'm happy to add a little bit there. I also don't have any financial numbers for our network either on me. But I can say that we have done the cost-benefit analysis associated with that green energy purchase, and the benefits of avoided social and environmental impacts with that carbon emission reduction are valued, even conservatively valued, much greater than the cost associated with the power purchase.

The CHAIR: Bearing in mind the scale of it—again, trains being 51 per cent—can you perhaps furnish us with some detail? Given the proportionality here, help us to understand that analysis, those benefits? There's no question there are benefits, perhaps costs too. But help us to understand that analysis, how that's played out and how, therefore, it might also be applied to other forms of public transport as well.

HOWARD COLLINS: Because I used to be the chief executive of Sydney Trains I can give you a little bit of a history of electricity procurement. As people may know, we use a lot of it. The interesting thing about Sydney Trains is we started off with 900,000 customers a day in 2013 when I first started and we were on 1.4 million a day in 2018-19 before COVID struck. So we are using 35 per cent more power. We did, and have over many years, run a competitive process to ensure that we procure electricity using all the tools which were available, from hedging to the complexities that I probably couldn't start to explain, but I'm sure there are people who can explain that.

We did have the opportunity, when those contracts were ready for renewal, to consider some options, as we had done in the past, of whether taking this route in utilising, for example, Avonlie Solar Farm and Red Energy and their zero-emission products and put that into the process of re-tendering for the supply market until 2030. Through a process of analysis, the gathering of data and looking at the business case and the benefits, we believed, and were supported by government, that this was the best route to take, and added the best value for money when it came to New South Wales and those people who use Sydney Trains. If you want more detail on that, I think I'd have to call upon my specialists to share information with you or take it on notice.

The CHAIR: Yes. Take it on notice, if you don't mind.

HOWARD COLLINS: I think it's important to understand that we did, for several years, look at this. But, unfortunately, the price of going completely net zero—Metro's consumption will be bigger but, for the time being, it is about 5 per cent to 6 per cent of Sydney Trains' consumption—we didn't have the capacity. But the good news is in New South Wales capacity has been greatly improved by solar farms and by the industry taking on board the need for larger use of electricity, and we're probably the second or third in New South Wales to plug into this genuine alternative and green energy.

JULIE MORGAN: If I could add to that, Mr Collins. Sydney Trains consumes 1.3 per cent of the energy produced in New South Wales, so we're a big consumer. Moving the electrified rail network over to green energy was really important in sending a signal to the energy industry that government was prepared to purchase green energy. We also knew that the demand for green energy was going up and it was important to lock in those contracts early to get the best possible price.

The CHAIR: Thank you. That's really helpful.

REBECCA McPHEE: If I may also add, when Sydney Metro first entered into what was a long-term green power supply agreement, it actually resulted in the establishment and construction of a whole new solar farm out at Mudgee. It's a big site. It's 145 hectares and it's producing enough power to power the equivalent of about 25,000 average New South Wales homes. At the time that long-term agreement, which enabled the establishment of the extra capacity, was quite novel. I think it was the first for a transport project in Australia. It really has formed the template for a number of other deals since then.

The CHAIR: Thank you, that is very helpful. I know this inquiry is focused on the future but help us to understand, Mr Collins. You mentioned that, in terms of numbers of rail users, there were 1.4 million in 2018-19.

HOWARD COLLINS: Yes, per day.

The CHAIR: One of the themes, as you've heard and as we've certainly heard today, has been the impact of COVID upon public transport utilisation. Where are we at today? In the context of the zero-emissions

discussion, how do we, in a sense, use that to encourage the community to come back to public transport some more?

HOWARD COLLINS: That is an excellent question. I could probably spend all day talking about this because it is so fascinating. Having come from a place where we transformed the way Sydney Trains operated and we got a lot more people back on, and a lot of new people back on the network, it is actually heartbreaking to see that we're now down to 700,000 to 800,000, but recognising that things have changed. This is not just a New South Wales issue. I meet regularly with my colleagues in other states. They're in a very similar position—between 50 to 60 per cent of the people who used to use the public transport network, particularly on rail. But we are very keen and working through a number of strategies to see what we can do. If you just take school students alone, there are only two-thirds travelling than what there were before COVID-19 came along. We know that's because many people's lifestyles have changed and the availability for parents to think, "Well, I'm at home. I'll drop the kids off, and I can pick them up the next day."

We are very keen to think about the alternative strategies, particularly for that first mile, last mile and considering Mobility as a Service. I know my colleague in active transport, we are very keen to consider the zero-emission alternative of people using active transport, electric vehicles and having a range of products to use when you're deciding either to go to the station or bus connection or leave it. Again, in Zurich—and there's a few other cities in Europe—you have a sweet shop of choices when you arrive at Zurich station, to pick and choose your scooter, your bike or walk. We're very keen to encourage that. It is difficult. As I said earlier, we're a car city. There is a balance. We do need new roads to move, particularly freight, around. There's no doubt about that.

I would say that one of the exciting things coming our way is Metro through the centre of Sydney, which is a first for us. The last centrally based railway to be built was the eastern suburbs railway and, before that, Bradfield, in the thirties. I do think there is an opportunity on many fronts. Some of the speakers who contributed this morning really did hit the nail on the head about what we need to do in terms of encouraging people to leave their car at home. That four-kilometre journey, which is done by a lot of car drivers in central Sydney, should be a thing of the past. I know there are lots of excuses—it's raining, it's too hot or it's too cold. But I do believe that part of our strategy is to consider what we call Mobility as a Service, sustainability and the connection—so that your ferry does not miss the bus. Part of my role in the future, and certainly what we're doing now, is managing the surface transport operations and bringing together the coordination of bus timetables, ferry timetables and rail timetables under one roof.

Ms JO HAYLEN: Can I ask a little further on trains and things on rails? Congratulations on the move to green energy; I think it's fantastic. What's next? What are Transport for NSW's plans for electrification beyond the current network? I would also like to ask in relation to Metro—I appreciate that it is green energy for the current operations and construction. What about reducing emissions in the construction of transport itself? There is a lot of concrete, for example, to build a metro.

REBECCA McPHEE: We approach this hierarchically. Obviously, the first thing we do is try to reduce emissions wherever we can. If you look at construction emissions—by that, I mean in the construction activities and in the materials, like the concrete, the steel and the embedded carbon—and you compare that across the asset over its 120-year design life, that construction and the materials account for about 10 per cent of the overall carbon. The first thing we try to do is reduce those through the construction phase. We have got a huge number of initiatives that we do through that phase, like setting targets, using green energy during construction and even using biofuels—for example, the cranes at Martin Place have been biofuelled—and a lot of recycled materials, particularly low-carbon concretes. The concrete we use can be up to 60 per cent recycled. Other materials across the build—recycled plastic instead of steel meshing, for instance.

Across those activities on the two metros that we're building at the moment, that has achieved a 20 per cent reduction over a "do nothing". We're really keen to ensure that we independently verify some of those activities. We do work with, for instance, the sustainability council and the green building organisation. The next step for us, and this is part of our strategy going forward, is how we can take that further and how we can achieve a pathway towards true net zero through construction and operations. That is underway, planning for our new metros.

Ms JO HAYLEN: Are those settings different to other construction across Transport for NSW?

HOWARD COLLINS: I certainly believe the good work that Metro has done to date has got the construction industry thinking when we are doing road projects, which are outside of Metro's jurisdiction, or major other construction works and building designs, from commuter car parks to the rail operations centre, where we've used best practice in terms of emissions. Energy control of the building and all of those things certainly have moved forward. To answer your question about what else is Transport doing, obviously, we've talked a lot about

buses and ferries—I'm sure Ms Morgan will say we're trying to focus on the big things before we go through the smaller items. There is a range of other activities that we're involved with.

Certainly, even from a simple, more straightforward station design and utilisation of solar panels, whilst they are smaller in overall carbon savings, we believe that we want to wash our face and be clean about all of our locations. Those small things add up in terms of energy savings. If you save just 5 per cent of your station electricity bill, that's hundreds of thousands of dollars every year. When I was on the Tube, I ran an energy competition. What was fantastic about it was that stations were trying to save as much energy as possible. We saved over £1 million worth of energy by just having the staff manage their own electricity. I can tell you a story that, once, someone went in at night to the station, and the station staff just had torches because they wanted to save—

Mrs MELINDA PAVEY: They wanted to win.

HOWARD COLLINS: —as much electricity as possible. It probably wasn't the right concept, but I think the opportunity for us to engage our staff and the manufacturing and construction industries is all part of our strategy going forward.

REBECCA McPHEE: Mr Collins, we should probably also mention the bi-mode train.

HOWARD COLLINS: Certainly, the regional train, which is on order through CAF [Construcciones y Auxiliar de Ferrocarriles] —

Mrs MELINDA PAVEY: It's a long time coming.

HOWARD COLLINS: A long time coming. The good news about that, and the decision we made way back in 2017, I think it was, was that we wanted to design a train which could be slingshot out of Sydney or to Sydney using electricity that is now zero emission or green energy, but then also have the capacity to operate in a bi-mode using the most efficient diesel engines, with low levels of pollution, for the regional journey out further. You asked a question about extending our electrical network. I love reading history and, certainly, the Gosford electrification and the electrification south of Sutherland changed the world when it came to rail commuters—from coming out of a railbus, diesel experience which stopped people ever going further south than Sutherland to now connecting cities. We are always considering what those options can be. We're a little bit constrained by the current ownership or leasing arrangements— Australian Rail Track Corporation [ARTC] versus the Sydney Trains network—but I do believe there are opportunities in the long-term future. Part of our new strategy for transport is considering those options.

Mrs MELINDA PAVEY: So electrification beyond Newcastle?

HOWARD COLLINS: I won't be saying that is a possibility or is going to happen, but I would say that the important thing to understand is, if you read the latest German report, Germany is electrifying its whole network. That is a major, significant step forward considering its relatively low levels of electrification at the moment.

The CHAIR: And having regard to the cost of energy in Germany at the moment as well.

GILLIAN GERAGHTY: Can I go back to your question about other projects outside of Metro? Ms Morgan might be able to add more. We've just led one of the largest industry initiatives in regard to sustainable procurement in infrastructure. That was really trying to identify how we are developing and delivering our projects in a more sustainable way. Ms Morgan, do you want to add more to that?

JULIE MORGAN: Absolutely. You're right; concrete and steel, we use a lot of them. They're two of the hardest-to-abate industries. We deliberately went out to industry earlier this year—I think it was March—with the sustainable procurement initiative and said, "We're actually going to need to do this with industry." We realised we need to co-create these solutions—so picking up on a lot of the good work that Metro has done, but making sure, at the same time, that we shift the dial on the carbon quantities in the materials that we're purchasing. We've had pretty good sustainability performance on our big projects, but what we're doing is embedding baseline sustainability requirements in all our projects across transport. Embodied carbon is something we're very focused on.

Ms JO HAYLEN: Can we talk about ferries? We heard some really fantastic evidence from some of our maritime manufacturers and we had the pleasure of going to Port Macquarie and seeing Birdon in operation. I'm interested in all your views about the River class and the potential conversion, also about their discussion about hybrid options while at the same time looking at the energy supply challenges. I'd also ask whether or not you've looked at shorter point to point type routes with smaller vessels, and I appreciate there is one in operation

down at Barangaroo. What other options are being considered in that space both from a passenger point of view and from an emissions reduction point of view?

HOWARD COLLINS: It was good to hear and certainly our conversations with industry are very similar to those which were shared this morning about how it is good to see Australia does have a worldwide capability of providing vessels but also the consideration of what the steps are through to more sustainable and zero-emission ferries. As described this morning, power utilisation in Sydney, and even in Newcastle, has almost two requirements. There's an inner harbour river journey experience, the F3 and the Inner Harbour, and then there's quite a different requirement for almost a semi-seagoing vessel which goes between Circular Quay and Manly, and for years we've obviously had the benefit of our great Freshwater fleet.

We have renewed 10 River class ferries through Birdon and also both Emerald 1 and Emerald 2 class ferries, and the design certainly of River class was to look at the capability of conversion. We are discovering as we talk to more of the experts in this industry, as of yet the stop-start requirement, as very eloquently described by the representatives from Austal, it is very difficult to actually demonstrate there is a product today out there which is fully electric. The transition, I do believe, may be hybrid to start with, with very efficient, low-pollutant, diesel-charging electric batteries.

I have already had a presentation from the fantastic work in Wellington where to see this fairly large catamaran, electric only, travelling in Wellington. It is fantastic. The very big difference is it's made out of carbon fibre. It's not quite *Wild Oats* or New Zealand equivalent, but it does show that the one issue which causes ferries to not get to fully electric yet on those short, sharp journeys are about weight and the design of the vessels. But we're watching the market very closely. We are very keen to explore the options of hybrid and we also are very keen to understand how we can get Australian manufacturing for our ferries back on the horizon. We're working and understanding what the strategy is as we speak about how we can do that.

Ms JO HAYLEN: Can I ask whether the options of those potential smaller emissions-free ferries might actually change the on-water public transport offerings? Have those shorter trips been considered?

HOWARD COLLINS: Yes. I think it's a bit like the rest of public transport. Generally speaking, the benefit you get from higher-volume individual vehicles versus the 1.1 people who travel in their steel boxes most days does leave itself to vessels of at least 50 to 100 to 200. We have worked very closely with the National Roads and Motorists' Association [NRMA] who have really pioneered that small vessel, but its maximum speed is four knots. It can't really cope with currents or big swells, so it's great for those little journeys. That may be a future strategy, but generally speaking we are looking at how we renew those current well-used formats of getting to Parramatta, going into the harbour and connecting what is a fantastic ferry network, and also Manly as well.

But we are talking about and talking to people in the future of what could be the options in terms of both hybrid and a full electric fleet in the future. But we're not there yet, and if anyone tells you that in Scandinavia they've got this, as I think the experts in the field who are the manufacturers will tell you, there's no equivalent full electric vessel of high capacity able to do the stop-start almost bus journey-type experience that we have in Sydney. Yes, in Norway you can plug into your HEP and you can make a pretty big ferry journey and all electric, but it then stops and gets charged for several hours before it goes back the other way.

The CHAIR: Do you have any comments, counsel for us or otherwise in relation to other providers of public transport that perhaps are not within your remit? I think this morning was mentioned community transport, disability transport, and obviously you've got taxis and others. Do you have any reflections, thoughts or otherwise on those elements?

HOWARD COLLINS: I don't know whether my colleague Ms Morgan might be able to comment. Obviously Transport for NSW provides some regulatory control over point to point, for example, through the regulation but also other forms of ensuring that vehicles are compliant. We're very keen if there's anything more we could share on that.

JULIE MORGAN: I think just to say the New South Wales Electric Vehicle Strategy is probably the key to many of those services converting over to battery electric vehicles. The supply and availability of battery electric vehicles coming into New South Wales will increase and it will become increasingly financially attractive for those providers to switch over to electric vehicles.

Ms JO HAYLEN: I have one further question. It's concerning that we are only at 16 per cent to 17 per cent of people using public transport. I do think one of the huge opportunities is the new generation that doesn't want to be in their cars because they want to be on their phones. We talk about Mobility as a Service and the appeal of green power and emissions-free travel. How far away are we from a technology solution where

I open my phone and I'm given a range of different transport options and it also includes green options within that remit?

Mrs MELINDA PAVEY: Green point to point?

Ms JO HAYLEN: Exactly. I might be convinced not to use my car today because it might take about the same time but also my other options are going to be green options. You can open that in Google Maps in other cities of the world and it's all available to me. How far away are we from that here in Sydney?

HOWARD COLLINS: I'll give a general view, and I don't know whether my colleagues can. Joost de Kock, who is the Deputy Secretary for Customer Strategy and Technology, can again talk about this very eloquently. We are catching up I think is our view. We are looking at a number of options in terms of sustaining and perhaps providing that service through Opal+, for example, which will allow people to make all sorts of journeys and get better discounts for more greener type journeys. We want to make sure that the mobility of services are connected products, so you don't have to fumble for one app for the next app to get on your Lime scooter or whatever. We want to make sure that there is a one-transport product, and you can see in Europe that has been successfully rolled out in Berlin and many other cities in Europe. We are certainly on that journey. I don't think we're there yet, but there is some quite exciting stuff coming forward.

I do like the idea of explaining to people as they're travelling on the journey, whether that's something in the display of a train or at metro stations, how many megawatts we're generating or how we're actually doing that in a very public way. I do think the other thing, which is a bit of a hobbyhorse of mine, is understanding the hidden costs of using your vehicle. I often say, and it's not a flippant comment, we should have a big meter in every car which ticks down the depreciation cost as it sits in the garage or whatever, because people say, "Gosh, my fares have gone up"—our fares are extremely low compared with many other countries—"I'm going to jump back in my car."

Many of those things, I think, we need to share more and give, particularly to the younger generation who are asking for it, real truth and a sense of what am I doing, what is the carbon I'm using, what are the journeys I'm making in terms of sustainability. Whilst people of our generation are still driving V8s and all sorts of stuff like that, which is fantastic for them, I think there is an opportunity for us to remarket and make sure, as Transport, we are clearly giving those people options. A bit of a—more than a personal view, but I do think that's important to recognise. I don't know whether any of my colleagues want to add to that?

JULIE MORGAN: Absolutely. In developing our sustainability plan we talked about the eight focus areas for Transport, and empowering our customers to make sustainable choices is certainly one of those focuses. We would be planning to promote the fact that Sydney Trains is now powered by green energy, because obviously that's a low-carbon option. In terms of the app you're talking about, I think that would be fantastic if we had that. But we probably also need to let the providers of point to point transport catch up and more and more of the buses come into the network to make it viable.

The CHAIR: Very well. Any final remarks?

HOWARD COLLINS: Thank you for the opportunity to allow my experts to talk and for me to generally waffle on a bit. I really think it's a great subject and we really did find this morning's—even the feedback, listening to the other points, was very useful for Transport for NSW, so thank you for that.

The CHAIR: Thank you so much. We thank you for your service to New South Wales, your commitment obviously to what is at the core of this inquiry, and we appreciate your remarks and inputs to the effect that New South Wales is leading the way. We appreciate your hard work, service and commitment to that. Thank you very much for your time today. So thank you, again, for appearing before the Committee. May we also send you some further questions in writing? Your replies will form part of your evidence and be made public. Would you be happy to provide a written reply to any further questions?

HOWARD COLLINS: Yes.

JULIE MORGAN: Yes.

(The witnesses withdrew.)

The Committee adjourned at 15:27.