T R A N S C R I P T

LEGISLATIVE COUNCIL ECONOMY AND INFRASTRUCTURE COMMITTEE

Inquiry into the Closure of the Hazelwood and Yallourn Power Stations

Traralgon—Wednesday, 2 March 2022

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WITNESS *(via videoconference)*

Mr Jeremy Stone, Non-Executive Director, J-Power Latrobe Valley Pty Ltd.

The CHAIR: The Economy and Infrastructure Committee public hearing for the Inquiry into the Closure of the Hazelwood and Yallourn Power Stations continues. Please ensure that mobile phones are switched to silent and any background noise is minimised.

I wish to acknowledge the traditional owners of the land, and I pay my respect to their elders past, present and emerging. I welcome members of the public that are watching via the broadcast or are in the gallery today here in Traralgon.

My name is Enver Erdogan, and I am Chair of the committee. I would like to introduce my fellow committee members that are present here today: Ms Melina Bath and Mr Rod Barton.

To the witness appearing via Zoom—Mr Stone—all evidence taken at this hearing is protected by parliamentary privilege as provided by the *Constitution Act* and the Legislative Council standing orders. Therefore any information you provide is protected by law; however, any comment repeated outside the hearing may not be protected. Any deliberately false or misleading evidence can be considered a contempt of Parliament.

All evidence is being recorded, and you will be provided with a transcript following today's hearing. Ultimately transcripts will be made public and put on the committee website.

We welcome any opening comments but ask that they be kept to a maximum of 5 to 10 minutes to allow plenty of time for discussion and questions with the committee. Could you please begin by stating your name and the organisation you are representing for Hansard. Over to you.

Mr STONE: Thank you, Mr Chair and committee members. I am just going to share my screen; just give me one moment. My name is Jeremy Stone. I am a Non-Executive Director and adviser to J-Power Latrobe Valley. J-Power is one of the organisations that is part of the Hydrogen Energy Supply Chain project. If it is okay with you, I would like to start my presentation. It is on PowerPoint, and I can supply it after the presentation. It will go for around about 10 minutes. The purpose is to provide you all with a common understanding of what we have been doing and why we have been doing this.

Visual presentation.

The CHAIR: Thank you, Mr Stone. The presentation is up and we can see it clearly, so please begin.

Mr STONE: Thank you very much. This project is a world-first project that aims to produce carbon-neutral hydrogen extracted from Victorian coal and biomass with carbon capture and storage. The purpose of this project is to reduce CO_2 to help reduce global warming, a very critical and urgent activity for all countries around the world. This was initially a Japanese initiative, and the reason why Japan are so focused on hydrogen is because currently they import around about 90 per cent of their fuel as fossil fuel and they have a target to reach carbon neutrality by 2050, so they need a clean, versatile and cost-effective energy source which can replace that fossil fuel. They were the first country, in around about 2017, to have a hydrogen strategy. Australia had a hydrogen strategy developed and released in December 2019, agnostic in terms of the way the clean hydrogen was to be produced. Australia's opportunity—although there is some need within Australia to be consumers of hydrogen, the great opportunity is as export to countries like Japan and South Korea.

For those not familiar, hydrogen is a clean-burning fuel. It only emits water. It can be used, for example, as an export. It can be used for heating. It can be used for making chemical feedstock, such as ammonia, and transportation, such as a fuel cell electric vehicle—in comparison, you have got a battery electric vehicle—and it can also be stored and used for energy and electricity. Right now there are around about 70 million tonnes of hydrogen per year around the world produced from fossil fuel without carbon capture and storage, and the Hydrogen Council estimates about an eight-time increase in hydrogen requirements and demand by 2050. That would provide a huge hydrogen economy, about 18 per cent of the energy demand and about $2.5 trillion in annual sales. So it is quite a major opportunity and one which Victoria and Australia can be part of.

Our hydrogen energy supply chain project consists of two phases. The first is the pilot phase, which we are close to completing, and that is to demonstrate that hydrogen can be produced through the extraction of Latrobe Valley coal and biomass and safely transported to Japan. The full-scale project at this moment we estimate at around about 225 000 tonnes a year of hydrogen through Latrobe Valley coal and biomass with carbon capture utilisation and storage. In a snapshot the project consists of, going from left to right on the screen, coal gasification and refining—so at high temperature and pressure we extract out the hydrogen from coal and biomass. With that hydrogen extracted for the pilot we then load that into a tube trailer truck and take it down to the port of Hastings, where Australia's first liquefaction facility has been built and operated. Then that gets loaded onto a world-first liquid hydrogen carrier, which we have already built, and gets transported to the port of Kobe in Japan. Actually that ship arrived in Kobe last Friday. For the pilot phase we have estimated CO_2 emissions of around about 500 petrol-driven vehicles, and for that we have purchased carbon credits. But for the commercial phase we will have carbon capture and storage, which we will talk about a bit later. This is a very significant project, around about $500 million worth. We recognise the financial contributions and leadership of the Victorian government, the Australian government and the Japanese government, as well as many private organisations which you see on the screen.

The hydrogen can also be produced from renewable energy, and we often get asked: why would you produce it from a fossil fuel with carbon capture and storage? And there are three main reasons: urgent emissions reductions, the scale of the challenge and the economics. At full commercial scale we estimate that our project would save around about 1.8 million tonnes of CO_2 per year, roughly equivalent to the emissions of 350 000 vehicles. Now, we have a major scale issue here. Alan Finkel often uses this as an example. To export the equivalent of the 70 million tonnes we currently export in natural gas we would need about 30 million tonnes of hydrogen, and to do that we would need eight times Australia's electrical generation in 2018. So eight times what we currently produce or did produce in 2018 would need to be developed and get online to produce the equivalent of hydrogen. So there is a very major, major scale-up issue. Thirdly, the cost of hydrogen—this is from Goldman Sachs, but other research has been done: hydrogen produced from a fossil fuel with carbon capture and storage is around about a half to a third of the cost of renewable hydrogen. That will always be the project dependent, but that is the order of magnitude. So that is currently quite a big cost saving.

If you are not aware, the gasification refining is in Latrobe Valley. We transport the hydrogen by road down to the port of Hastings, where the liquefaction facility is. All elements have been built. This is the gasification and refining facility at Latrobe Valley. This is the liquefaction facility at the port of Hastings. This is the world-first liquid hydrogen carrier, which was in our waters, in Gippsland waters, about a month ago. And this is the port of Kobe, where it arrived last Friday to discharge the hydrogen.

In terms of the project time line, we are wrapping up the pilot operations and concurrently looking at commercial pathways with the aim to have a commercial phase operating by the end of the decade.

In terms of the commercial vision, it looks similar to what you saw in the pilot. The two main differences are: rather than trucking the hydrogen to a chosen port, we would have the hydrogen pipeline; and the second most important change is we would have a carbon capture, utilisation and storage system.

My final few slides are really talking about carbon capture and storage, often spoken about. We would like to just present some facts as we know it. First of all, if we proceed to a commercial phase, we will have a carbon capture, utilisation and storage system. There are 27 facilities which have been built over the past 45 years, which have safely stored 40 million tonnes of CO_2. That is the equivalent of around about 8 million vehicles. There are another 135 CCS projects around the world in various stages of development—so in the US, in Canada, in the UK, in China, in Asia, in the Middle East and of course in Australia. So many, many countries see this as an additional pathway to hit our carbon neutrality targets.

CCS is also supported by the IPCC and IEA, the International Energy Agency. The aim here is ultimately that this is another pathway, being very pragmatic, and rather than talking about colours of hydrogen, the aim is to be talking about the carbon intensity of hydrogen. Australia is developing a guarantee of origin scheme, which will ultimately indicate the intensity of carbon, for example, per kilo of hydrogen, and that will become a tradeable platform. So that will be far more credible and accurate about the carbon intensity, allowing the customers to decide what they want—the carbon intensity of their hydrogen and also the price point of their hydrogen.

Specifically, the CarbonNet project, jointly developed by the Australian and Victorian governments, is not far down the road from where the hydrogen source is. They have been in development for 10 years. They have an estimated 31 gigatonnes of CO_2 capacity, which is around about one year of the world's emissions, so a very significant storage capacity. There are decades of knowledge of the depleted oil and gas reservoirs, so basically what they will do is inject CO_2 into the depleted oil and gas reservoirs. It is like reverse engineering. So once they have extracted out the oil and gas from these natural rock formations which have been safely storing oil and gas for millions of years, they will inject the CO_2 into them.

The final two slides—we think in Gippsland there is a huge opportunity to be a player in the hydrogen economy. It has been awarded a hydrogen technology cluster by NERA. Gippsland has excellence in power generation, existing skills and assets, a huge amount of existing infrastructure, can support all forms of hydrogen production and has a world-class carbon capture and storage facility, nearby the hydrogen source in this instance.

To wrap up, we believe hydrogen in Gippsland is available. There is an opportunity for us in terms of the HESC project. It will provide quick emissions reductions. It will provide jobs; we estimate about 1000 jobs a year, so a 30-year project would generate 30 000 jobs for the region and provide export and investment income into the region as well as Victoria. With that I will stop, and thank you very much for the opportunity.

The CHAIR: Thank you, Mr Stone, and thank you to J-Power and you for that presentation. It was very informative about the work you are doing and your proposal. On that note, I might pass on to committee members to ask some questions. Ms Bath, would you like to go first?

Ms BATH: Thank you. I hope you have got 3 hours, Mr Stone, because I have got so many questions and they are still formulating in my mind. First of all, congratulations on being part of HESC. I think it is a very exciting venture, and I would love for it to be more than a venture, for it to be a reality and to create at the end of the day long-term sustainable jobs in our region and mitigate climate change by reducing our CO_2 emissions. On that point, you raised green, blue and brown hydrogen. Can you unpack that a little bit more? You talked about a guarantee of origin that can be tradeable and carbon intensity. Just kind of unpack that a little bit more. Should we be—what is the right word?—snobbish about the colour of our hydrogen, or should we be focused on carbon emissions? And how do they play? How can one play into the other and support our economy?

Mr STONE: Well, first, thank you for the question. At the dawn of the hydrogen economy I think colours have been useful because it is relatively simplistic and gets the people starting to understand the differences. So green hydrogen is often referred to, or renewable energy and splitting water into hydrogen and oxygen is known as green hydrogen. Blue hydrogen would be a fossil fuel, such as what we are proposing with carbon capture and storage. And grey hydrogen is really what is being currently used for the 70 million tonnes a year, which is a fossil fuel without carbon capture and storage. So there are basically three colours which we work towards. But often it is a bit more complex, like most things are, and it does not really describe the carbon intensity of some of those choices.

What the Australian government is heading towards and other international jurisdictions are working towards is, rather than referring to it as a colour, they want a credible and transparent understanding of the carbon—CO_2—intensity of the hydrogen they are purchasing, because every customer has their own targets to achieve, their own carbon reduction targets. So rather than dictating that they have to have hydrogen zero intensity, the hydrogen guarantee of origin scheme will enable the customers to decide what carbon intensity they want and what price they have to pay for that. So if you can imagine us going into a petrol station now, we can choose between 91, 95 and 98 petrol, and we will make that choice based on what we need for our engine and also the price we are prepared to pay for it. Hydrogen, particularly as it starts off as a global tradeable commodity, this will provide maximum flexibility and get the hydrogen industry going, and through that ultimately the customers will decide what they want in terms of carbon intensity and the price.

Ms BATH: Thank you. Fascinating. I am interested too in the storage of energy. The one thing that our baseload coal power stations have provided is flexible and dispatchable—to meet the needs of our state/country, and we are hearing battery power is going to be fabulous. The most recent battery that we hear about from EnergyAustralia is going to be able to produce 4 hours worth of battery storage. Can hydrogen, as a fuel cell, be expanded to be, say, an energy storage other than in our vehicles and the like?

Mr STONE: Absolutely, yes. That is one of the benefits. It is a versatile energy. So, for example, it can be actually shipped as energy across to places like Japan and South Korea, but equally it can be stored in our cities and in our remote locations around the world, and therefore it can be used as a dispatchable energy source. Right now there is a lot of work and research going on in hydrogen-powered generators as well as ammonia-fired generators, so therefore even as peaking loads and base loads, that will become another alternative, another energy opportunity, for the countries of the world. Rather than just relying on batteries, the choice will be by communities, governments and customers to use hydrogen or ammonia as their dispatchable energy storage and peak loading, if that is what is required, as well.

Ms BATH: Thank you, Chair. Mr Stone, one of the key things that we are talking about is jobs for the future, jobs in the valley specifically, noting, I think it was, in about 2014 that both the federal and state governments put in $50 million, a Japanese consortium and government, an enormous amount of money. What do you see the needs of investment from the likes of HESC projects in the valley from either—we are talking about state government at the moment. What do you see are your needs, and how can you articulate them? Do you have a figure that government may invest in the future, or what are your needs? We need to write recommendations in this inquiry. What is a recommendation that we should put to the Parliament of Victoria?

Mr STONE: Well, it is the dawn of a new industry, so there are many things which need to be done: first of all, strong leadership in promoting an agnostic approach to getting this industry up and away, so like the Australian government, whether it be—going back to colours—blue or green hydrogen, support or whatever it is, as long as it is clean and the CO_2 carbon intensity is known and down. So first of all is that sort of work level of support. Policy support in terms of the ability to use hydrogen in our communities—so enabling the demand, because we need to get the demand up to enable the production to be cost effective, so looking for policy support in encouraging organisations to adopt hydrogen as another energy source.

In terms of financial support—I am sure there will be some financial support required going forward—we have not determined what that will be yet because we are unfamiliar as yet with ultimately the scale of our project and the timing of that project, but there will no doubt be some financial support requested. It is worth noting in that regard that if we were to build a commercial phase HESC project, many of the facilities could be used for any form of hydrogen production. So we are talking about coal and biomass, but it could be renewables, so our hydrogen pipeline and our liquefaction facility in the port would be open for any form of hydrogen production. So investments, even in our project, if we were first, would also provide investment into other clean hydrogen production pathways, so we would see that as a great advantage.

Ms BATH: As they come online and develop and grow the proportionality can shift.

Mr STONE: Exactly, and I think what we are seeing here is we need to move fairly rapidly. So every state and territory of Australia, for example, has hydrogen activities, hydrogen initiatives. The state governments and territory governments are putting a lot of money behind their opportunities. Victoria happens to be the first, which is fantastic. It is also worth noting that many other countries in the world are also pursuing the hydrogen export industry, so we need to move quickly, otherwise I do fear that we may miss this opportunity, particularly on exports. So far the Victorian government have been very supportive over a number of years, but the next phase is the most challenging phase and we will continue to need their support.

Ms BATH: Thank you. Chair, I have many more, but perhaps I had better—

The CHAIR: Yes, we will give it to Mr Barton, and then we will probably get more time at the end. Mr Barton, over to you.

Mr BARTON: G'day. This is an area I too am very interested in, and it is something that I have been following for a little while now. We are now seeing a situation about energy security with what is happening in the Ukraine at the moment; it is affecting our fuel prices. I think this is a great opportunity for Australia and obviously down in the Latrobe Valley, down here. I think I am correct in saying that Toyota has got a plant over in Altona doing a hydrogen trial. I do not think the public understand at the moment. We are in a situation, and certainly from some conversations I have had with some universities, they believe the swing to batteries in EVs at the moment is a 10- to 20-year project and when that price point gets right our cars, trucks, trains and ships will all be hydrogen. I do not think that message is out there for the public to understand that we are actually going through a shift there. So I think it is a pretty exciting thing going on down there. The only part

that I have some real concerns about is the carbon capture. In our documentation here about Bass Strait—could you just go again about the time frame? Like, is there 50 years worth we can put into there or 100 years or 200 years? What capacity have we got?

Mr STONE: Well, on the specifics it is best to deal with CarbonNet, because it is their project. It is not our project. We are running in parallel because we need each other. So they estimate about 31 gigatonnes of storage. As I mentioned, that is more or less the world's emissions in any given year. So in terms of how many decades or centuries it has, the capacity would be significant. I could not tell you the exact amount, because it depends on how much CO_2 is going in, but the amount of CO_2 is relatively small compared to its storage capacity, so I think we have got decades of available opportunities there.

The other important element you were mentioning was energy security. Personally, I do not think there is any perfect solution which exists out there for clean energy, so I take a pragmatic approach, and our company does as well. We need to have a range of clean-energy, low-carbon solutions, because we do not have time to keep waiting for a perfect solution.

I just wanted to make that point. We are not saying this is the only way of going about this; we are saying this is a very pragmatic, meaningful CO_2 reduction project which will provide a great opportunity for the valley and Gippsland as a whole to transition and transform itself into a clean new cluster, because the hydrogen produced does not just provide energy but also provides, if wanted and if required, feedstock into other industries, such as ammonia and urea and building products and other chemicals and things. So it provides the opportunity for the valley to actually grow and develop a whole range of new industries, and I think to me that is a very exciting path. Also it is worthwhile noting that our by-products, including hydrogen and CO_2 and even nitrogen, can be used in other forms of industry. So we want to pursue a circular economy and try and use and re-use as much as of our by-products as possible. Even the CO_2 has great uses in the beverage industry, the food industry, the fertiliser industry to make building products. So these are other opportunities which Gippsland and the valley can have coming off a hydrogen project using our form of production.

Mr BARTON: Yes. That is it, I think, Chair.

The CHAIR: Thank you for that. You touched a bit on some of the infrastructure that is needed, such as the port of Hastings. What other infrastructure would be needed in our state for this kind of industry to develop, besides the port of Hastings?

Mr STONE: We certainly have not chosen the port of Hastings as the location of the commercial phase—there will need to be a lot more work done there—but that is obviously an option. So there is the infrastructure to produce and transport the hydrogen for export, but I think equally there is the demand side, the Victorian demand side, of hydrogen. So the infrastructure for the demand would be hydrogen refuelling stations. There is the opportunity for, in Victoria, hydrogen to be injected into our existing gas pipelines to lower the carbon intensity of the gas. So if we can inject, for example, up to 10 per cent by volume of hydrogen into the gas mains, we will have a demand for hydrogen which helps lower the cost of production but also lowers the carbon footprint of the gas used across industry and homes. So I think initially the opportunities are fuel cells; procurement opportunities for the state government to procure fuel cell electric vehicles like trucks, buses, trains and trams; and also the infrastructure for gas injection, for co-firing gas in our mains.

The CHAIR: For the procurement, I guess this is a developing technology as well, this marketplace. Are there opportunities in Australia, in Victoria, for some of those industries to develop in terms of, I guess, hydrogen fuel technology? Or is Japan the leader? Who are the leaders in this space at the moment?

Mr STONE: There are many parts to the hydrogen chain. Obviously Japan is going to be a great user. They have invested a lot of their efforts into working out the technology, such as our project, the world's first liquid hydrogen carrier. But I think the opportunities for Victoria exist again in the demand side as well. I believe one of the hydrogen fuel cell motor companies has recently signed an MOU to set up an operation in Victoria. I cannot recall—it is worthwhile checking—but I am pretty sure that exists. It could be Hyzon. So I will preface that by saying I am not 100 per cent sure, but that would be a great opportunity. I think again, given that this is a world-first project we have done in Gippsland and in Victoria, we have that opportunity to further develop it. We have worked with the CSIRO and we have worked with Federation Uni in all of our research to date, and we want to continue that. That can end in commercialised—not just through our project but other projects

across Victoria, Australia and the world. So I think these are the opportunities, but it needs ongoing investment and focus.

The CHAIR: Thank you for that. At the moment that is all I have. I might pass over to Ms Bath to ask a couple of additional questions.

Ms BATH: Thanks, Chair. Thank you. That is great. I am interested in biomass, because we hear and see there is wastage in our society and I believe we should be all going down to zero waste, if we can, or recycle et cetera. So can you unpack a little bit more about hydrogen and biomass—explain that to us?

Mr STONE: Sure. So if we were just to use coal and extract the hydrogen out of coal, we would deem that a low-carbon solution or clean—and often these words get mixed—solution with carbon capture and storage. We have successfully trialled a mix of Latrobe Valley coal with biomass to produce pure hydrogen. The purpose of using biomass is we can become carbon neutral or have that carbon intensity zero.

Ms BATH: Can you define biomass, explain that?

Mr STONE: Yes, absolutely.

The CHAIR: And biofuel as well, if you can, because they are kind of interrelated terminology.

Mr STONE: Sure. In terms of what we have used, we have used wood-based material. It is early days, but we have proven that we can do it in terms of technology. Our vision is to use waste timber from, for example, the construction industry—there is a lot of waste timber in the construction industry—and waste from plantation, so all the debris and unused timber from plantations, and if we need more biomass we would use dedicated plantations. That would be currently our three focused sources of biomass.

Ms BATH: And incorporating that into the process of making hydrogen, you are saying you are making it more towards zero in carbon intensity. Is that correct?

Mr STONE: Yes. So depending on our carbon capture and our percentage of biomass, it can be carbon neutral, and as an absolute minimum we can lower the carbon intensity, again giving the customers the choice about what they want in carbon intensity and the price point.

Ms BATH: Thanks, Chair. And from my point of view, finally, the HESC is a trial. At what point along the next few years will you, as J-Power, as part of that consortium, say, 'This is what we need to develop it into a full-scale industry in the valley?'.

Mr STONE: The foundation milestone we need is offtakers. So we will ultimately need a customer or customers to sign offtake agreements, and what that really means is they commit to purchasing a certain amount of hydrogen per year for a number of years at a certain price. With that we can then have, let us call it, a bankable project. And again the analogy might be an apartment building, where it is rare that an apartment developer builds the apartment block with the hope they may sell the apartments later. They would typically want to have a certain number of committed purchasers. So it is not that dissimilar to our project. We need committed offtakers, and that is what we are spending so much time on now. And that is why I had mentioned the Victorian government can play their part in that, because they could also encourage offtakers of our hydrogen produced to be used locally so it is not just an export-driven project but equally there is a demand locally. Once we can get a certain critical mass of offtakers and prices and lengths of time, we then can commit to a certain scale of project and then design and then build the infrastructure to suit. So that is the journey.

The CHAIR: Just to follow on from Ms Bath's question, just additionally, because we are talking about it: so you are saying you need effectively pre-sales, I guess, or prepurchases. Which sectors do you think are most appropriate for this kind of hydrogen energy to be deployable or suitable for?

Mr STONE: In Victoria, I think, fuel cell electric vehicles and injection into gas mains to lower the carbon intensity of the burning of gas. Export-wise we are really looking at countries like Japan and potentially countries like South Korea, for example, who are large fossil fuel energy importers at the moment, so we would need those countries and therefore the organisations in those countries to commit to purchasing. So it is a confirmation of their order. They have not purchased it, but they are purchasing it as an offtake agreement for maybe 15 years, for example, it could be, and then we can actually—

The CHAIR: And you did state that the Victorian government is leading the way in terms of the initial contribution and the commonwealth government has contributed too. Is that right?

Mr STONE: So for our project the Victorian government contributed $50 million and the Australian government $50 million, and the remaining $400 million was the Japanese government and organisations such as ourselves.

The CHAIR: Okay. Thank you for that, Mr Stone. From me that is all. If there are no other questions, on that note, on behalf of the committee I would like to thank you for your submission and your presentation. It was very informative. I know for me it was very, very informative; I do not have the same level of background as some of my committee colleagues in this field of energy. It was a pleasure to have you on the committee. If we have any additional questions, are you happy for the secretariat to reach out and put them to you? And you would be happy to respond in a timely fashion?

Mr STONE: Absolutely. Thank you very much for your time.

The CHAIR: Thank you, and thank you to J-Power for your time.

Witness withdrew.