Hazer Enters Japan With Hydrogen Facility

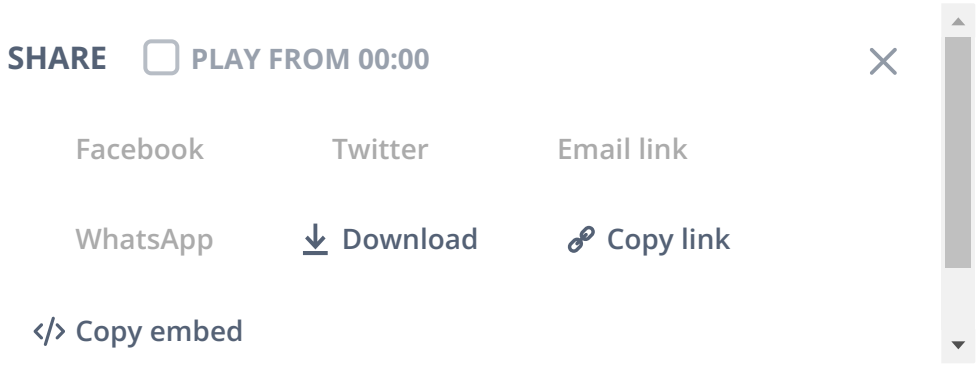
Hazer Group is planning a hydrogen plant in Japan, adding to their demonstration plant in Perth and one in Vancouver. Glenn Corrie, the new CEO and managing director, tells Alan Kohler how Hazer's technology will disrupt the market for hydrogen.

By Alan Kohler · 18 Apr 2023

Alan Kohler here and I'm talking to Glenn Corrie, the CEO and managing director of Hazer Group. He took over from Geoff Ward last October and I interviewed Geoff last August and I thought it'd be a good idea to catch up with Glenn to just see how he's seeing the company and also, they've just announced a big deal with a couple of Japanese companies to build a plant in Japan that would add to their demonstration plant in Perth and a plant that they're working on in Vancouver. So, Hazer has got technology to make hydrogen and graphite from methane and they're looking to disrupt the existing hydrogen market and to make hydrogen for the future hydrogen market that's obviously there.

I think part of the reason I'm interested in Hazer and interviewing them a couple of times in reasonably quick succession, is because I think hydrogen is clearly a big future industry and this is one of the few ways of getting some exposure to it in Australia. I'm not saying that you definitely should invest in Hazer, I don't know, it's a risky proposition and it's going to take a while to start generating cash, but they seem to have a good technology, it seems to be innovative, they've got patents for it and they expect soon to have a big demonstration plant operating in WA, which could attract some attention, so I think it's worth paying some attention to.

Here's Glenn Corrie, the CEO and managing director of Hazer Group.



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Glenn, you've recently taken over and now just announced a deal. Describe the deal that's with Japanese companies.

Thanks, Alan. Yeah, the deal, from our perspective, it's a strategic deal for everybody involved and of course, very transformational for Hazer which really further validates our technology in a market, Japan, that we believe is an ideal fit for the company. As I've said in our announcement, it firmly positions us as a really serious climate technology that's coming up with scale really quick and is there to support and accelerate global decarbonisation.

Yeah, but you're going to build a plant in Japan, is that the idea?

Yeah, the idea is we're going to work for the next six to 12 months, effectively developing what we're calling a project development plan, which aims to effectively build a Hazer Technology Plant, a hydrogen and graphitic carbon production facility in Nagoya region. Initial phase will be up to 10,000 tonnes per annum and then all going to plan, we'll potentially increase that over 50,000,

potentially up to 100,000 tonnes per annum, so a really large commercial-scale Hazer facility which is going to be effectively deployed in the Chubu Electric Power region to effectively support their decarbonisation of their power network.

Right, so and the company is Chubu Electric Power Company, right?

Yep, so there's two companies involved, the first one is Chubu Electric Power and the second one is Chiyoda Corporation. Chiyoda's one of the world's largest industrial groups and Chiyoda, who will be familiar to many in Australia because they are one of Australia's largest buyers of LNG. In fact, they import, I think, roughly around 15 per cent of Japan's total LNG importation, so a fairly large energy giant as well and both of them are really serious about their decarbonisation strategies in their portfolios.

And so, who's going to own the plant?

Well, Chubu Electric and Chiyoda, it'll be a plant for their industry.

So, you'll be licencing your technology to them, is that how it'll work?

Yes. Our role in the venture will be two things, to licence the technology to them as well as supply the catalyst, which is a key component of our process, that is the iron ore that we use in the process itself.

Probably better just remind our listeners what your process is and where you get the methane from?

Yeah, no I will actually step back and talk about the technology, if that's okay? Well, Alan, we are a methane pyrolysis technology, so it's a technology that's been around for over a century, well established. Essentially, it takes LNG or natural gas or methane and effectively at a temperature of somewhere around 800 to 900 degrees Celsius, it decomposes methane which is CH4, into its raw element of pure hydrogen and graphitic carbon. Now, our X-factors, as I like to explain them, are two-fold. We use iron ore as a catalyst to accelerate and lower the process temperature and secondly, we have a graphitic carbon product

output alongside of the hydrogen. So, normal methane pyrolysis technologies run at temperatures far exceeding 2,000 degrees and they have a carbon black product.

So, with graphitic carbon, we're able to serve a much broader application in industry all the way from lithium-ion batteries, potentially down to large-scale low-grade battery technology, water purification, replacement for coking coal in the steel making process in the blast furnace. So, a much broader application which we think will attract a premium in the long run. So, that's generally the process that we employ. We've been at this now for 15 years, we have scaled up very successfully our technology over the last 10 to 12 years and we're on our sixth scale up today with our project in Canada. So, Japan will represent the seventh and we are at that tipping point now of commercialisation.

And where will you commercialise first, do you think? Where do you think you'll be selling the first hydrogen from your process?

Well, I think the first place you'll see revenue coming into the company is through our Suncor and Fortis facility in Canada. We struck a transaction with both of those companies in the early part of last year to develop a plant in Vancouver, British Columbia, and we will be essentially blending hydrogen into the Vancouver pipeline network. So, there will be effectively revenue flowing from that project when it starts up in late 2025.

Right, okay, so that's 2025, when do you think the Japanese project will start to generate cash?

Yeah, at the moment, we essentially work on about a two to three-year period for feasibility studies, engineering and then design, construction and start-up. We have it currently on our initial plan in 2027-2028 and that's consistent with what we've just said to the market and if we can accelerate that, even better. One of the benefits of the project is that we've been working with Chiyoda Corp now for a number of years, 2020 actually, in looking at some conceptual engineering studies to support a Hazer facility in Japan. So, we're already out of the blocks on that project with a bunch of pre-work and conceptual design work and engineering work to support that project. So, we'll be looking for every angle to accelerate it to the extent possible.

Presumably, a lot of the work you're doing both in Japan and Canada and with Chiyoda is around about the pricing of hydrogen, the cost and the pricing and what the profit's going to be and so on. Can you just take us through the pricing, how it's going to work and what sort of price of hydrogen you need and how likely that is?

Yeah, well the first point to make is that the hydrogen market – actually, I'll even step further back. The hydrogen market today, Alan, is actually very large. What many people don't appreciate is that it is 100 million tonnes per annum today, the market, and I like to tell people that's over a quarter of the LNG market in its scale, so it's a large market. In value terms, hydrogen market versus the LNG market, actually the hydrogen market's valued even higher, it's about $175 billion market, relative to $150 billion market. So it's large and it's more valuable. But the challenge is it's not a liquid market, as you may appreciate. Typically speaking, hydrogen is produced today through a process called steam methane reforming, which has been around for a very long time.

Now, the downside of steam methane reforming which is responsible for around 95 per cent of the hydrogen market today, for every kilogram of hydrogen that's produced through SMR, steam methane reforming, there is 11 kilograms of CO2. So, whilst it actually doesn't solve the climate problem, it actually creates one, so our disruption is to replace steam methane reforming, which is disruptive today. Now, in terms of the market itself, it is a captive market...

Glenn, can I just interrupt?

Yep.

That market, the 100 million tonnes or whatever it is, the hydrogen that's currently being sold, what's it being used for and who's buying it? What is the market for hydrogen? Because it's not for cars, right?

Yeah, well the market – no, it's definitely not for mobility yet, but it will be. The market today is generally steel making, it is generally cement making where you really need high temperatures and you can't achieve that through power, petrochemicals as a feedstock for fertiliser and ammonia, it is also used in refining to de-sulphurise crude oil. So there's a really broad, wide-ranging

application of hydrogen today that's being used in the industry. Now, the challenge for industry is that at these very high temperatures, it's very difficult to electrify them so you need hydrogen to effectively get temperatures up to where they need to be, that's what we call hard to abate sectors.

All of these sectors, petrochemicals, refining, ammonia, fertiliser, the steel making and cement making industries, they all require hydrogen to effectively run their processes and they all produce that through typically steam methane reforming today, worldwide. There's thousands of these parts operating and for every one of them, as I've said, for 1 kilogram of hydrogen produced, there's 9 to 11 kilograms of CO2.

And what's the current price of hydrogen?

Well, like I say, it's not liquid so to unravel that is difficult. What basically the industry works on today is the cost of supply and most hydrogen prices, if you like, are transfer pricing linked to feedstock prices which are natural gas or LNG or methane. The way to think about the economics and the pricing model of this is through a margin relative to your input cost of gas as your feedstock. For example, in the US, where you've got Henry Hub as the pricing market or North America or Canada, you know you'll have feedstock there at $3 to $5 per mmbtu molecule. In Asia and parts of Europe, you'll probably see LNG or gas prices go up to $8, maybe $10, per mmbtu.

Okay, two questions for you then with Hazer. Is your hydrogen cheaper than what comes out of steam methane reforming and what's your CO2 output?

Yeah, very good question. In terms of our cost – and we have a slide that we have recently put into one of our investor decks which tries to articulate the differences between the three main hydrogen technologies today, green hydrogen which is commonly referred to as electrolysis; there is grey hydrogen which is steam methane reforming, as I said, 95 per cent of the market; and there's turquoise which is us, Hazer. Green hydrogen, of course, is electrolysis, that's pure thermodynamics, Alan. The ability to split and decompose water, H2O, into its raw elements of hydrogen and oxygen is seven times harder than doing the same process with methane, splitting it into carbon and hydrogen, so just pure thermodynamics.

The Hazer process is six to seven times lower energy intensity, which translates into a lower cost. So, relative to electrolysis and green hydrogen, we're going to be much more cost competitive. Relative to steam methane reforming, steam methane reforming has been a very well-established process, it's currently running industry-wide today at around $2 to $3 a kilogram of hydrogen. Now, these are all US Dollar unit costs. But in the long run, because of the high CO2 footprint, steam methane reforming will need to transform into what they call blue hydrogen, which is abating and sequestering or reinjecting the CO2 into a subsurface reservoir to essentially dispose of the CO2, because in the long run of course you can't deal with all the CO2 emissions.

So, that, on our numbers, takes the steam methane reforming process from around $3 to $4, possibly $4.50 per unit cost. Hazer, on our numbers, in our business plan, at a 50,000 tonne per annum plant, ranges between potentially $3 and $4 depending on your input assumptions. That will be driven by the value that we ascribe to the graphite. Now, if you say, well, okay, the graphite market is not well established today and we're not able to sell large volumes into the market, then we'll be leaning towards that $4 unit cost. If we attract in the range of a couple of hundred dollars a ton for graphite, then we'll see our overall benefit and unit cost come down to converging towards $3 a kilogram.

Right, so $3 assumes that you're selling the graphite for a decent price?

That's right, yeah.

A lot of the literature on the subject, particularly from the government, talks about that the hydrogen price needs to be sub-$2 in order for the whole thing to be viable, particularly for mobility. Can you ever get your price down below $2?

I think in the long run. I think the industry's fairly early stage. We don't factor into our numbers, the learning curve, yet. We also don't factor into account the growth in the graphite market. Both of those could substantially turn the needle. These are not complex plants, so there's definitely a capex learning curve that we've got to apply, working alongside Chiyoda, working alongside Suncor and other big engineering groups like Wood and Hatch, we're confident that our learning curve is going to benefit us in the long run. On the feedstock side, I

think natural gas prices are always going to bounce around depending on what jurisdictions you are. But I think the real value kicker here, to be fair, is the graphite.

We've been partnering now with Mitsui, the big trading group out of Japan, for a couple of months and they have been exploring the potential market for our graphite and the initial results from that study and that work is very exciting. One of the ones that I wanted to highlight, is that we have got quite a bit of attention from the Asian steel makers, who see Hazer graphite as a potential replacement for the coking coal that's used in the blast furnace, now that's a much bigger industry than the lithium-ion battery industry. And of course, steel making and cement making is, I think, responsible for maybe 20 per cent of global CO2 emissions, so it's a big problem, a big market that needs a decarbonisation solution yesterday and I can see, just based on the initial work that's been done with Mitsui, that we've got a lot more running room in the Hazer graphite market yet to play out. I don't want to take too many guesses on numbers, but I could easily see the graphite market edging above $500 a ton in the long run for Hazer graphite, possibly even higher.

What would $500 a ton do to your cost of hydrogen?

Well, very simplistically, very, very crudely, and it's much bigger than this, but if you say $500 a ton divided by 1,000 is 50 cents a kilogram, which could be the net benefit. Now, bearing in mind that for every kilogram of hydrogen we produce, we have 3.8 kilograms of graphite, so you almost need to multiply that by three. So, I can see a pathway to two, Alan, we're not there yet, we've got work to be done, but we're quickly coming up the technology curve and I think as we start to deploy plants, come up the learning curve, I think we'll start to see our costs be very, very competitive in the market. Is it worth talking about our CDP or...?

What's CDP?

Because we've got our commercial demonstration plant...

Yeah, this is the one in Vancouver?

No, we've got our commercial demonstration plant about to commence operations this year, it is the fifth scale up of our technology, so it takes us to a very advanced technology readiness level. It is 100 tonnes per annum and it is a 30 times scale up on our pilot project that we did between 2017 and 2020.

And where is it?

It's in the Perth Metropolitan area, so it's close by. We have more or less completed the construction of it, we had a few speed humps last year due to supply chains. We're waiting on two pieces of equipment, the heat exchanger and our first-generation reactor which should arrive in the next couple of months. So, we're very excited about bringing that project online, it's been a work in progress now for the last couple of years and it really just demonstrates and showcases our technology on an industrial and commercial scale on a continuous basis, which is the most important thing as you start to roll it out commercially.

And your business plan involves just licencing your technology multiple times, is that correct?

Yeah, that's correct. We take a capex-light approach to our business, which does a few things for us. Importantly, it enables early free cash flow for us. So, we're deploying the typical licencing arrangement to a technology, as you'll see in the industry and our licencing structure is a combination of licence fees and royalties on outputs. We like to think of ourselves as one technology that serves three markets and that's nice diversification. We have a hydrogen market to serve, we have a graphite and graphitic carbon market to serve and the one that I think is a real sleeper in terms of value, is that we have the whole decarbonisation carbon offset market to serve. Using Hazer technology will save the user costs because they don't need to buy and purchase carbon credits. So, there's three markets, one technology and that's what drives our value. So, capex-light, early free cash flow and serving three markets.

Does your process produce zero carbon dioxide or some?

Yeah, so I should have got to that. Our absolute process internally, scope one emissions is zero. We don't refer to ourselves as zero emissions because our scope two emissions relies on and is a direct implication of the power grid that's being used. So, in Australia, of course, you know, we'll have slightly higher carbon intensity relative to, say, Canada. But to give you an idea, our carbon intensity for our project in Canada is, I think, around 0.5 to 0.65 kilograms of CO2.

This is because of the electricity you're buying as hydro?

Yeah, so the energy mix in Canada is a combination of hydro and gas, and so it's a lower carbon intensity. In Australia, of course, that's going to be slightly higher because it's mostly gas and coal. So, it'll be driven by the power grid but that's the scope two emissions. Then of course as grid power comes, cleans up, that's going to reduce. That said, of course, we can always plug ourselves into a renewable power grid, there's nothing stopping us from doing that either. We can be a green, pure net zero process. Now, at our CDP in Perth, we are actually using the Water Corp's bio-methane and wastewater gas, so we are actually there achieving net zero for our process.

Now, that could be a possible business model for us on a smaller scale, addressing the large carbon or methane footprint of wastewater treatment plants, but that brings our process, at least in Perth, down to zero, proves that we can do it using methane and wastewater gas. And of course, with that we also attracted Australian government funding through Arena to the tune of I think just shy of $10 million and we just recently unlocked another tranche of that which is $3 million.

Is your long-term plan to just disrupt steam methane reforming, that process, that industry that exists and to basically take that industry to some extent? Or is it to get a share of the future hydrogen that's going to be made for mobility and whatever else using electrolysis, so that it won't entirely be electrolysis or is a bit of both?

Yeah, no, look, there's a market for all of these technologies today, but I think where we are able to accelerate our deployment is today because we can disrupt steam methane reforming, which is most of the market and that said,

there's a future application in the short-term in terms of mobility and other applications. So, are something that can be deployed today, that's the real benefit of Hazer relative to potentially some of the other technologies and processes that are coming up the curve. That's what's attracting attention from a lot of the users. Our deal in Japan is because we are something that can be deployed today to fix a problem that needed to be fixed yesterday and that's the excitement of Hazer relative to others.

Now, we are very understanding that the market is large and there's a place for everybody here, but from our perspective it's getting the first-mover advantage, getting on the ground, getting the initial phases of these projects designed and built and then from there we can scale up. My vision for this company is that we essentially contribute to global decarbonisation in the industry and provide that future generation with a much cleaner planet. Our ability to be on the ground today, to develop project that we can scale up into the future and essentially build and operate alongside partners projects that will be larger scale, I think is an advantage for Hazer today.

We'll have to leave it there, but it's been really interesting talking to you, Glenn, thanks very much.

Thanks, Alan.

That was Glenn Corrie, the CEO and managing director of Hazer Group.