

## **Transcript for #99. Driving Zero-Emission Innovation With Hydrogen Fuel Cell Technology**

**Guest Ben Nyland, President and CEO, Loop Energy**

**August 14, 2023**

Tammy Klein (00:01):

Hi, everyone. Welcome to the show today, I'm really excited to have with me Ben Nyland. Ben is president and CEO of Loop Energy, and they're doing some really interesting things in the hydrogen space. I've been wanting to get more and more into the hydrogen space as the show season has gone on, and I'm super excited that Ben is able to join us today. Ben, welcome to the show.

Ben Nyland (00:45):

Thanks, Tammy. Great to be here.

Tammy Klein (00:46):

All right, good to have you. So let's talk Loop Energy and hydrogen. So first of all, for the listeners who may not be familiar, can you talk about what Loop Energy does, how the company came about, your involvement, the whole genesis of everything?

Ben Nyland (01:06):

Yeah, absolutely. So, in a nutshell, Loop Energy is a manufacturer of what we call hydrogen fuel cell engines for commercial vehicles. So our product is intended to allow a vehicle manufacturer to create a zero-emission vehicle that uses hydrogen as the fuel. So that, at the simplest level, is what we do. And for the listeners out there who are wondering, "Okay, what's the similar type of company that I'd be familiar with?" For those that are familiar with companies like Cummins or Detroit Diesel, it's a different type of product. They build diesel engines, but we fill the same sort of role in the supply chain. And so it's a new technology, sort of. I say sort of in that fuel cells have been around for decades and decades as an understood technology. But in terms of bringing this technology into a product that can service the market and actually commercially viable product, that's quite a recent innovation.

(02:06):

Ballard started down this path a few decades ago, started bringing products two decades ago, but it's really only in the last few years that that traction has begun. And, Loop has been in this market for 20 years. I mean, you, you asked how did it get started? The founder of Loop one day had sort of an epiphany. He was driving along, he saw a bunch of pollution. He lives in a very beautiful part of the world here in British Columbia, where there are mountains and mountain valleys. And, there was a bunch of smog, frankly, that was blocking his view. And he thought, I've heard a lot about fuel cells recently. I'd like to get into this space and figure out if there's something I can do to improve the air quality. And so this was back in 2000.

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And so he started a classic in his garage with some friends and started working on this. And, they made a discovery that today is our core technology, we call it eFlow. They took that into the National Research Council and here in Canada, which is somewhat similar to the Department of Energy in the States and said, "Hey, we've made this discovery, what do you think?" And it was very well received. It got a lot of government support and spent about a decade doing research into figuring out how to make this innovation useful in fuel cell systems. And, that's when I met Dave in 2012. He had proven the technology. He'd received patents protecting the technology, and was trying to figure out, what's the application? Where can we commercialize this?

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And so I joined him to help him try to figure that out. And we started down the path that we're on today and I was made CEO in 2016 and have been driving the growth of the company since then. And today, we're a company of just shy of a hundred people. We've got offices in our main offices here in Vancouver in British Columbia, but we have sales and service in Europe. We have a manufacturing, sales and service facility in China. And we've got quite a good global footprint with customers around the world. So it's really a great success story in terms of a technology becoming a real product that can be used by customers.

Tammy Klein (04:26):

So you talked a little bit about traction, that the company started to get traction. I think there's this impression out there of this is a new space and, but really like Ballard and you all, you've been laboring, for years and years and years and years too, in this space. So what was the traction for you all? Was it the Paris Agreement? Was that sort of the tipping point? Where was that for you, where things really started to go?

Ben Nyland (05:02):

Well, it's interesting. I think it's been different tipping points in different geographies over time. So prior to Covid, we were working a lot in China. And China was really where the bulk of the global activity was happening around fuel cells. And, it was because the Chinese government recognized that clean energy wasn't just about climate change. I think we all agree climate change is a really serious issue. but they'd identified clean energy as an energy security issue, and hydrogen as being a key pillar in that. And so there was a lot of emphasis in China on making fuel cells a reality. Prior to Covid, much more so than in other geographies around the world. And then during Covid really Europe began to recognize the economic impact of covid was similar, but even less than what climate change was going to be.

(06:06):

And so there was this tipping point in Europe during Covid where they recognized, "Hey, we need to start really pouring resources into clean energy." They identified a number of different types of clean energy, hydrogen and fuel cells was one of those. And it was the first time we really saw significant capital being poured into hydrogen production initiatives in Europe and that sort of thing. And then adding fuel to that fire when Russia invaded Ukraine, then just like China, Europe recognized, "Hey, this is actually an energy security issue, not just a climate change issue." And we saw a significant acceleration in activity there. and then geographically, when the IRA came to the US last year that's when we started to see some momentum in North America that has been largely absent. North America has really been lagging Asia and Europe in this category for quite a while, but we're now seeing indications that's going to change, which is great. So that's how we have seen things develop over time.

Tammy Klein (07:19):

So you talked about, the equivalent, on the heavy-duty trucking side of Cummins and Detroit Diesel. but you have a whole range of folks go to Loop Energy website, which will be in the, the linked in the show notes, there's a whole range of different applications. So my question is, what are your top target market applications, especially when it comes to the transport side? And then who are your customers and how are they receiving the product?

Ben Nyland (07:58):

Well, you're absolutely right. We've got a broad range of products. and most people when they think of Cummins, think of large heavy-duty vehicles, right? So it's an illustration of a well-known

engine company. We're actually focused on smaller vehicles than that, still commercial vehicles. But the bulk of our customers are in the municipal bus market, the light and medium-duty commercial vehicle markets. So if you think of delivery vehicles like what UPS has, or Amazon or those types of vehicles, that's what we design our products for. And we did that specifically because we feel that the value proposition that fuel cells offer in those vehicles is really, really strong. Not just relative to battery electric, but relative to today's internal combustion vehicles. And also because those fleets tend to be in a good position to be able to access hydrogen, which is the key fuel that they, so those are the markets that we actively sell into. We actively have outbound sales campaigns and marketing campaigns to meet with vehicle OEMs. We've also had additional markets come along that we hadn't necessarily been expecting and our existing products work well for. So these are things like stationary or mobile power.

Tammy Klein (09:17):

I was going to ask you about that.

Ben Nyland (09:19):

With the diesel gen sets that movie industries use to power lighting systems and construction companies use to power equipment that they need to build in temporary sites, those companies are looking for zero-emission solutions. And our products are turning out to be very good fits for those types of applications as well as product movement applications and ports and this sort of thing. So rubber tire gantry cranes and such. So, we're seeing these additional applications come up. We're not developing products specifically for those applications, but our existing products for the commercial vehicles fit really well into a number of these. And so, in terms of customer base around the world, we've got around two dozen customers today. These would be companies that are building vehicles or building gen sets to supply to customers, and we provide them with the engine that creates the power.

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And it's been very, very well received. So you have to understand that this is a transition time. It's a disruptive time for the industry. And if you're building vehicles, you're trying to understand what does this mean for me as a business? How do I change my manufacturing configuration? How do I support my customers effectively? and how do I think about getting vehicles on the road? And so, like any technology company, I'm sure you talk to, our claim is that our technology is better than everyone else. And, I'm happy to talk about that. I'm always happy to talk about that. But we recognize really early on that that's not enough. We need to make sure that we're helping the customer understand the new economics, and we need to do everything we can to help them integrate successfully into their new product.

(11:23):

And so that means not just delivering a product that we're really proud of, and that works better than the competition. It also means really getting to know the customer, really getting to understand what their needs are and helping them figure out how best to use the product. And I think what we've been very successful at with these two dozen customers is, is really engaging with them and getting to know them. We've had extremely fast integration processes stunningly fast. I think because we work with the customer and understand what we're doing but we're also finding that it really is helping to inform future product development processes. Because when you engage with a customer who's never built a fuel cell vehicle before, they think they know what they need. But it's not surprising to know. They discover things along the way. things that need to change, and the closer we are to the customer, the better we can make sure we're adapting as well. And so we tend to get feedback from customers, not only that our products are outperforming our competition's products from their experience but that they're also really

pleased with the way we interact with them. And a number of our customers will say that that's the reason that they have engaged with us is that white glove service that we bring to the relationship.

Tammy Klein (12:50):

So I want to go back to something that you said that was, that I think is really important. I feel like, or I think that there's a common perception, at least in the states, that the battle air quotes, nobody can see my air quotes, the battle <laugh> or the light duty space, and even the medium-duty space or light commercial vehicle space is done, and that's going to be electrification, and we're going to do that, and that's going to go here. And then over here on the long haul side, well, the batteries there are proponents who want to see battery electric long haul trucking not the subject of this, this podcast. And hydrogen's really a better fit for the long haul. And we're going to do electrification over here. And the way that the talk is from NGOs from those that are maybe in that market space and other proponents, even policymakers is like the Department of Energy is that, that space is decided, it's done. And what you're saying is, Hmm, not really. that there is a space there. Do you observe the same, how do you respond to that and especially, deal with that when it comes to the customer?

Ben Nyland (14:27):

Well, look here, I think so, so first of all, I would say that that is not a resolved issue. And yeah. And I don't say that from the perspective of being a hydrogen and fuel cell advocate. And, I think that's part of the challenge here is a lot of those voices and messages that you just described are coming from people who are advocating for their particular silo. So, before 2012, I didn't know anything about fuel cells, didn't really even know what they were. So the bulk of my career has been outside of this industry. I think it's really important to understand that as an industry, in order to get the fastest adoption possible and the most effective mitigation of carbon, we need to be delivering solutions that solve the needs of the customer. And the reality is that there is no single silver bullet solution that's going to solve those problems.

(15:19):

Batteries are not the silver bullet. Fuel cells are not the silver bullet. And I often say to people, look, it's not a perfect analogy, but it's not a bad one. If a vehicle runs on gas today, it's probably batteries are a great solution for it. If a vehicle runs on diesel today, it's probably going to need a fuel cell to go zero emissions. And, there are a couple of reasons for that at the vehicle level. And then there are some considerations at the fleet level. And again, I'm not advocating that fuel cells need to be in everything, but there are a lot of benefits to fuel cells. So some of the initial ones are driven by the operating requirements of the vehicle. So the fact of the matter is batteries are heavy. A fuel cell vehicle is an electric vehicle. The only difference is the energy is stored in the vehicle as hydrogen instead of being stored in batteries.

(16:12):

And that leads to a significant reduction in the weight of the vehicle. So if you have a vehicle that needs to deliver goods and is sensitive to curb weight, so if you're delivering anything other than potato chips, you're sensitive to curb weight, Then, then many of those applications need a lighter curb weight vehicle than a pure battery solution can provide simply so that they can deliver the goods. And in the absence of that, the only solution fleet operators have, if they can't transport the same amount of goods in the zero-emission vehicle as the internal combustion vehicle is, they have to buy more vehicles and employ more drivers, which increases the cost, which has to be passed on to the consumer. And so there is economics that drives this. That means that weight of the vehicle, if it's a consideration, fuel cells have an advantage range of the vehicle.

(17:07):

If this vehicle needs to go a long distance between refuelings, fuel cells also have an advantage because the refueling time is similar to internal combustion. 10 minutes and off you go, rather than plugging into recharge. and then operating time, right? That recharging time that I just mentioned. So those are vehicle level. And then when fleet operators start looking at, hey, it's, it's easy to deploy an electric vehicle. If I've got five of them or 10 of them, I just plug them in at night, and off I go. But if I have to recharge a thousand or 2000 vehicles, now I'm looking at installing additional transmission lines in areas that often are, the grid is already strained and stressed. Yeah. And it's extraordinarily expensive. And so the economics of fleet ownership are also pointing towards, in many cases, fuel cells being a more viable alternative. and so I think we need to be careful not to, like I say, advocate for a particular technology based on characteristics of that technology, but recognize that business decisions are more nuanced and they're influenced by a lot of different costs that need to be considered and as a result, we're seeing a lot of fleet operators recognizing that they thought they would be able to just go with battery electric but now they need a fuel cell solution.

Tammy Klein (18:33):

I think one of the major challenges, and you sort of talk about it a little bit, and I wonder if you can say a little more, as someone who...I work a lot on electrification issues and in particular charging, and it is at least in the states, but I suspect the same, I think the same for Canada, Europe, and actually even China. I've looked at charging in China. It's very challenging simply, from a cost perspective in terms of putting in the charging as you say it's costly and time-consuming. because you may need to add transmission, you may need to add substations, or the utility will have to do that, then you're waiting in line behind all the other projects that need to happen, which increases time and increases costs.

(19:28):

And I can see the advantage for hydrogen is its contained refueling infrastructure at the depot. That sort of avoids the utility wait times, and then if utilities have to add significant transmission and substations, then you're in a whole public utility commission process, which itself might take a couple of years. And I think one of the things that I see huge red flags is I don't think people have figured this out. And there are 50 PUCs in the 50 states, then you throw in the provinces in Canada, they have their own regulatory processes, same with the member states in the EU and same in China. So I just wonder if that's going to really open some doors for this application because people are going to realize, like, I need to reduce emissions now. I made serious net zero targets that I now have publicly put on my website in my SEC reports, so on and so forth. This just needs to get done. I'm not going to get this necessarily quickly through electrification. And I wonder if, if you're hearing that from customers that's sort of driving, some of the discussion is some of the concerns around that.

Ben Nyland (21:00):

Yeah, I think the general view is that, as I said, there's no silver bullet solution. It's going to take a number of different solutions. and what you've pointed out is absolutely true, right? Utilities, commissions and expansion of the grid and management of the grid, and really a destabilization of the grid is more of these renewable power applications come on board is all part of the discussion. but I would say it doesn't matter. We need to maximize that, and we need to get as many battery-electric vehicles in service as possible because the flip side of that is people will point to the lack of hydrogen infrastructure. And say, well, that can't solve the whole problem either. And, and I think that is my entire point, is that nothing is positioned well to solve the whole problem.

(21:50):

If we're seriously committed to getting as much traction as possible, we need to move forward with all the available technologies. And, and you're absolutely right. There are going to be many scenarios in which deploying hydrogen vehicles is going to happen faster, the economics are going to be better. By the same token, there are going to be scenarios where battery electric vehicles work great for whatever reason, there's a lot of hydroelectric power in that particular location it works really well. There's good transmission infrastructure. And what we need to avoid is pointing to one or two examples and saying, see it work there. That's what we should be doing everywhere. We need to look at each different situation, and when I say we, it's obviously the communal, the collective, and we - Loop - will be providing the best fuel cell module systems we can to optimize the efficiency and the economics for the fuel cell vehicles that are being deployed in those situations.

Tammy Klein (22:55):

So I also want to go back to what you were talking about with respect to gen sets, because I've been looking at that issue recently. and there's really...I wouldn't say a fight for market share because I think that's a little bit of an overstatement, but you really see data centers and others in the space that need backup stationary power. there's really sort of been kind of an explosion of interest in the different fuel options that are out there. renewable diesel has been talked about as an option your product is talked about as an option. Do you see that as a really strong market for you all globally? And do you also see it as a potential pathway for supporting reliability in the grid or parts of the grid?

Ben Nyland (23:58):

Two very different questions. So I'll say, so first of all, our focus or I shouldn't say our focus, the customers that we're seeing on the stationary power and backup power side of things are smaller than the data centers. So we're sort of operating in the sub-300 kilowatt sizes. So that's going to be the mobile power units, the stationary backup units for smaller buildings and that sort of thing. We think that's a good space for us to be operating in. Those big data center backup systems tend to be megawatt systems - very large. and if I'm Google or Microsoft I'm as interested in the balance sheet of the provider of those systems as I am in the quality of the technology. Meaning if that thing fails, I need someone I can sue. And, we just recognize as a company at our stage, we're not in a position to really supply to that market.

(24:56):

So we're not going after it, but we see that sort of 50 to 300-kilowatt market as being an exceptional market. It's driven to a great extent by companies like you described a little bit earlier who have made commitments to emissions reductions, and now we're trying to figure out how to get there. So in Vancouver probably the best example for us is the movie industry who do lots of mobile set work. Traditionally they're using diesel gen sets, it's a source of emissions for their shoots. And getting those systems zeroed from an emission perspective is extremely helpful. And we're seeing a lot of push towards that from major movie studios in Vancouver. And we're also seeing that in Los Angeles. So those sorts of niche markets that require the sub-300 kilowatt are really good markets and a surprising market for us has been car charging, electric car charging, using...

Tammy Klein (25:56):

I was wondering about that as a sort of backup battery.

Ben Nyland (26:01):

So it never would've imagined this two years ago. And I think it's actually a great example of wow, what happens when you're in such a disruptive time. Because a couple of companies recognize, "Hey, wait a second, the grid is really strained in this location." Some of the locations are California we're seeing this a little bit in Korea as well and we've got these cars that can take significant electron pipes. Porsche can take 300 kilowatts. let's provide those electrons using fuel cells, and it acts, the economics work better than the grid. Whether that's because of the cost of increasing transmission surge pricing that the utilities put on sudden jumps in energy draws and so, like I say, a market we never imagined a couple of years ago, but it seems to be a really interesting niche market. It's developing. It's basically in the stationary power sector. Yeah. So, that's a great market.

Tammy Klein (27:07):

I see. if I had to pick possibilities, that one really seems to me to be really, really bright for all the reasons we discussed, earlier until transmission is added, until reliability assured, and it's a real possibility because there are targets now to meet in Canada and also in the US at the state level and soon to be the federal level. So the charging, it has to happen. So I see providers, even maybe the OEMs really, that have invested in some of those providers and are ultimately charged with compliance, really, really looking for those solutions. And I think that's a real example of the complementarity of technology to bridge that gap.

Ben Nyland (28:08):

Absolutely.

Tammy Klein (28:09):

Yeah. Yeah. So I want to ask you how you see the market, your key markets evolving over time and how you see the company evolving over time over the next five or 10 years. What's your vision and where do you all see yourselves in that?

Ben Nyland (28:34):

That is a big question. It's a big question. It's a big question. It's a great question. I mean, our vision is to be one of the top providers of fuel cell engines for the commercial vehicle market and, and ancillary markets as they come on. We have a really strong focus on commercial vehicles and that market, from our perspective numbers in the tens of millions of units per year, ultimately. Now a much smaller part of that market is actually accessible to us today. The part that's electrifying, but it's, it's strong and it's growing. If we'd had this conversation at this time last year, I would've said we are now at the turning point for the fuel cell industry. It's explosive growth from here for the next several years. however, what's happened over the last year is some really significant economic shock waves, as we're all aware of around the world, like no, geography has avoided this and what that has done in our key markets is it's slowed the adoption process as fleet operators recognize that they need to manage their costs a little bit more closely and are not as aggressive with their zero emissions. So I think we're in a period of time, I don't know how long it's going to last, a year, two, three years here where the adoption cycle that we seemed to be entering into this time last year slows. but that was a signal of what's to come in the future. So the thing we know is nothing lasts forever. Good times don't last forever, and neither do the challenging times that we're in right now. And that will change. And so we see an opportunity for Loop to be a major international player in this value chain, really enabling vehicle manufacturers to deliver zero-emission vehicles that meet both the emission and the economic requirements that fleets have and their operating requirements at the same time. And that's our, our mandate, that's our mission. And we see ourselves as a key part of the solution to making zero emissions a reality in the transportation sector.

Tammy Klein (30:53):

So the last question I want to ask you just to follow on is how policy fits into the equation. And I wanted to ask your view on the policies that are in place in North America, but also globally. So we're talking Inflation Reduction Act. I know the Canadian government has announced some measures to counteract or support Canadian business with more to follow. We have Low Carbon Fuel Standards. We have Advanced Clean Car and Advanced Clean Truck standards that are coming in California. And in some of the US states we have Fit for 55. and the whole regime that you sort of indicated a little bit earlier, and we have New Energy Vehicle Program and assorted policies in China and, and the rest of the world. So the change that I see, especially in the Inflation Reduction Act, is for the first time, hydrogen's not glommed on to other sorts of zero-emission vehicle programs where hydrogen's part of it, but it doesn't really effectively maybe incentivize. so that's a real positive change as I see it. There are tax credits now, there's hydrogen hubs, there's all kinds of stuff that's going on, but are those policies enough to help the industry scale up and to benefit your customers and the company itself? If so, why? If not, why? How do you see it?

Ben Nyland (32:36):

Yeah, so look, I guess I'll focus a little bit more on North America but the first kind of generally speaking policies have improved dramatically around the world. I think we're headed in great directions. I think consistently in Europe and North America, the policies are really focused on hydrogen production, increasing the capacity of hydrogen production, increasing the infrastructure for distribution of hydrogen. And as much as we would love those policies to be focused directly at companies like Loop and, and building the vehicles, the reality is that the biggest cost contributor to the total cost of ownership for a commercial vehicle is the fuel over the lifetime of that vehicle. And we know that our engines today can deliver equivalent total cost of ownership to diesel if we can get the hydrogen price down to something more reasonable and realistic than what it's being pumped at in California today.

(33:39):

And so, to that extent, I think the concentration of these programs on increasing hydrogen capacity and getting it distributed and getting that cost down is exactly where it needs to be from a macro perspective. And then, the effectiveness of different programs from a policy perspective frankly, there are people that are far more qualified than I am to assess how effective they're going to be. And, I think the same comment I made about the disruptive nature of this time is also true. I'm not sure everybody really knows exactly what's going to be the most effective. And so it's good to see different countries adopting different policies. I think the IRA is fantastic. Like you say, hydrogen isn't sort of glommed on as a special interest and it's central. And we're seeing the impact of that with major energy companies, whether it's Exxon, Chevron, Shell really moving serious resources towards participating in this hydrogen space. and whatever issues people might have about how those companies have behaved in the past, there's no question that they are set up better than anyone else to rapidly produce and distribute hydrogen. And so my hope is that the IRA really moves them towards those sorts of production initiatives. In Canada We've got a little bit different setup. It's an investment tax credit instead of production tax credit. But I'm also hearing noises about a policy that would look a little bit more like a production tax credit, which personally, I feel is the production tax credit is much, a much more powerful tool to stimulate the growth that we need right now. but I think, like you say, the biggest change here is it's no longer a special interests discussion, it's a mainstream discussion. There's a recognition that hydrogen is a key pillar in any clean energy program. And, we're really excited about that because that's what's really going to drive to growth, right? So if there's anything constraining the growth of fleets of fuel cell vehicles today, it's access to hydrogen.



And, as that problem gets solved, our market is going to grow really quickly. And we're, we're very excited about that.

Tammy Klein (36:11):

Well, Ben, thank you so much for joining the show. It was a real pleasure to talk with you about what Loop's doing and where you're going. Great places!

Ben Nyland (36:21):

Awesome, Tammy. Thanks. I really enjoyed this, it was awesome.