Podcast 71 – Deploying Hydrogen for Transportation Outside of California

Brian: Hello everyone, and welcome to episode 71 of the HydrogenNowcast for March 10, 2023.

Well, on the podcast today, we're going to talk about how to develop and deploy the hydrogen transportation market. And the primary challenge, which I think seems to be underappreciated, is the need to develop both the supply and the demand at the same time. And in this case, of course, supply is high. Hydrogen fueling and demand are the users, the fleets and the drivers. But because this is a new market, there's a third component as well, which is the hydrogen vehicles. So fuel stations, users and vehicles all need to be brought together at the same time. And this is outside the business model of most companies except for one New Day Hydrogen.

So with us today to talk about how New Day Hydrogen is solving this, we have two guests. The first is Seth Terry, who's the chief executive officer. Seth, welcome to the show.

Seth: Thanks Brian, good to be speaking with you again.

Brian: Well, it's great to have you, Seth. I appreciate your time. Our second guest is Buford Barr, who's the chief operations officer. Buford, welcome to the show.

Buford: Thanks, Brian, I appreciate it. Definitely excited to be here. I really appreciate the efforts that you and the Colorado Hydrogen Network do to expand the word of hydrogen across the US. So thanks.

Brian: Well, thanks Buford, and thank you as well for your time to be here.

Now, regular listeners to the podcast may recall that New Day Hydrogen was featured on the podcast over two years ago on Episode 18 to talk about deploying hydrogen fuel stations. And a lot has changed in the past two years. So Seth, why don't we start with you to give the listeners an overview of New Day Hydrogen.

Seth: Yeah, sure. Thanks Brian. We've been at this a couple of years, as you've said, and really we've evolved into a company that has set about making it as easy as possible for commercial fleets to say yes to hydrogen. We've done this by developing a modular containerized system that produces and dispenses hydrogen from water, to fuel vehicles at both 350 and 700 bar pressures. Our systems comprise only three containers for the electrolysis, compression, storage and dispensing, and can be sited easily on small marginal parcels just about anywhere. Our systems are special precisely because of that small size, allowing us to serve as few as 10 or 15 heavier duty vehicles. We're talking trucks and buses that are located in centralized sites. As you know, these heavier duty vehicles tend to run off diesel today while producing an awful lot of emission. But because these vehicles are heavy working vehicles, they really are not very good candidates for battery electrification. So with that in mind, the ability to fuel these vehicles in minutes rather than recharging them over hours can be a real boon for fleets who are striving to achieve zero emission as well as for the communities in which we would cite those stations.

Brian: Well, thanks Seth. As we both said, New Day Hydrogen has been working at this for the past two years to lay the groundwork for hydrogen fueling and the vehicle deployment in various places around the US. But Denver has now risen to prominence as the next great place outside of California to deploy this ecosystem. Why Denver and why now?

Seth: Yeah, well, we agree. We think Denver is a great place to start given the city's important role as a nexus for regional transportation. It also just happens to be where we are from right now. So we've got really excellent contacts here, relationships in the area, but really it really gets down to that centralized location. Obviously, I-70 and I-25 are major transportation hubs, making that central area an excellent location to find fleet participants for our initial microhub project.

Further, it is also the location of a heavily transportation impacted community as well as a significant revitalization effort that is taking place with respect to the National Western Center and the CSU Spur campus. So with that location in mind, we put together an initial microhub proposed project for which we applied to the Office of Economic Development and International Trade here in Colorado for an Advanced Industries Grant award. We received that award very generously back in November, and that was all built up around putting together this initial station for that application. We received support from several fleet stakeholders, including our great friends at AAA Colorado, as well as Via Mobility Xcel Energy, Denver Water, Fluid Truck, Wagner Equipment, CDOT, and, of course, the CSU Spur campus. And we're looking to get support from the City of Denver as well.

Brian: Well, thanks Seth. You know, that site at the National Western Area is really an ideal place because it's at the center of the Denver metro area. But Buford, let's turn to you to tell us a little bit more about this site and a little bit more about why it's so significant.

Buford: Yeah, really. And Brian, I think you hit the nail right on the head. If you kind of scale back and look at Denver on a larger scale, on a bird's eye view, you really see that the National Western Center is smack-dab in the dead of the bullseye of Denver. So really, as Seth indicated, at the nexus point of I-70 and I-25, the major transportation thoroughfares through Denver. So it seems like an ideal location for us to talk about transportation.

But the flip side of that transportation is while there are benefits to it, there's a negative side to it as well. If you've driven in Denver, Denver has a lot of several things. One is traffic, and then it's the associated emissions and noise. And while a lot of us travel through that, this neighborhood is smack-dab in the middle of it. So they get the impacts of that on a daily basis. And that's where we think the microhub really can be a benefit, can help minimize the potential impact of that transportation on this neighborhood. And that's why we see the National Western Center and this Globeville-Elyria-Swansea neighborhood as being an ideal fit for this first public facing hydrogen fueling station in the state of Colorado.

But even beyond that, the National Western Center and the City of Denver have established a master plan to revitalize this area and really turn it into a shining green jewel in the midst of a whole lot of concrete, but still allowing for the establishment of the flow of people, the flow of vehicles, the flow of goods. And even beyond that, as part of the National Western Center, CSU, the Colorado State University, has established the Spur campus on the site. And the Spur campus basically consists of three primary buildings: their Terra building or Earth, which is primarily focused on agriculture, their Vida building or life based on veterinary sciences, and then Hydro. Obviously, up here in the high desert, this is important because it's water, but underpinning all of that is energy. And once again, that's where we think the micro hub aligns perfectly well with the intentions of the National Western Center, the CSU spur campus and the Globeville-Elyria-Swansea neighborhood. Aligning perfectly well to minimize that impact, but also develop this region as a leader in the advancement of alternative fuels. As we talked about, this is a disadvantaged community, but I really don't like that term. I'd rather call this a transportation impacted community. And that's really an area that we feel very strongly that we can help, that we can minimize and mitigate that impact.

Brian: All right. Thanks, Buford. Well, that kind of segues into the next thing to talk about here. And as regular listeners know, I've spoken many times on this podcast about why hydrogen is so critical to decarbonized transportation. But let's get your thoughts on why we need hydrogen to do that.

Buford: Yeah, I appreciate that and definitely appreciate you continuing to voice the potential of hydrogen when it comes to the vehicles, because that is an important part of this, is how does hydrogen fit into the transportation side? And really, it boils down to the fuel cell electric vehicles, those hydrogen vehicles, and we're talking about them because they're true zero emission vehicles. The only emissions that come from these is water vapor, but they're also true electric vehicles. You get that same instant torque, that same low noise, that same zero emissions that you get from a battery electric vehicle. You're just powered by a tank of hydrogen instead of a large, heavy battery pack. So in essence, you get a vehicle with the same operating parameter as the diesel vehicles we know today. That same instant refueling, that similar range, that minimal impact due to terrain or temperature, a true one to one replacement for those diesel vehicles. But you get it in a true zero emission vehicle.

Brian: All right. Thanks, Buford. Well, as I mentioned earlier, hydrogen fuel stations and customers willing to operate the hydrogen vehicles are really just two of the three elements needed to deploy a hydrogen transportation market. And the third element, of course, is the vehicles. And although listeners may be familiar with passenger vehicles available from Toyota and Hyundai and soon Honda, what about the medium and heavy-duty commercial hydrogen vehicles? Tell us what's available in those areas.

Buford: Yeah, the really nice thing with hydrogen is you're starting to see vehicles really being present across the entire breadth of the vehicle classifications from, like you indicated, those light duty passenger vehicles that are out there in the market right now, but also inclusive of the medium duty market, where predominantly you're seeing the integrators. These are companies that basically obtain vehicles from the OEM's like Ford and GM. They strip out the internal combustion components and they replace it with an electric motor. They replace it with a hydrogen tank and a fuel cell, converting it over to a fuel cell electric vehicle, and then all the way up to the big class eights, the big semi-trucks that you see moving freight around.

There are plenty of projects that are being done right now. Toyota and Kenworth just completed a pilot project down at the port of Long Beach in California. Hyzon has established itself. Nikola.Daimler has vehicles on the road as well. So really establishing that high end, that heavy duty side of things.

But even beyond that, we're seeing it within the transit buses. The State of California predominantly is where the majority of those reside within the states, but you're starting to see those outside the state of California as well with Ohio. And even beyond that, we're really starting to see that transit side get established.

But also even beyond those vehicles, you start getting into the more exotic vehicles. You start getting into those off-road construction vehicles, those-off road vehicles for moving freight within a yard, for handling at airports. But even more, you're getting into the snow cats. Prinoth is one of the ones out there that are making a fuel cell electric snow cat, which we're finding from a lot of the ski communities in the Colorado area, there's a lot of interest in the potential of a hydrogen vehicle on their mountains. They're very excited about that. So really it's the entire width and breadth of the vehicle classifications where now we have hydrogen vehicles entering that market.

Brian: Well, thanks, Buford. And maybe you could just talk a minute about how New Day has gone out and talked to these different vehicle suppliers and actually brings them into the conversation with the fleets that are interested. Is that right?

Buford: You're exactly right. Really, the vast majority of the fuel cell electric vehicles that are in the US. Market today really reside in the California market. That's really the only fully established hydrogen transportation market in the US. But it's predominantly a light duty market. They built out their infrastructure based off an “if you build it, they will come” type of a philosophy. But that requires heavy subsidies from the state to be able to do that. We don't believe that's replicable across the US.

So what we're doing is we're actually reaching out to the individual fleets. We see them as the initial movers into a market. Their utilization of the vehicles aligns perfectly well with the strengths of hydrogen and the whole idea of basically having a centralized fleet that's going out and back on a regular basis, that aligns perfectly well with what we're trying to do as far as setting up those initial stations. So we see the fleets as being those initial movers into the market, establishing the market, allowing that hydrogen infrastructure to grow, and thereby allowing the light duty vehicles to enter into the market. So it's a completely different philosophy than what we're seeing in California, and we think it's an ideal fit for both here in Colorado and even beyond.

Brian: Absolutely. And I think I will add that a commercial vehicle that's driven all day will probably use 20 times the hydrogen that a passenger vehicle is going to take. And so it takes a lot less vehicles to provide a return on investment for those fuel stations. So, speaking of fuel stations, let's talk about that a little bit. What is new New Day Hydrogen's plan to provide green hydrogen at a competitive cost and at an economical scale to match this developing market?

Buford: Yeah, that's ultimately what we're trying to do is trying to get to the point where we're establishing the infrastructure, driving the cost of the fuel down to that rough parity with diesel. And really, the way that we're doing that is through high utilization of the station. So the more vehicles that we have, the more hydrogen we're turning over, the more economical we can set up the hydrogen for.

So, as I indicated, our intentions are we're reaching out to the individual fleets to set up a fleet that's underpinning this initial station. In order to do that, we probably need somewhere in the neighborhood of ten to 15 medium duty trucks. And Brian, as you said so well, those vehicles use a lot more hydrogen than a passenger vehicle, just like they use a lot more diesel than a passenger vehicle today as well. But the way we're looking at this is that need for ten to 15 vehicles to set up the station. We're not envisioning a single fleet entering the market and saying, yes, I will convert ten to 15 vehicles tomorrow. We're really looking at this more as a grouping of fleets that will partner with us to set up these initial stations, thereby setting it up where we're only needing a couple of vehicles from each individual fleet, thereby really de-risking their position within this, where their requirements are simply one, two, three vehicles as opposed to 15 vehicles. We're really hearing strong messages from our customers that they want to start on a small scale and scale upwards. So that's how we're trying to set this up have multiple fleets starting on a small scale and then scaling upwards and then allowing our stations to grow as they grow out their fleets.

Brian: Well, Buford, I know that you work closely with a lot of the different fleets, not only in Denver, but around the country, and we hear a lot that they want to decarbonize, but they have issues with battery vehicles to meet their needs. Could you talk a little bit about why New Day Hydrogen is really so focused on trying to help these fleet users and the commercial vehicles decarbonize?

Buford: Yeah, it's a challenge that's being put in front of these commercial fleets. They're being faced with a huge challenge of pivoting away from a technology that they know extremely well, diesel technology. Not only do they know the pricing components, they know the ranges, they know how to work on these vehicles. Now they're being asked to pivot away from that to a technology that

admittedly, right now they don't know as well. So we're working with them to figure out, okay, how do we transition? Let's figure out how we make this manageable, as opposed to saying, all right, we're just going to have to shut down your diesel fleet today and convert everything over tomorrow. We simply don't think that's something that anyone is going to be capable of doing. We see it as they've got their long-term budget, their long-term plans. They have conversions or replacements that they are setting up within their own plans. We want to work within their plans as opposed to disrupting their plans. So that's our entire focus at this point in time is we're sitting down with those fleets, figuring out how can we assist them as they transition into this new arena, how can we set this up to make them successful as they're transitioning from a fossil-fuel based fleet to a zero emissions based fleet? There's a lot of interest out there from the fleets. We're getting a lot of very positive feedback, and we think this is the way we're going to allow the market to take off.

Brian: Well, let's switch gears a little bit and let's talk about money. As with any new technology, the early devices are often pretty expensive until the initial design. Engineering costs are amortized and production volumes help drop the price. And just for fun, I did a little research one time and took a look at some technologies that we're all familiar with in today's dollars. Back in 1927, the first refrigerator was about almost $7,500 in today's money. The the first cell phone back in 1983, the Motorola DynaTac, it looked like a brick was $11,200 in today's dollars. The first compact Desk Pro 386 computer back in 1988 was $18,000 to $30,000. And in 1998, the first Sony high-def TV was about $15,500. And of course, we would just laugh at those prices today because they've dropped so much. But let's talk a little bit about the vehicles that are available now, the fuel cell vehicles. And they are a little bit more expensive than gas or diesel and of course the fleets can't really afford that. So what support and things like that is available right now to help bring the cost of those fuel cell vehicles down to parity with diesel so that these early adopter fleets can afford to acquire them?

Buford: And that's really the ultimate question – how do we drive down the cost of the vehicles, of the fuel down to diesel parity? That's ultimately where we want to be because then you get to a location where you've got a vehicle that has the same operating parameters as the diesel vehicles they know today, that's at a similar price point as the vehicles they know today but are true zero emission vehicles. If we get to that point, then this market takes off on its own. It no longer needs assistance.

But as you indicated, right now we need assistance to get the market – really to get the industry – to be able to stand up on its own. And really what we're seeing is there's plenty of assistance that's out there, predominantly from the federal and state government grants and incentives to basically address the cost delta between a fuel cell electric vehicle and the base diesel vehicle. So really driving those costs down to the point of diesel parity.

In addition to that, there are grants and incentives associated with the infrastructure side of things, driving those costs down as well, getting us to the point of an early transition into a diesel parity world – like I said, allowing that market to step itself up. And then, as your point, then you're going to start seeing scale takeover. At that point, you're going to start seeing the industry scale up, start driving those costs down, and really getting to a point where the grants and incentives are no longer needed, but ultimately getting us to that point where you truly have a vehicle that has the same operating parameters as a diesel, the same price as a diesel, but as a zero-emission vehicle. At that point the market takes off on its own.

Brian: That's right. And there's no reason to think that the price of vehicles won't get there because if you look at the complexity of a gasoline or a diesel vehicle compared to a fuel cell vehicle, (there are) a lot less moving parts. So there's no reason why – and many of the experts in the industry also agree - that the price is going to get down to parity or maybe even lower than gas and diesel vehicle.

Well, maybe to kind of recap where we are a little bit. So New Day Hydrogen really has brought together all the stakeholders needed to deploy a hydrogen transportation system. New Day is going to provide the fueling, the fleet users are being brought in, vehicle suppliers, investors, and the support programs for supplementing the cost of things. So how do you see this unfolding in the upcoming months?

Buford: So what's next? Where do we go with all of this? We truly believe that there's a lot of momentum aligning behind what we're trying to do here. As Seth alluded to, we've got a grant from the Colorado OEDIT Office. We've submitted for a grant to DOE's Vehicle Technologies Office. So a lot of these are starting to align for us here relatively quickly. So here in the near future, in the next couple of months, our focus is going to be predominantly on working with our customers, driving down from the conceptual of what we can do down to the specifics of what they need, what exact number of

vehicles, exact type of vehicles, and starting to get all of that aligned, but also working down the pathway of the financial side as well.

So aligning both our customers and the financial side, setting us up to get all of that established and nailed down here within the next couple of months. Once we have that, then really we shift into more of a fabrication mode where we actually fabricate the stations, we actually work with the vehicle providers, getting those vehicles set up and fabricated as well, with the intention of late 2023 - 2024 time frame we're actually going through the fabrication process, going through the permitting process, going through the installation process with the intention of, in late 2024, having that first public facing hydrogen fueling station up and running. Starting to kick off this market within Colorado, but having this set up as a program that is easily replicable across the state of Colorado and across the US. So we can start growing out this market, taking advantage of the capabilities of hydrogen and assisting these fleets as they're working to transition from that fossil fuel based fleet into a zero emission fleet and really kicking this off and getting it up and running very quickly, very soon. In advance of all of the large-scale projects that are trying to be established from the DOE, like the Hydrogen Hub programs, we think we're ready now to get this established, kicked off and running.

Brian: Well, Buford and Seth, thank you for the work that you're doing. I know you've both spent two years of your life trying to get this off the ground and all that hard work is really starting to pay off. And I'm in contact with hydrogen advocates all over the world. And to my knowledge, New Day Hydrogen is the only group, public or private, that's really addressing this complete picture of bringing together the fueling, the users, the vehicle and the financial support in one package. And it seems clear that really, this is the model that needs to be deployed around the world to get Hydrogen transportation market established.

Well, listeners, again, I've been talking with Seth Terry and Buford bar with New Day hydrogen. And the website for New Day is all one word, newdayhydrogen.com. And if fleets or investors or someone else in the world who wants to try to do this want to reach out to New Day Hydrogen, probably the best way to do that is to contact Seth at Seth@newdayhydrogen.com or Buford at buford@newdayhydrogen.com . But before we wrap up Seth, do you have anything you'd like to add?

Seth: Yeah. Thanks, Brian. I'd really like to just add on and echo Buford's thoughts regarding how excited we are to be working with the folks in the Globeville area Swansea neighborhood as well as CSU Spur and the National Western Center. I think that one thing that should be pretty apparent here is that this is something that we're doing. We're on the leading edge of doing this for an important emerging sector. Therefore, we really see ourselves as a big tent company. Very grateful for all the support that we get, whether it be from Colorado OEDIT on the grant side or hopefully from some federal grant support, but also the fleet stakeholders that we've mentioned for their support and then obviously moving forward to continue working with us. And then of course, that goes back to the campus and neighborhoods as we were speaking there. And then one other thing, I would echo that Buford said is that we really do feel like at the scale of the micro hub sites that we're proposing, we have a repeatable and replicable model that we can roll out across other transportation impacted communities across North America. We've been speaking to folks on both coasts as well as up in Canada, and we're getting some support and we're really starting to feel a bit of pull here. So thank you very much. Appreciate the time.

Brian: Well, thank you, Seth. And I'll also add that the Colorado Energy Office and the Colorado Department of Transportation have both been very supportive of this idea and we thank them for their support. So Buford, would you like to add anything else?

Buford: Yeah, the only other things I wanted to add: definitely Brian, appreciate all the efforts that you and Colorado Hydrogen Network have done really supporting the growth of hydrogen here in Colorado and here within the Front Range and really spreading the word. That's extremely helpful. We're very excited about the project we have. We're very excited about the partnerships that we've been able to develop, but there's always room for more within that tent that Seth alluded to. So if there are fleets out there, if there are others that are interested in what we're doing, please feel free to reach out to us. We'd love to talk to you about it and kind of walk you through what we're doing and hopefully continue to grow that partnership and really set this up to take off and really establish hydrogen here in Colorado. But as a first step for beyond as well.

Brian: All right, great. Well, thank you both again for your time to be with us today, as well as the work that you're doing.

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So until next time, this is Brian de Bruin wishing you health and prosperity. Goodbye.