

Speaker 1 ([00:00](#)):

This podcast episode reflects the opinions of the hosts and guests and not of Greenberg Traurig, LLP. This episode is presented for informational purposes only and it is not intended to be construed or used as general legal advice nor a solicitation of any type.

Bill Garner ([00:14](#)):

Welcome to Greenberg Traurig's E2 Law Podcast, where we discuss hot, global topics related to environmental and energy law. This two-part episode focuses on the US and European federal and state governmental roles in hydrogen development with Greenberg Traurig attorneys, Marijn Bodelier of Amsterdam, Martin Borning of Berlin, Pietro Caliceti of Milan, and me, Bill Garner.

Bill Garner ([00:49](#)):

Our special guests on this podcast are Heike Bernhardt of the German engineering firm of DEEP.KBB of Hanover, Frederik de Vries from Dutch consulting firm, Rebel Group, of Rotterdam, and Katrina Fritz, the Executive Director of the California Stationary Fuel Collaborative in the United States. In this segment we discuss US federal and state policies, as well as European Union and Dutch policies regarding hydrogen.

Speaker 3 ([01:22](#)):

So the speakers today, we'll go first with Katrina Fritz, who's an American, who lives so far north in America that she could be a Canadian. In fact she was telling us a story that when she grew up she lived so far north that Canadian coins were interchangeable with American coins, and then Marijn Bodelier is going to follow and talk about European Union and Dutch policy thereafter.

Speaker 3 ([01:47](#)):

So let's go first to Katrina. Katrina is the Executive Director of the Stationary Fuel Cell Collaborative, which guides policy development of US states, local US air districts, and American industry. She works with The National Fuel Cell Research Center and state clean energy policy. She serves as an expert to the European Union Commission for hydrogen fuel cell research and innovation, and previously has held leadership positions in numerous trade associations and advisory boards, including the California Hydrogen Business Council, the IEA's Fuel Cell Working Group, the US Fuel Cell and Hydrogen Energy Association, the Alliance for Clean Energy in New York, the Pacific Clean Energy Application Center at The University of California, Berkeley, and the Connecticut Fuel Cell and Hydrogen Coalition. I think you can see that Katrina is an expert on hydrogen fuel cells and policy, and so with that, Katrina, take it away.

Katrina Fritz ([02:51](#)):

Thank you very much, and thank you to Greenberg Traurig for inviting me to kick off this panel discussion today. So I'll start by just setting some background and going through some of the policy drivers that have enabled the development thus far of fuel cells and hydrogen in the US and beyond. So the first is increased penetration of renewables. As we start to use more and more intermittent renewables, there is all also a need for firm power resources like fuel cell systems. In this picture you can see an example from Korea, where they are using 78.96 megawatts of fuel cells at one site to generate power for about 44,000 homes. This kind of firm power is necessary alongside those renewable resources.

Katrina Fritz ([03:43](#)):

Resilience and grid outages is another huge topic in the US. We have grid outages it seems like everywhere now. It was California for the past few years during wildfires. They also have instituted public safety power shutoffs in California, where they purposefully turn the power off to prevent wildfires. But you've probably heard about the outages in Texas. We even had, I think, downstate in Michigan five to six extended outages this year, and the East Coast also has annual grid outages. So big topic, and we're trying to figure out how to make our grid both more reliable and more resilient.

Katrina Fritz ([04:21](#)):

Decarbonization. Decarbonization is a global theme. I don't need to explain that to everyone on the heels of the COP26 summit, but that did include hydrogen this time. The summit included hydrogen, and as I will talk about later, so is US federal policy including hydrogen in their energy strategy.

Katrina Fritz ([04:41](#)):

Zero emission transportation in goods movement. This is use of hydrogen across the board. At ports, in ferries, in vehicles, buses, forklifts, material handling, aviation. Some of these are difficult to electrify sectors with batteries, and that is a big driver for the hydrogen market there.

Katrina Fritz ([05:03](#)):

And community health risk mitigation and equity. In addition to greenhouse gas emission reduction, carbon reduction, air quality improvement is required. And it's usually the disadvantaged communities that are suffering from disproportionate health impacts of air quality, and criteria air pollutants air toxics, and fuel cells can directly address that because they don't produce any air emissions.

Katrina Fritz ([05:31](#)):

So, as I said, there's a focus on air quality. A natural gas generator has an increased level and diesel generators are highly emitting devices. So for any of the sectors that are replacing diesel generators with fuel cell systems and hydrogen-based fuel cell systems, they are seeing more reliability, they are seeing easy refueling. They are cost effective. The payback period has shortened as thousands of these smaller fuel cell units are being used now, and of course they have this environmental win. You know, in California, there is this urgent need for emissions-free resilience as I described.

Katrina Fritz ([06:12](#)):

And the Southeast is another example where they have hurricanes quite frequently. They were one of the first, they really were, in my opinion... The first mass uptake of the fuel cell systems was in the Southeast to address communication outages at cell towers during the power outages that follow the hurricanes, and California is the second largest user of these, both at utility sites, at railroad crossings, traffic stops, as well as this much larger telecommunication sector for backup power. So these are one-to-one replacements, as I said, for diesel generators strictly for backup power. Therefore without the criteria air pollutant emissions, The California Air Resources Board has great interest in using fuel cells as part of their portfolio of zero and near zero emission technologies.

Katrina Fritz ([07:07](#)):

Stationary fuel cell systems can run off of natural gas, biogas, or direct hydrogen today. And from a policy perspective in the US, there are a lot of drivers to use hydrogen directly and eliminate any of the

natural gas options, and I will talk more about that as well. So the California Air Resources Board here is tracking the use to fuel cell systems across the US. So really all over the country, but as I said, there's a cluster in California, the Southeast, and the Northeast, and those are areas where they really do suffer more from the natural disasters and the grid outages.

Katrina Fritz ([07:47](#)):

The air districts. California is divided into 32 different air districts as well who are each individually responsible for their emissions, and they also are supporters, I would say, of hydrogen and fuel cells, and include them in their district level policy. Data centers are also seen as a huge market for fuel cell systems right now. Data centers are being built up into the 100 megawatt plus range. And some data centers started out using fuel cell several years ago, so they may be grid tide but they want to generate renewable power from solar and wind resources on site at the data centers and to use the hydrogen from electrolysis generated from those renewables on site in fuel cell systems that would be a one for one replacement for the backup power diesel generators.

Katrina Fritz ([08:39](#)):

Similar to this concept are fuel cell based microgrids. Microgrids are a very large topic right now in California, in New Jersey. Fuel cells are being used in microgrids across the Northeast. Here's a couple examples. The Marcus Garvey Village. It's a low income housing development that was newly built, and they were able to build a system with solar and batteries and fuel cell systems, because the fuel cell systems can provide the resilient power when the grid does go down.

Katrina Fritz ([09:10](#)):

And the Stone Edge Farm Microgrid is a great example of future microgrid systems that we should see, where there is a solar array generating power, there is an electrolyzer on site generating hydrogen from the excess solar power, there is battery energy storage, and you have a picture here of plug power fuel cell systems that are able to use that hydrogen to both peak shave the grid as well as provide backup power. That microgrid is powering all the time, a 100%, an elementary school, a library, a senior center, and a hospital, and when the grid goes down, that microgrid takes over the load for the gas station and the supermarket locally, which are critical services when you have a massive power outage.

Katrina Fritz ([10:00](#)):

But here's an example of a Ballard hydrogen based fuel cell system. Refineries, steel industry, these are all considered difficult to electrify sectors and sectors that can make a huge impact if we can decarbonize them. So Ballard is demonstrating at this point a one megawatt fuel cell system that is powering a refinery and it's producing the hydrogen right there on site as well.

Katrina Fritz ([10:27](#)):

And a similar system but much larger, a 50 megawatts, is in Korea. This is a byproduct hydrogen fuel cell power plant. So that hydrogen comes from a co-located chemical plant, and they have built this 50 megawatt fuel cell plant to use the hydrogen that's coming off of that chemical plant and put it onto the grid powering about 160,000 homes. The reason Korea is building these really large scale fuel cell and hydrogen systems is that they include fuel cell systems in their renewable portfolio standard. Now they felt very early on that they needed to have as many resources available as possible, and they see this fuel cells and their ability to use both natural gas today and hydrogen in the future as a great way to do

that, and to use less land. That's a key factor here. It's a key driver. And they were able to stack those fuel cell systems in two storeys, and then on the top they put the cooling tower, saving a lot of space.

Katrina Fritz ([11:34](#)):

So that's where we are today. And where are we headed? You have the solar and the wind resources that can run through an electrolyzer system and create hydrogen. That hydrogen can then be used for electric generation, for resilient and reliable power, for fueling hydrogen fuel cell vehicles, which include light duty vehicles, heavy duty vehicles, material handling vehicles, the shipping sector that I talked about earlier, and hydrogen injection into the natural gas pipeline. This is one of the topics I think we will be talking about today with the rest of the group.

Katrina Fritz ([12:16](#)):

The US is just starting to think about hydrogen injection in their various grid modernization and gas planning forums. There are currently proceedings in California, Connecticut, Massachusetts, and New York, those are the states I'm aware of, there may be more, where they are talking about the future of the grid. And they are talking about the level of electrification, as well as the level of renewable gas that will be used in the future, and should they continue to use and repurpose the existing gas infrastructure. So recognizing that hydrogen enables long duration, resilience, reliability, and seasonal storage at a scale that just isn't possible with batteries alone. There is a lot of support for decarbonizing with hydrogen and that supplements that electrification scenario. So it's not an either or, it's a both scenario moving forward.

Katrina Fritz ([13:14](#)):

Also I think it's necessary that we start sharing some regional standards and definitions to facilitate this movement through the pipeline, and there are some large scale projects being developed that will attempt to address that. There has been talk of conversion of some power production plants to using hydrogen that were formerly used to combine cycle natural gas plants. And another discussion point that needs to move a little faster, I believe, in the US is the access to wholesale market rates, for electrolyzers, especially, to generate this hydrogen.

Katrina Fritz ([13:50](#)):

So today the West Coast, East Coast have the most supportive policy for fuel cells and hydrogen. I would not say it's sufficient policy, it's nascent still, but it is there. There's a lot of support for vehicle and hydrogen fueling infrastructure in California. They just announced additional support through the California Energy Commission this week. There are over 12,000 fuel cell cars on the road in California today. That's the really large number and it's expanding exponentially. There are almost 50 buses and there will be close to a 100 buses that are under development right now in California.

Katrina Fritz ([14:33](#)):

Oregon and Washington want to move straight to that 100% renewable scenario so they have put policies in place to support the development of renewable hydrogen. New York has recently announced some of those. They've traditionally been a supporter of fuel cell systems. They do include fuel cells and renewable hydrogen. The names are changing rapidly. So their former clean energy standard, which now falls under the Climate Leadership and Community Protection Act, so the CLCPA for short, is what is mandating that all of the new resources and any resources that are supported by the government funding be 100% renewable. So fuel cells and hydrogen as 100% renewable are included in that.

Katrina Fritz ([15:22](#)):

Connecticut has a lot of the fuel cell companies and they are looking at decarbonization pathways and how to... Perhaps I would like them to look at, using some of the offshore wind resources that are in Long Island Sound and off the coast of Rhode Island, to produce hydrogen. And New Jersey. I know there are some utilities in New Jersey looking at hydrogen and how they can produce it from their offshore wind resources.

Katrina Fritz ([15:50](#)):

And there still is a federal investment tax credit through 2022 for fuel cell systems and hydrogen infrastructure. President Biden signed the Infrastructure Investment and Jobs Act, which includes an unprecedented amount for support of clean hydrogen. \$9.5 billion, this is the direct funding allocated to hydrogen in that act. So this allocates \$8 billion for regional clean hydrogen hubs.

Katrina Fritz ([16:20](#)):

For those of you from the EU, if you're familiar with the hydrogen valley concept, this is very similar. They want to have regional hydrogen hubs where hydrogen's being produced from different sources, from renewables, from nuclear, to prove out how it can be produced from these diverse sources, as well as multi-sector end use of that hydrogen in these different regions. So it's \$8 billion for at least four, that is the language, so at least four projects, and you can anticipate that there probably will be more than four for that amount of funding. The clean hydrogen electrolysis program, \$1 billion for the demonstration, commercialization, and deployment of electrolyzers, which really should go a long way toward helping the cost effectiveness of the electrolyzers, and as I would say, it'll catapult the US to be a leader in this area.

Katrina Fritz ([17:15](#)):

Clean hydrogen manufacturing and recycling, \$500 million for that investment in the domestic supply chain. Reestablishing the DOE's larger clean hydrogen research and development program. And creating a clean hydrogen strategy and roadmap. That includes a carbon intensity standards. This is an interesting topic because right now there's a lot of discussion about the colors of hydrogen, and there's a lot of debate and subjectivity, I think, involved in discussing the colors of hydrogen. This takes that and makes a more objective standard for carbon intensity at the federal level that could then set a precedent to, I would say, expedite some of this policy at the state level.

Katrina Fritz ([18:00](#)):

And these are additional areas that are supported within that act that could also support hydrogen and fuel cells topics that I've talked about, air quality, transportational electrification, alternative fuel infrastructure, resiliency and reliability, and the transportation, including the ferries, buses, and ports as well, as well as energy storage, which can include hydrogen energy storage. So those are the highlights from the US. Thank you very much.

Bill Garner ([18:33](#)):

This concludes part one of our podcast, stay tuned to the next episode, part two.