



California Hydrogen Car Owners Association (CHCOA) Proton Monthly – October 2023, Issue B

Oct. 31, 2023

A David and Goliath moment for fuel cell cars?

Perhaps.

- David; that would be us. Small in stature, but with great determination.
- Goliath; our task at hand. Initially, 200 H₂ stations in the next 7 years. That's 146 new stations, an average of more than 20 stations each year! Certainly a Herculean effort is required (I'm mixing up my lessons of antiquity here), but we are up to the task!

There have been a number of articles lately and a lot of chatter on Facebook about the automakers pulling back on their commitment to light-duty (LD) FCEVs, but there have been just as many, if not more, articles about automakers who are looking forward to a bright sales future for hydrogen cars. To find out first hand how one automaker sees the LD FCEV future, we went to the source, interviewing Jackie Birdsall, Senior Engineering Manager of the Fuel Cell Integration Group for Toyota North America. Jackie's view, when asked about how Toyota sees the future for the Mirai: "...we are still committed for the long haul!" We'll take that! Read about our conversation with Jackie, below.

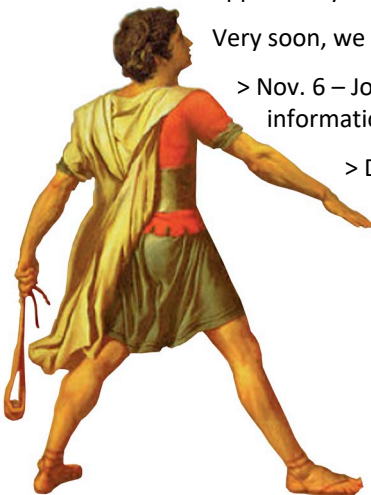
Bobbie and I are catching up on our backlog, and as long promised, we have included our notes on a most thought-provoking conversation with Mik Skvarla and Teresa Cooke. Together, these two make quite a team, possessing a storehouse of knowledge about the hydrogen industry in CA. In our September meeting, and follow-up emails, two themes deserve a special highlight here:

- 1) As important as our goal of 200 stations by 2030 is, it is critically important that we not lose sight of the steadfast and visionary goal of constructing enough stations to ensure that these cars play their part in California's green energy future. Different organizations have proposed varying long-term goals. In the UC Davis Base Scenario, 1,400 stations will be needed by 2045, 22 years from now.
- 2) We won't get to 200 stations, much less 1,400, without a committed and ongoing advocacy of FCEV drivers. As Teresa put it, when asked what drivers can do to help, she replied, "Successful politics involves grassroots advocacy; we need to stack the room or the Zoom with FCEV drivers any time there is an opportunity to do so."

Very soon, we have two great opportunities to stack the room or the Zoom:

- > Nov. 6 – Joint CA Agency FCEV Customer Experience Workshop: This is a virtual-only event. For more information and Zoom link: <https://h2tonps.org/fcev-workshop-11%2F6%2F23>
- > Dec. 3 – **SAVE THE DATE** – LD FCEV Drivers Town Hall: Co-sponsored by the Office of CA State Senator Newman, CHCOA, et al. This will be both in-person and virtual. More information to come.

- Greg and Bobbie Cane
greg@h2tonps.org or bobbie@h2tonps.org



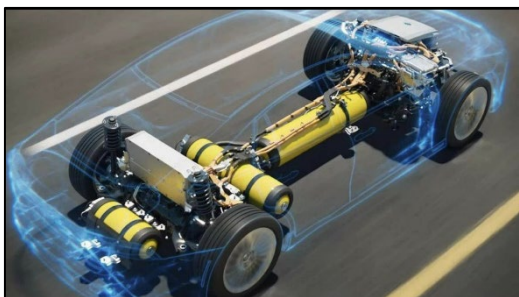
Interview with Toyota's Jackie Birdsall

By Bobbie Cane

On a beautiful day in mid-August, we went to the Toyota Research and Development Facility in Gardena, California to take a tour and speak with Senior Engineering Manager, Jackie Birdsall. After signing a Non-Disclosure Agreement (NDA), we were led into the inner workings of this fascinating research center.

One of the first things we observed was the innards of a fuel cell, and quickly realized that our previous conception of what the fuel cell looked like inside had been incorrect! The fuel cells are placed across the top vertically, close together, like files in a file cabinet, not down horizontally, like we had thought. The compressed and filtered air flows freely over the membranes and everything except O₂ passes out through the exhaust.

After that humbling realization, we then moved on to other parts of the facility, such as the testing lab for emissions, the semi-truck testing and development area, and the calibration/testing area for cars and semi's. There were some aspects of our tour that we



Cutaway view of Gen 2 Mirai

cannot mention (remember that NDA?) but we can say that what we did see has positive implications for the future!

As many of you know, in the newer Mirais there are three tanks; one main tank, about 4.5' in length, sits lengthwise with two shorter tanks placed crosswise in the middle/back of the car (see figure). The tanks are composed of three layers: an interior polymer that keeps H₂ from passing through, a middle layer made of carbon fiber for strength, and an outer layer made of glass fiber for protection against the elements; all told, the layers are about 1.25" thick.

One question Greg and I are often asked from

Birdsall Interview (cont.)

interested folks is about the safety of the hydrogen in the car. Jackie told us that in crash testing, no tanks have ever ruptured. Additionally, as a part of the initial testing, Toyota hired a skilled ex-military sniper to fire an armor-piercing round at the tank from 40 meters away. The tank was penetrated but did not catch fire as there was no ignition source or metal near the tank. Normal bullets do not pierce the tank (which should be a comfort to you if you are ever in a high-speed chase with the police 😊!) In addition, she explained that in a fire, there is a metal plug that melts at very high temperatures to safely vent the hydrogen down and to the rear of the car.

Next, Jackie showed us the testing area. One of the primary functions of their testing and calibration labs is sizing the batteries to make sure they are big enough to supplement the vehicles' fuel cells in all possible driving conditions. In a separate area, they are working on making a fuel cell generator that, ironically, may one day be used to charge battery electric vehicles.

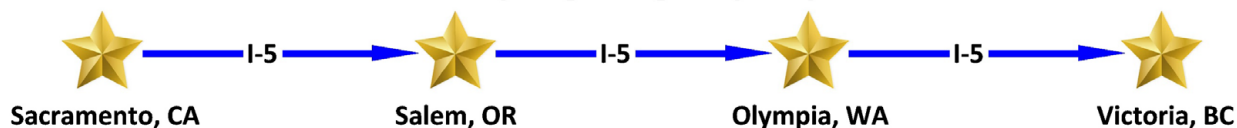
Toyota is working with Peterbilt and Kenworth to build fuel cell trucks. Outside there were earlier versions of these test trucks, now considered "show dollies". The trucks use the same fuel cells stacks that are in the Gen 2 Mirai; two are used, one atop the other. Next year, in Kentucky, they are going into production on the next generation of semi-trucks.

Jackie is currently working with Washington and Oregon as they prepare to introduce H₂ vehicles into their states. She is assisting them with formulating their codes, drawing on her experience with problems encountered in California. For example, requiring the stations to have minimum uptimes, and an inventory of parts, etc.

That discussion provided a segway for questions related to the frustrations that California drivers are having with station reliability and fuel price. Jackie is a Mirai driver herself and knows first-hand of these frustrations. It's a bit easier for her to refuel because they have an H₂ station on site. (However, on that particular day, it was not functioning.) She said having their own station helps them to understand the problems with the equipment, including parts that frequently need to be replaced, etc.

Toyota has invested a lot of money over the years in fuel cell technology. Given the problems that fuel cell car

Join us on the Hydrogen Highway - September 2025



Birdsall Interview (cont)



Jackie and I with our Mirai

drivers have been having with station reliability and hydrogen pricing (as well as the lack of robust government support for the fuel cell industry) we asked her if Toyota is still committed to making the Mirai? Her answer was an enthusiastic, "Yes, we are still committed for the long haul!". We were very glad to hear that, and very satisfied with our tour!

- - -

Hydrogen Car Decals Available



Image of Decal

3" X 8" Vinyl Decal

Some folks have said that they would like a way of identifying their FCEV as a hydrogen car. We had these made and have placed one each on the rear passenger windows of our Mirai.



Decal on Car Window

On my second try at applying them, they worked fine (it never hurts to read the directions first).

These are free, but a donation to cover our costs (\$5.00 each) would be appreciated. To order, contact me at greg@h2tonps.org.

Teresa Cooke and Mik Skvarla

- Teamed Advocacy for Hydrogen -

On Sept. 18, we sat down with Mik Skvarla, H₂ lobbyist for the California Hydrogen Coalition (CHC) and the CA Hydrogen Business Council (CHBC) and his wife, Teresa Cooke, CEO of CHC and lobbyist for CHBC; and their beautiful baby daughter Mila, at Mik's office at The Gualco Group. Together, these



Mikhael (Mik) Škvarla



Teresa Cooke

two make quite a team, possessing a storehouse of knowledge about the hydrogen industry in CA. As promised in last month's Proton Monthly, a summary of our interview with Mik and Teresa follows:

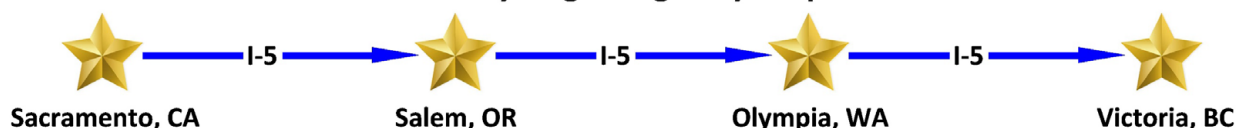
CHCOA: *We believe that it is undeniable that the lack of reliable hydrogen fueling infrastructure in California is single-handedly thwarting the success of these cars in the U.S. Tapping into your combined breadth of knowledge, what do you see on the horizon that could address the lack of H₂ refueling stations?*

Mik and Teresa (M&T): There is good news, including the following:

- Chevron has partnered with Iwatani to build 30 stations in CA. They are doing this without government funding, and therefore will have much more flexibility in how these are deployed. Their first station is in Vacaville. It will serve both light duty (LD) and medium duty (MD) FCEVs and will be opening soon.
- First Element (True Zero) remains active and several new stations are in the development or construction phase. Additionally, they are constructing a plant in Santa Ana to manufacture their own equipment (*ed., The facility is now open.*).
- Truck stops, for example Flying J, will likely incorporate LD dispensers into their designs.

CHCOA: *What do you see as some of the greatest*

Join us on the Hydrogen Highway - September 2025



Cooke and Skvarla (cont.)

challenges to building more LD stations?

M&T: Here are a few:

- Permitting time is one of the biggest challenges. Recently it took 900 days to review and approve the permit for one station;
- Opposition from the Battery Electric Vehicle (BEV) and environmental folks. We are not always sure why they oppose hydrogen cars, but some do;
- Inadequate funding for this nascent technology;
- Grant funding from the California Energy Commission (CEC) has been problematic. One example, in the 2020 funding cycle, only two grants were awarded. Additionally, due to inflation, there has been a 20% drop in the award cap;
- For politicians, it's tougher to support infrastructure for hydrogen in transportation because it takes a long time to build this industry, so there is not an instant political result that they can point to (unlike with BEV charging stations which can be built much more quickly);
- Clearly, H₂ fueling stations are more expensive to build than BEV charging stations. However, considering these construction costs, dollar for dollar H₂ stations provide 3 times the energy transfer.

CHCOA: Will the Governor sign AB126?

M&T: Absolutely! We strongly believe that it will get the Governor's signature, (ed., It happened on 10/7/23) and then we need to get to work on building the stations that should result from this funding. (As a reminder from Teresa's article in last month's newsletter, AB 126 provides a minimum of 15% of the funds appropriated by the Legislature from the Alternative and Renewable Fuel and Vehicle Technology Fund for hydrogen station construction until July 2030, resulting in at least \$106,353,000.)

CHCOA: Are there other hopeful signs on the horizon for H₂ in general?

M&T: The big opportunity now is using biomass to produce H₂. This is especially valuable for vegetation cleared for wildfire risk mitigation. The process is actually more efficient than electrolysis. The new H₂ biogas plant

Cooke and Skvarla (cont.)

in Oroville will be carbon negative. (ed., The plant will produce 7 million kilograms of renewable hydrogen per year. It is scheduled to go online in 2026.)

CHCOA: Any final thoughts?

M&T: The last 20% of work takes 50% of the effort!

CHCOA: What can CHCOA do to help?

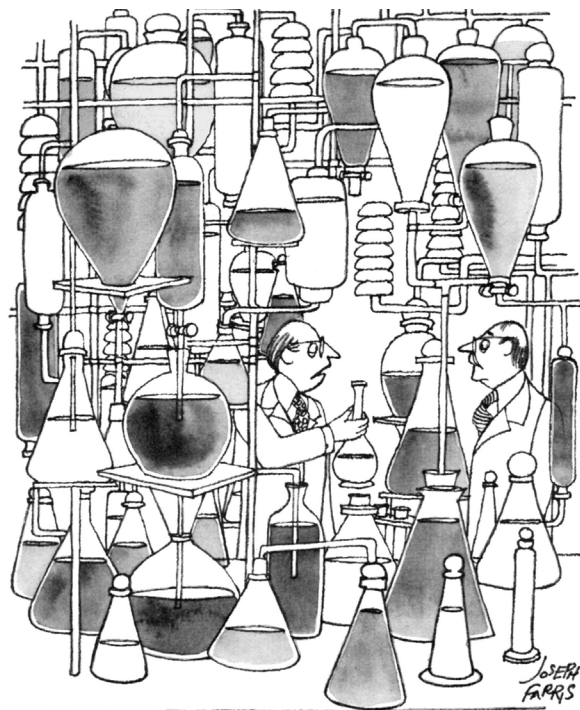
M&T: Successful politics involves:

- Argument
- Data
- Grassroots advocacy; we need to stack the room or the Zoom with FCEV drivers any time there is an opportunity to do so.

. . . Mik and Teresa confirmed at the end that they are both FCEV drivers 😊.

- - -

Hydrogen Funny Pages



"Fourteen months ago, I started with H₂O.
I just ended with H₂O."

CartoonStock.com

- The Fuel Cell Process -

Join us on the Hydrogen Highway - September 2025

