

## Trend Memo

### Trend Memo (Part I): Hydrogen Fueling Station Development Under Way in the U.S.

Fuel cell electric vehicles (FCEVs) are attracting consumer, enthusiast and media attention as an alternative to today's cars, with no fuel combustion and zero tailpipe emissions, a driving range in the hundreds of miles, and fast and easy hydrogen refueling that takes just minutes, similar to filling up at gas stations today.

Reports from recent auto shows feature new and exciting FCEVs from Audi, Honda, Hyundai, Toyota, and Volkswagen; show customers in southern California and Vancouver, Canada, receiving keys for Hyundai Tucson FCEVs; and discuss automaker plans to sell FCEVs—Toyota at the end of 2015, Honda in 2016, and Daimler and others to follow.

These news stories have naturally led to questions about the current, and future, availability of hydrogen fuel to support FCEVs. Few outside the industry realize the current scale of U.S. hydrogen production—currently [about 10-11 million metric tons annually](#)<sup>i</sup>—enough to fuel 20-30 million cars, and the scope of efforts currently underway to build America's hydrogen fueling infrastructure.

High profile industry partnerships—which include automakers, hydrogen fuel companies, and government agencies—are working to facilitate the buildup of hydrogen stations nationwide. The federal government, and a number of state governments, support the development of hydrogen fueling stations to increase the number of zero-emission vehicles on roadways, helping to meet greenhouse gas reduction goals.

Recently, the Massachusetts Hydrogen Coalition said that [fuel cell cars could be operating in Massachusetts by the end of 2015](#). The state presently has one fueling station in Billerica. By April 2015, two new hydrogen stations will be located in Charlestown and Braintree, with more to follow.

On the west coast, the California State University, Los Angeles hydrogen station became the [first in the state to be certified to sell hydrogen fuel to the public](#). The facility passed a rigorous state safety and performance evaluation and is now allowed to sell hydrogen by the kilogram to drivers of FCEVs, a process similar to selling gasoline by the gallon.



*Hyundai Tucson Fuel Cell*



*Toyota Mirai*



*Honda FCV Concept*



*Volkswagen Golf SportWagen HyMotion*



*Audi A7 Sportback h tron quattro*



*Cal State LA's public hydrogen station*

In 2014, hydrogen fueling station development took a step forward with significant policy efforts and funding commitments that will enable the number of hydrogen fueling stations to grow across the U.S., Europe, and Asia. U.S. support includes federal activity through the U.S. Department of Energy (DOE), many national laboratories working on fuel cell and hydrogen activity, state-level assistance in California, and collaboration of automakers and hydrogen suppliers:

- The [H<sub>2</sub>USA](#) public-private collaboration, which is working to accelerate the rollout of a U.S. hydrogen fueling infrastructure for FCEVs, welcomed a number of new participants, including the State of California and the Northeast States for Coordinated Air Use Management (NESCAUM). To support H<sub>2</sub>USA, DOE's Fuel Cell Technologies Office established [Hydrogen Fueling Infrastructure Research and Station Technology \(H<sub>2</sub>FIRST\)](#), a collaborative effort between Sandia National Laboratories and the National Renewable Energy Laboratory to provide access to world-class technical facilities to demonstrate hydrogen refueling technologies and infrastructure, reduce the cost and time of new fueling station construction, and improve station availability and reliability.
- The [California Energy Commission awarded \\$46.6 million](#) from the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP) for 28 new public hydrogen stations and one mobile refueler. This award adds 13 new stations in Northern California and 15 in Southern California. Six of the stations will use 100% renewably-generated hydrogen. California's state government plans to fund at least 100 hydrogen stations with a commitment of up to \$20 million per year.
- Honda and Toyota are also committing resources to support California's hydrogen station development. FirstElement Fuel, which was awarded more than \$27.5 million in ARFVTP funding for 19 hydrogen stations, [will receive a \\$7.3 million loan from Toyota](#) to aid in the development of these stations. Air Products will supply FirstElement with its SmartFuel® hydrogen fueling stations for these sites. [Honda also signed a letter of intent to provide \\$13.8 million](#) in financial assistance to FirstElement to build additional hydrogen fueling stations in the state.
- [Toyota and Air Liquide are partnering to develop a phased network of 12 hydrogen stations](#) in New York, New Jersey, Massachusetts, Connecticut and Rhode Island to provide the backbone of a northeast corridor of hydrogen stations.
- A [DOE and General Services Administration-funded feasibility study](#) recommends that a public hydrogen fueling station be developed at Fort Armstrong (Honolulu, Hawaii) to support 85-100 vehicles. The facility, which would include a solar array and small H<sub>2</sub> production and distribution station, is intended to be a flagship installation, establishing a renewable hydrogen infrastructure in Hawaii for other government and private entities to follow.

For additional information on worldwide hydrogen fueling infrastructure development, see *Trend Memo (Part II): Hydrogen Fueling Station Development Under Way Internationally*.

URL: [www.fchea.org/s/Trend-Memo-Hydrogen-Fueling-Stations-International.docx](http://www.fchea.org/s/Trend-Memo-Hydrogen-Fueling-Stations-International.docx)

To learn more about FCEVs and hydrogen infrastructure, please visit the Fuel Cell and Hydrogen Energy Association web page, [www.fchea.org/media-kit](http://www.fchea.org/media-kit), or contact us at [info@fchea.org](mailto:info@fchea.org) to reach experts for interviews, images, quotes, or connections to member companies.

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<sup>i</sup> Also see [http://www.hydrogen.energy.gov/pdfs/12014\\_current\\_us\\_hydrogen\\_production.pdf](http://www.hydrogen.energy.gov/pdfs/12014_current_us_hydrogen_production.pdf)