CA Roadmap to Fuel Cell Vehicles: 68 Stations

OVERVIEW

Successful introduction and commercialization of fuel cell electric vehicles (FCEVs) in California will require a comprehensive network of hydrogen fueling stations that is adequate to create the level of consumer confidence essential for enabling an early market; with a sufficient network of stations, consumers will have certainty of station availability and minimal “range anxiety.” With multiple automakers having expressed intent to deploy commercial volumes of FCEVs in the year 2015, the development of such a network of hydrogen stations is critical. Achieving an adequate network of hydrogen fueling stations is challenging because an insufficient network could impede the market success of FCEVs by reducing consumer confidence, while a network that is overbuilt could be exceedingly costly, resulting in longer periods of time to recuperate investments and demonstrate a successful business case.

GOALS

Work with stakeholders such as automakers, fuel providers, and government funders to determine both the number and location of hydrogen stations required for an optimized, sufficient network, thus minimizing up-front equipment capital and targeting investments to where they will be most effectively utilized.

RESULTS

The Spatially and Temporally Resolved Energy and Environment Tool (STREET) developed by the Advanced Power and Energy Program (APEP) at the University of California, Irvine includes the capability to optimize the number and location of alternative fueling stations based on the intersection of multiple land-use, demographic, traffic pattern, and infrastructure data.

STREET is utilized in collaboration with automobile manufacturers and contributes to the California Fuel Cell Partnership’s Strategic Plan for the Rollout of Hydrogen Fueling Stations in California that will enable the introduction of commercial volumes of FCEVs in the state. The Strategic Plan concludes that 68 strategically located hydrogen fueling stations are needed in the State of California (50 new hydrogen fueling stations in addition to the 18 existing or planned stations) by 2015 to enable the introduction of commercial volumes of FCEVs, and determines the geographic distribution of stations that is required in order to fuel these vehicles. when the network of hydrogen fueling stations is sparse, additional stations strategically grow the network and result in large improvements to driver accessibility (i.e., the amount of time that an FCEV customer will have to drive to reach a station). A 68 station network in the state represents a “tipping point” in that a network of fewer than 68 will likely be insufficient to support commercial volumes of FCEVs, and as the network grows beyond 68 stations, it will support commercial volumes of FCEVs and likely become “self-sustaining” as shown in the figure below.

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PERSONNEL

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Legend
- Existing Hydrogen Stations
- Hydrogen Stations Pending or Under Construction
- Hydrogen Stations Needed in 2016

Location of 18 existing and 50 additional hydrogen fueling stations required in California by 2015 to enable commercial volumes of FCEVs

A California network of 68 hydrogen stations lies at the tipping point between insufficient infrastructure and a self-sustaining market