California Hydrogen Highway Network

Hydrogen Infrastructure

California - Committed to Hydrogen Vehicles and Infrastructure

California continues to lead the nation by requiring the development and commercialization of zero emission vehicles that consumers will want to drive. And, convenient reliable fueling infrastructure is vital to commercial success of any alternative fueled vehicle. For hydrogen, this means fueling stations that offer the same convenience that drivers have come to expect with gasoline.

Policy Drivers Create Commitment

California has a number of important legislative and regulatory drivers that support the advancement of hydrogen fuel cell electric vehicles and infrastructure.

The Zero Emission Vehicle (ZEV) regulation requires each large auto maker to produce ZEVs. ZEVs include hydrogen fuel cell electric vehicles, and battery electric vehicles. For details on the ZEV mandate, go to: www.arb.ca.gov/msprog/zev.

Global Warming Solutions Act of 2006—Assembly Bill 32 establishes a comprehensive program of regulatory and market mechanisms to achieve real, quantifiable cost effective reductions of greenhouse gases. The Scoping Plan's Low Carbon Fuel Standard calls for a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020. Hydrogen is an important lower carbon compliance option in this standard. For more information, go to: www.arb.ca.gov/cc/cc.htm.

Environmental and Energy Standards for Hydrogen Production – Senate Bill 1505 (Chapter 887, Statutes 2006) directs the Air Resources Board (ARB) to develop emission reduction requirements for transportation hydrogen. Relative to gasoline 50 percent reduction in Oxides of Nitrogen, 30 percent reduction in greenhouse gas and no increase in toxic air contaminants. In addition, 33.3 percent of the energy source to produce that hydrogen must be renewable. For more information, go to: www.arb.ca.gov/msprog/hydprog/hydprod.htm.

Hydrogen Funding

Federal, state and local governments will continue to support hydrogen vehicle advancement by forming partnerships to fund stations and encourage clean renewable hydrogen production.

Initial California Hydrogen Highway Infrastructure funding provided over $25 million for hydrogen transit buses, light duty passenger vehicles, and hydrogen stations. The State has provided co-funding for 9 stations.

Assembly Bill 118 (Nuñez Statutes of 2007) directs the California Energy Commission to prepare periodic Investment Plans for the Alternative and Renewable Fuel and Vehicle Technology Program. The program makes available approximately $100 million to co-fund alternative fuels projects, a portion of which has been set aside for hydrogen infrastructure.

California Hydrogen Highway Network Evolution

Much progress has been made since the early days of hydrogen infrastructure development.

2005—The Hydrogen Highway Blueprint Plan recommended that initial fueling stations be located in major urban regions. To date, nearly 30 stations have been developed – located in the greater Los Angeles, San Diego, San Francisco, and Sacramento areas. Most of these stations were demonstration/research stations supporting predominantly fleet vehicles. Learnings included station/footprint development, fueling protocols, operations and maintenance, safety and emergency response protocols, reliability, and usage patterns.

2008—In response to numerous meetings with U.S. Fuel Cell Council, and the California Fuel Cell Partnership members, and one-on-one meetings with the major automakers, the State offered co-funding only to those stations located in particular cities (clusters) within the original major four regions of interest. The six clusters with no

formally prescribed boundaries included: Sacramento area, greater San Francisco Bay Area, Santa Monica, Torrance, Irvine and Newport Beach.

2009—The 2009 hydrogen highway solicitations aimed to focus on larger capacity, retail like stations in more targeted neighborhood/communities with demographics matching potential fuel cell vehicle customers, and areas adjacent to well travelled routes (corridors) connecting the clusters.

2010—An in depth analysis of vehicle rollout data by the State, automobile manufacturers, infrastructure providers, and other partners continues. A clearer, further refined vision of immediate infrastructure needs has formed. This includes specific neighborhoods within clusters where additional stations are critically needed. It will include station capacity, number of fueling nozzles, and where the nearest "back-up station" is located. Regions of focus remain: Los Angeles, San Francisco, Sacramento, and San Diego areas.

Hydrogen Vehicle Rollouts

Large scale fuel cell demonstrations are taking place in Germany, Japan, Korea, and elsewhere. Auto manufacturers have committed to significant production numbers with a large percentage targeted to California customers. Vehicle rollout numbers will largely be determined by infrastructure availability and customer acceptance. Automobile manufacturers have submitted plans for deploying fuel cell passenger vehicles in northern and southern California. According to their combined projections, the number of passenger fuel cell vehicles deployed in California will more than double each year between 2010 and 2017, when they expect the total to be over 45,000.

California's Hydrogen Highway Network

By 2017, an estimated 50 to 100 retail hydrogen stations - roughly 10 stations per year – will be needed to satisfy the demand created by the vehicle and bus deployments. These new public stations must meet customer expectations and next generation fuel cell vehicle requirements with regard to location, ease of access, reliability, and dispensing capabilities. Clusters will grow larger and more numerous. More connector/corridor stations will develop and a new type of "destination" station will be built at weekend and vacation locations.

Hydrogen Stations Co-Funded by State of California

Name/Location	State funding (millions)	Capacity (kg H2/day)	Percent Renewable H2
Air Products and Chemicals, Hwy 405 in Fountain Valley	$2.7	100	100%
CalState University, Los Angeles, Hwy 10 at Hwy 710	$2.7	60	100%
Mebtahi Station Services, PCH (Hwy 1) in Harbor City	$1.7	100	0%
Shell Newport Beach	$1.7	100	0%
City of Burbank	$0.3	100	33%
UCLA, SW corner of campus Hwy 405 in Westwood	$1.7	140	0%
Alameda-Contra Costa Transit, Hwy 80 in Emeryville	$2.7	60	100
San Francisco Airport, Hwy 101 in San Bruno	$1.7	100	0%
Oakland AC Transit	$1.1	180	33%
Statewide totals	$16.3	940	33%†

†Statewide average percent renewable hydrogen from State co-funded stations

For More Information

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