



Launching California's Fuel Cell Vehicle Market

Hydrogen Fuel Cell Technical Advisory Committee
April 1-2, 2014

Janea Scott, Commissioner
California Energy Commission



California Transportation: Nation-State Statistics

- Population: 37.8 million
- GDP: \$2.0 trillion – 8th largest global economy
- GHG Emissions: 448 MMT*
 - Transportation accounts for 42% of all GHG emissions in California
- Vehicles: 26 million cars + 1 million trucks
- Annual Fuel Consumption: 17.8 billion gallons
 - 14.5 billion gallons gasoline
 - 3.3 billion gallons diesel

* Source: California Air Resources Board 2011 Inventory



California Energy Commission Commissioners

Five Commission seats, appointed for
five year, staggered terms.

**Chair Robert
Weisenmiller**



Scientist / Engineer

**Commissioner
Janea Scott**



Public Member

**Commissioner
Andrew McAllister**



Economist

**Commissioner
David Hochschild**



Environmental

**Commissioner
Karen Douglas**



Attorney



California Energy Commission

Diverse Responsibilities

- **Energy Analysis**: develop key energy metrics and archive historic data
- **Permitting**: review and permit thermal power plants \geq 50 megawatts (MW)
- **R&D**: research and development program administration (e.g. PIER and EPIC)
- **Energy Efficiency**: promulgate appliance and building energy efficiency regulations (Title 20 & 24)
- **Transportation**: support deployment of alternative vehicles and renewable fueling infrastructure
- **Renewable Energy**: administer renewable incentive programs, provide certification, and verification of renewable generation, and promulgate POU RPS regulations
- **Contingency Planning**: state energy emergency planning and oversight
- **Integrated Energy Policy Report**: publication of the “IEPR,” the State’s official source of energy policy guidance



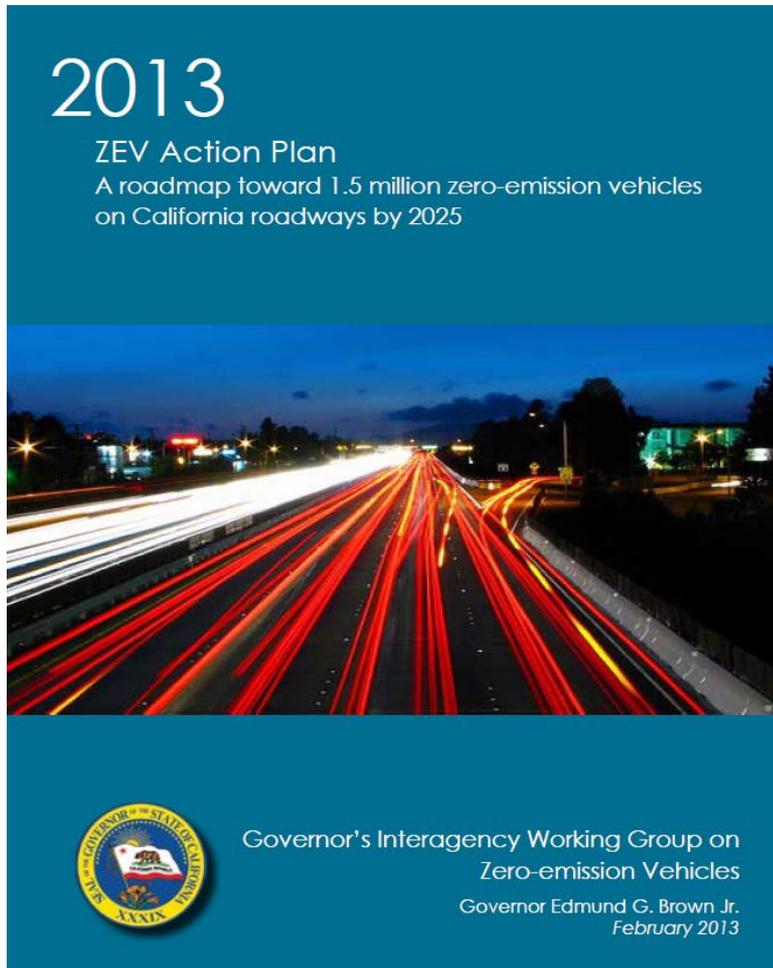


California's Policy Goals and Objectives

Policy Objectives	Goals and Milestones
Global Warming Solutions Act (AB32)	Reduce GHG emissions to 1990 levels by 2020 and 80% below 1990 levels by 2050
Petroleum Reduction	Reduce petroleum fuel use to 15% below 2003 levels by 2020
In-State Biofuels Production	Produce in California 20% of biofuels used in state by 2010, 40% by 2020, and 75% by 2050
Low Carbon Fuel Standard	10% reduction in carbon intensity of transportation fuels in California by 2020
RFS2	36 billion gallons of renewable fuel by 2022
Air Quality	80% reduction in NOx by 2023
Governor Brown's ZEV Executive Order	Accommodate 1M EVs by 2020 and 1.5M by 2025



2013 Zero Emission Vehicle Action Plan

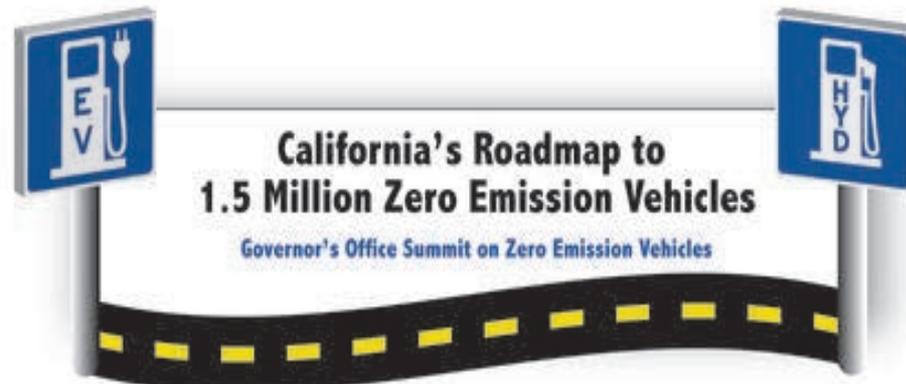


- Partnership of 15 state agencies/entities, including the California Energy Commission
- Oversight by the Governor's Office
- Open, inclusive process, input from broad range of stakeholders
- 123 specific actions (with responsible agencies and timelines)



Governor's Office Zero Emission Vehicle Summit

- **Date:**
 - March 7, 2014
- **Purpose:**
 - Bring together industry, nonprofit, and local and state government leaders to evaluate progress towards achieving the goals of Governor Brown's Executive Order on Zero Emission Vehicles and the ZEV Action Plan.
 - Identify potential updates to the ZEV Action Plan





Alternative and Renewable Fuel and Vehicle Technology Program (California State Assembly Bill 118)

Purpose

To transform California's transportation market into a diverse collection of alternative fuels and technologies and reduce California's dependence on petroleum.

“...develop and deploy innovative technologies that transform California’s fuel and vehicle types to help attain the state’s climate change policies.” (Health and Safety Code Section 44272(a))

Up to \$100 Million in Annual State Funding Program

The Energy Commission will receive up to **\$100 million/year** to implement the ARFVT Program: Fuel Production, Infrastructure, Vehicles, Manufacturing, Training

**Extended through January 1, 2024
(California State Assembly Bill 8)**



ARFVTP Funding Summary: 2009-2013

Investment Areas	Funding Amount (millions)	Percent of Total (%)	Number of Awards
Biofuels	\$118.5	28	45
Electric Drive	\$143.5	35	87
Natural Gas/Propane	\$66.6	16	56
Hydrogen	\$43.6	11	11
Workforce Development	\$25.2	6	39
Market and Program Development	\$15.6	4	26
Total	\$413.0	100	264



California State Assembly Bill 8 (Perea) and California Energy Commission's ARFVTP



- Extends ARFVTP through January 1, 2023
- New hydrogen provisions
 - Designates up to **\$20 million** per year from ARFVTP for hydrogen station funding
 - Goal is network of at least 100 hydrogen stations
 - Air Resources Board and Energy Commission to work collaboratively to assess pace of fuel cell vehicle deployment in California



California Energy Commission Hydrogen Development Projects

Public Station Funding

- 17 New Stations - \$27.1m
- ~ 5 Station Upgrades - \$6.7m
- 11-13 New Stations - \$30m (recent solicitation)

Other Funding Activities

- AC Transit Fuel Cell Bus Station - \$3m
- California Department of Food and Agriculture Division of Weights and Measures (Retail Dispensing Fuel Standards) - \$4m
- UC Irvine STREET Model = \$1.5m
- SCAQMD Regional Readiness - \$299,360





Diamond Bar - California





California Market Development Challenges

H2 Station Development: Complex, Expensive, Slow

Tentative Market Signals between Station Developers and FCV Auto Makers

Uncertainty on Stations ↔ Uncertainty on Cars

Sustainability: Government can facilitate markets
Government can incentivize markets
Government cannot create markets



Hydrogen Fueling Infrastructure (PON-13-607)



- \$30 million available
- Included funding for new stations, renewable fuel stations, upgrades, mobile refuelers, and station O&M
- Sliding scale funding encouraged early project completion
- The solicitation closed in February



Hydrogen Fueling Infrastructure Funding

	Station Operation Dates		
	On or Before October 31, 2015	November 1, 2015 through February 29, 2016	On or After March 1, 2016
O&M Support	100% up to \$100,000 per year (max \$300,000)	80% up to \$80,000 per year (max \$240,000)	60% up to \$60,000 per year (max \$150,000)
Capital Costs	Up to 85% of per station costs or \$2,125,000 (whichever is less).	Up to 75% of per station costs or \$1,875,000 (whichever is less).	Up to 70% of per station costs or \$1,750,000 (whichever is less).



Fuel Cell Vehicles

- **Hyundai** – Leasing Tucson Fuel Cell for \$499 per month, which includes unlimited free hydrogen fuel
- **Toyota** – Planning a market launch in 2015 with initial roll out in California



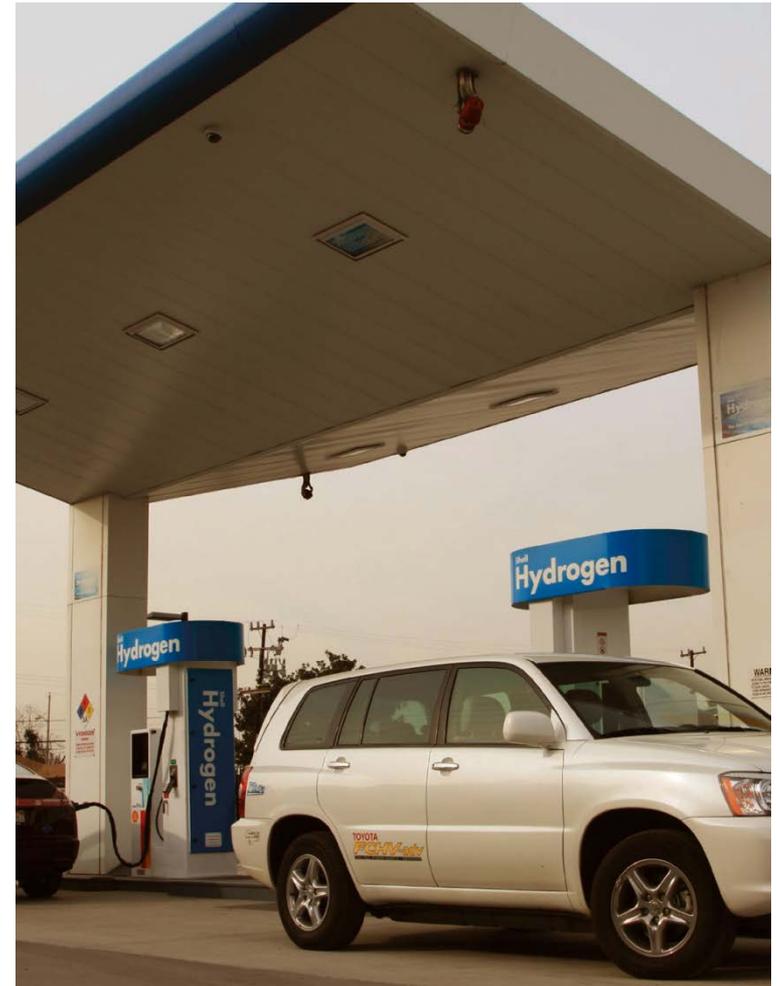
- **Honda** – Presented a new concept car at the 2013 LA Auto show for a vehicle scheduled to launch in 2015
- **Mercedes** – Continues to lease vehicles in Northern and Southern California





Market Development Strategies

- Facilitate new market participants
- Bilateral communication between OEMs and station developers through non-disclosure agreements
- Regional and community readiness planning
 - Standardize permitting
- Consumer outreach and education





Public-Private Partnerships



A California Roadmap: Bringing Hydrogen Fuel Cell Vehicles to the Golden State

- Need a network of 68 stations
- Geographic clusters for station deployment

California Fuel Cell Partnership:

- Auto manufacturers
- Energy providers
- Government agencies
- Fuel cell technology companies





Thank You

Commissioner Janea Scott
California Energy Commission

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