



Funding Opportunities for Hydrogen-Related Projects at Ports

October 10, 2018

Chris Jenks

California Energy Commission

Fuels and Transportation Division

Advanced Freight Technologies & Planning Unit

California Transportation Statistics



VEHICLES

28.9 millions cars
1 million trucks



GHG EMISSIONS

429.4 MMT CO₂e (2016)
41% from transportation



AIR QUALITY

Severe Non-Attainment for Ozone
San Joaquin Valley & South Coast



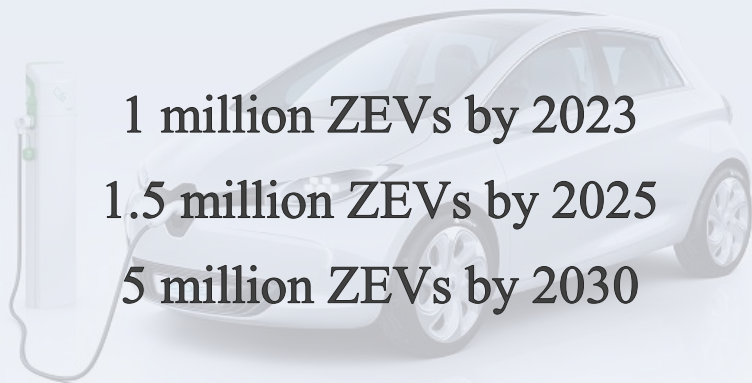
PETROLEUM CONSUMPTION

13.9 billion gallons gasoline
3.3 billion gallons diesel



Guiding Policies and Regulations

EXECUTIVE ORDER B-16-12
SENATE BILL 1275 (2014)
EXECUTE ORDER B-48-18



1 million ZEVs by 2023

1.5 million ZEVs by 2025

5 million ZEVs by 2030

250,000 EV chargers by 2025

200 hydrogen stations by 2025

SENATE BILL 32 (2016)
EXECUTIVE ORDER S-3-05

GHG ↓ 40% by 2030

GHG ↓ 80% by 2050

(1990 baseline)

CLEAN AIR ACT

NO_x ↓ 70% by 2023

(2017 baseline)



Purpose of the ARFVTP

“...to develop and deploy innovative technologies that transform California’s fuel and vehicle types to help attain the state’s climate change policies.”

California Health and Safety Code 44272(a)

Complementary goals:

- Improve air quality
- Increase alternative fuel use
- Reduce petroleum dependence
- Promote economic development



Current ARFVTP Funding

ARFVTP Funding Allocations for FY 2018-2019

Funded Activity	Proposed New Funding Allocation
Electric Vehicle Charging Infrastructure	\$94.2 million
Hydrogen Refueling Infrastructure	\$20 million
Manufacturing and Workforce Development	\$8.5 million
Advanced Freight and Fleet Technologies	\$17.5 million
Low-Carbon Fuel Production and Supply	\$25 million**
Total	\$165.2 million
<p>**Funding Source: \$12.5 million GGRF; \$12.5 million ARFVT Fund.</p>	



Notice of Proposed Awards from a Solicitation

California Energy Commission

Alternative and Renewable Fuel and Vehicle Technology Program

Solicitation GFO-17-603

Advanced Freight Vehicle Infrastructure Deployment

April 06, 2018



Proposal Number	Applicant	Project Title	Funds Requested	Proposed Award	Match Amount	Score	Recommendation
Proposed Awards							
9	Equilon Enterprises LLC (dba Shell Oil Products US)	Renewable Hydrogen Fueling at Scale for Freight (H2Freight)	\$8,000,000	\$8,000,000	\$4,001,800	81.3%	Awardee
1	City of Long Beach Harbor Department (Port of Long Beach)	The Port Advanced Vehicle Electrification (PAVE) Project	\$8,000,000	\$8,000,000	\$8,757,912	80.1%	Awardee
3	City of Los Angeles Harbor Department (Port of Los Angeles)	Zero Emission Freight Vehicle Advanced Infrastructure Demonstration (AID)	\$7,842,270	\$7,842,270	\$3,405,784	77.4%	Awardee
TOTAL FUNDING RECOMMENDED			\$23,842,270	\$23,842,270	\$16,165,496		



Advanced Freight Vehicle Infrastructure Deployment

GFO-17-603 was released December 18, 2017.

This solicitation provided nearly \$24M for alternative freight infrastructure, including infrastructure for:

- One hydrogen fuel cell project awarded \$8M.
- Two electric projects awarded for nearly \$16M.
- The solicitation was highly oversubscribed.



Source: Port of
Los Angeles



Awarded Hydrogen Infrastructure Project

Renewable Hydrogen Fueling at Scale for Freight (H2Freight)

- Equilon Enterprises LLC (dba Shell Oil Products US) was awarded \$8M to build a 100% renewable, 1,000 kg/day hydrogen refueling station at the Port of Long Beach.
- The station will serve ten Class 8 fuel-cell trucks.



Source: Equilon
Enterprises LLC



Projects of Interest

The other hydrogen fueling station proposals received, but not funded, under GFO-17-603 were:

- Production of 1,000 kg/day of hydrogen from rooftop solar to demonstrate operation of 5 Nikola Class 8 hydrogen fuel cell trucks, later to be expanded to a fleet of 35, at a manufacturing facility.
- Production of 1,000 kg/day of renewable hydrogen using a new 2.5 MW electrolysis plant to demonstrate operation of 10 hydrogen fuel cell drayage trucks between the Port of Los Angeles and the Inland Empire.
- Production of about 580 kg/day of hydrogen using on-site SMR of natural gas to demonstrate operation of 30 Class 8 hydrogen fuel cell trucks.



GFO-16-604: Sustainable Freight Transportation Projects

- A 2016 solicitation offered \$27M for projects that demonstrate medium- and/or heavy-duty advanced vehicle technologies at seaports.
- A hydrogen application under this solicitation:
 - Demonstration of two Class 8 hydrogen fuel cell drayage trucks. Hydrogen for the trucks was to be obtained from light-duty hydrogen fueling stations by means of a certified hydrogen tank trailer.



Source: Bay Area Air Quality Management District



GFO-15-604: Freight Transportation Projects at California Seaports

- A 2015 solicitation offered \$14M for projects that demonstrate Class 3 through Class 8 vehicles using alternative fuels at California seaports.
- Hydrogen applications under this solicitation include:
 - Demonstration of two custom-built Class 8 hydrogen fuel cell freight trucks. Again these were to be fueled using a certified hydrogen tank trailer visiting a light duty hydrogen fueling station.
 - Demonstration of hydrogen fuel cell auxiliary power units for transportation refrigeration units in three vehicles. Hydrogen would come from a station dedicated to the project.



GFO-14-605: Medium- and Heavy-Duty Advanced Vehicle Technology Demonstration

- A 2014 solicitation offered \$25M for projects that demonstrate Class 3 through Class 8 vehicles using alternative fuels.
- Among the nine projects funded was one to build and demonstrate a hydrogen fuel cell Class 8 drayage truck on a route between the Port of Los Angeles and Port of Long Beach.



Solicitation Development

Solicitations are typically developed through this process:

- Energy Commission staff develop draft solicitation concepts.
- The draft concepts are publicly presented and stakeholder feedback is requested.
- Answers to workshop questions are published.
- The final solicitation is developed and presented.
- Applications for solicitation funding are accepted.
- The applications are evaluated and funding is offered for the projects best meeting the published evaluation criteria.



Example of Upcoming Workshop

Notice of Webinar for Pre-Solicitation Concepts for Zero-Emission Vehicle Infrastructure Manufacturing

California Energy Commission (Energy Commission) staff will conduct a public webinar to discuss a pre-solicitation concept for zero-emission vehicle (ZEV) infrastructure manufacturing. The Energy Commission is seeking input from stakeholders on a proposed solicitation concept for a future solicitation for eligible manufacturers of electric vehicle (EV) chargers and components and hydrogen refueling station (HRS) components and equipment. The webinar will be held on:

October 15, 2018

10:00 a.m. – 12:00 p.m.

Remote Access Available by Computer or Phone via WebEx™
(Instructions below)



Events are Posted to the Energy Commission Website



mission Recognizes Leadership of State in Energy, Climate Policy

News

rsroom

EVENTS

etings - Next meeting November 7, 2018

nd Renewable Fuel and Vehicle Technology Program 10th Anniversary

fficiency Program: Title 20

rgy Efficiency Program - Title 24

ermany Bilateral Energy Conference 2018

mission Project Map and Project Equity Dashboard

nergy Policy Report (IEPR)

re Disclosure

50 & Assembly Bill 802 - Implementation

gress Reports

EVENTS

<	Oct 2018					>
S	M	T	W	T	F	S
	01	02	03	04	05	06
07	08	09	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

- » Pre-Application Workshop - GFO-18-603 - Outreach, Education, and Collaborative Planning for California's Central Valley
October 10, 2018
- » Pre-Bid Conference - RFP-18-802 - Technology Transfer for EPIC Research Projects
October 10, 2018
- » Status Conference - McLaren Backup Generating Facility
October 10, 2018
- » [Webinar for Pre-Solicitation Concepts for Zero-Emission Vehicle Infrastructure Manufacturing](#)
October 15, 2018



List Server Email Groups

Prospective applicants can remain informed of solicitation development and funding opportunities by joining one or more Energy Commission email lists:

- *opportunity* – RFPs, solicitations, contracts, funding announcements
- *alftuels* – Alternative and Renewable Fuels and Vehicle Technology Program
- *transportation* – General transportation and petroleum issues
- See: <http://www.energy.ca.gov/listservers/>





Additional Resources

- Governor's 2016 ZEV Action Plan
 - https://www.gov.ca.gov/docs/2016_ZEV_Action_Plan.pdf
- California Fuel Cell Partnership
 - <http://cafcp.org/>
- NREL Hydrogen & Fuel Cell Research
 - http://www.nrel.gov/hydrogen/about_fc_hydrogen.html
- Pacific Northwest National Laboratory
 - https://h2tools.org/sites/default/files/Safety_Planning_for_Hydrogen_and_Fuel_Cell_Projects-March_2016.pdf
- California Air Resources Board
 - https://www.arb.ca.gov/fuels/altfuels/electric_hydrogen/electric_hydrogen.htm

Thank You

Chris Jenks can be reached at:

California Energy Commission

Advanced Freight Technologies and Planning Unit

1516 Ninth Street, MS 6

Sacramento, CA 95814-5512

Direct (916) 654-4201

Fax (916) 654-4676

chris.jenks@energy.ca.gov

