California Energy Commission
Infrastructure Corridors & Strategic Placement of Charging Infrastructure for
1 Million Zero-Emission Vehicles and Medium- and Heavy-Duty Projects
April 29, 2016

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Assembly Bill 8
(Perea, Chapter 401, Statutes of 2013)

- Extends ARFVTP funding through January 1, 2024
  - $100 million per year
- 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))
## ARFVTP Funding Summary: 2009-2015

<table>
<thead>
<tr>
<th>Investment Areas</th>
<th>Funding Amount (millions)</th>
<th>Percent of Total (%)</th>
<th>Number of Awards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biofuels</td>
<td>$158</td>
<td>26</td>
<td>61</td>
</tr>
<tr>
<td>Electric Drive</td>
<td>$199</td>
<td>33</td>
<td>153</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>$95</td>
<td>16</td>
<td>185</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>$113</td>
<td>19</td>
<td>72</td>
</tr>
<tr>
<td>Workforce Development</td>
<td>$28</td>
<td>4</td>
<td>58</td>
</tr>
<tr>
<td>Market &amp; Program Develop.</td>
<td>$13</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$606</strong></td>
<td><strong>100</strong></td>
<td><strong>545</strong></td>
</tr>
</tbody>
</table>

Through Q4 2015
# Funding Allocations for 2016-2017

<table>
<thead>
<tr>
<th>Category</th>
<th>Funded Activity</th>
<th>Proposed Funding Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative Fuel Production</td>
<td>Biofuel Production and Supply</td>
<td>$20 million</td>
</tr>
<tr>
<td>Alternative Fuel Infrastructure</td>
<td>Electric Charging Infrastructure</td>
<td>$17 million</td>
</tr>
<tr>
<td></td>
<td>Hydrogen Refueling Infrastructure</td>
<td>$20 million</td>
</tr>
<tr>
<td></td>
<td>Natural Gas Fueling Infrastructure</td>
<td>$2.5 million</td>
</tr>
<tr>
<td>Alternative Fuel and Advanced Technology Vehicles</td>
<td>Natural Gas Vehicle Incentives</td>
<td>$10 million</td>
</tr>
<tr>
<td></td>
<td>Medium- and Heavy-Duty Advanced Vehicle Technology Demonstration and Scale-Up</td>
<td>$23 million</td>
</tr>
<tr>
<td>Related Needs and Opportunities</td>
<td>Emerging Opportunities</td>
<td>$3 million</td>
</tr>
<tr>
<td></td>
<td>Workforce Training and Development</td>
<td>$2.5 million</td>
</tr>
<tr>
<td></td>
<td>Regional Readiness</td>
<td>$2 million</td>
</tr>
<tr>
<td>Total Proposed</td>
<td></td>
<td>$100 million</td>
</tr>
</tbody>
</table>
Fixing America’s Surface Transportation (FAST) Act

Federal legislation that authorizes $305 billion over fiscal years 2016-2020 to:

- Improve surface transportation infrastructure (including roads, bridges, transit systems, and rail transportation network)
- Reform and strengthen transportation programs
- Provide long-term certainty and flexibility for states and local governments
- Streamline project approval processes while maintaining safety.

Currently, 4 notices for funding opportunities.
- Advanced Transportation and Congestion Management Technologies Deployment Initiative
- Letters of Interest for Credit Assistance under the Transportation Infrastructure Finance and Innovation Act Program
- Nationally Significant Freight and Highway Projects
- Surface Transportation System Funding Alternatives
National Electric Vehicle Charging and Hydrogen, Propane, and Natural Gas Fueling Corridors

By December 2016, the U.S. Department of Transportation (DOT) must designate national plug-in electric vehicle charging and hydrogen, propane, and natural gas fueling corridors in strategic locations along major highways to improve the mobility of alternative fuel vehicles.

To designate the corridors, DOT will:

• Solicit nominations from state and local officials
• Work with industry stakeholders
• Incorporate existing fueling infrastructure

Within five years of the establishment of the corridors, and every five years thereafter, DOT will issue a report identifying charging and fueling infrastructure, analyzing standardization needs for fuel providers and purchasers, and reestablishing the goal of achieving strategic deployment of fueling infrastructure in the designated corridors by the end of 2020. (Reference Public Law 114-94)
### Energy Commission ARFVTP Alternative Fueling Infrastructure Funding to Date

<table>
<thead>
<tr>
<th>Alternative Fuel</th>
<th>Awards (in millions of dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric Vehicle Charging Infrastructure</td>
<td>$49.5 for 8,748 charging stations</td>
</tr>
<tr>
<td>Hydrogen Refueling Infrastructure</td>
<td>$96.0 for 49 fueling stations</td>
</tr>
<tr>
<td>Natural Gas Fueling Infrastructure</td>
<td>$21.0 for 65 fueling stations</td>
</tr>
<tr>
<td>Upstream Biodiesel Infrastructure (production)</td>
<td>$4.0 for 4 infrastructure sites</td>
</tr>
<tr>
<td>E85 Fueling Infrastructure</td>
<td>$13.7 for 158 fueling stations</td>
</tr>
</tbody>
</table>
GFO-15-601 Sites

- 41 Sites
  - Interstate-5: 22 sites
  - Highway 99: 11 sites
  - US 101: 8 sites

- 61 DC Fast Chargers
- 42 Level 2 chargers

Source: Energy Commission Staff Analysis, PlugShare.com, US Department of Energy Alternative Fuels Data Center
Central and Northern California DC Fast Charge Corridors: Grant Funding Opportunity 15-601 and 15-603
Southern California DC Fast Charger Corridors: Grant Funding Opportunity 15-601 and 15-603
Energy Commission Funded Hydrogen Refueling Stations in Northern California

Operational:
- Emeryville - AC Transit
- San Jose
- South San Francisco
- West Sacramento

In Development:
- Campbell
- Corte Madera
- Foster City
- Half Moon Bay
- Mountain View
- Oakland
- Palo Alto
- Redwood City
* Robert Park
- San Bruno
- Saratoga
* Lincard
- Woodside
* Not shown on map

December 2015
Energy Commission Funded Hydrogen Refueling Stations in Southern California

December 2015

Southern CA Hydrogen Stations

Operational
- Malibu
- Calabasas
- Costa Mesa
- La Verne
- Thousand Oaks
- Yorba Linda
- Long Beach
- Los Angeles - La Mirada
- Los Angeles - Harbor City
- Los Angeles - Lakewood
- Los Angeles - Rancho Cucamonga
- Los Angeles - Santa Monica
- Newport Beach
- Ontario
- Palmdale
- Thousand Oaks
- Torrance

In Development
- Aliso Viejo
- Calabasas
- Covina
- Glendora
- Hesperia
- Huntington Beach
- Lake Elsinore
- La Habra
- Lake Forest
- Lake Mission Viejo
- Laguna Beach
- Riverside
- San Diego
- San Dimas
- San Fernando
- San Gabriel
- San Gabriel Valley
- Santa Ana
- Santa Clarita
- Santa Monica
- South Gate
- Vista

*Data shown on map*
Energy Commission Funded Natural Gas Fueling Stations in California
### Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP) Electric Vehicle Support

<table>
<thead>
<tr>
<th>Charging Connectors</th>
<th>Residential</th>
<th>Multi-unit Dwelling</th>
<th>Commercial</th>
<th>Workplace</th>
<th>Fleet</th>
<th>DC Fast Chargers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installed</td>
<td>3,937</td>
<td>178</td>
<td>2,039</td>
<td>189</td>
<td>100</td>
<td>43</td>
<td>6,486</td>
</tr>
<tr>
<td>Planned</td>
<td>-</td>
<td>167</td>
<td>1,415</td>
<td>236</td>
<td>36</td>
<td>199</td>
<td>2,053</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>209</td>
<td></td>
<td>209</td>
<td></td>
<td></td>
<td>209</td>
</tr>
<tr>
<td>Total</td>
<td>3,937</td>
<td>345</td>
<td>3,454</td>
<td>634</td>
<td>136</td>
<td>242</td>
<td>8,748</td>
</tr>
</tbody>
</table>

**Charging Infrastructure Grants:** $49.5 M

**Plus 34 ZEV Regional Readiness Planning Grants:** $7.6 M

**CPCFA Loan-Loss Reserve Program:** $2 M
Regional PEV Readiness Plans
Energy Commission’s EV Charging Infrastructure Focus

- Gather data to inform charging infrastructure deployment and update NREL EV Infrastructure Assessment
- Coordinate with the CPUC and utilities
- Rapidly deploy charging infrastructure to target “fast followers” and meet California’s goals
- Choose strategic locations and sites that will spur EV adoption
- Include reliability and uptime of charging stations in funding opportunities in order to maintain California’s network of chargers
Energy Commission Current and Upcoming ARFVTP Electric Vehicle Infrastructure Funding Opportunities

- 2016 Charging Infrastructure Funding: $6.8 million

- DC Fast Charging for California’s Interregional Corridors GFO-15-603: $9.97 million (Applications due June 24, 2016)

- Zero-Emission Vehicle Regional Planning: $1.9 million

- 2016-2017 ARFVTP Investment Plan:
  - $17 million for charging infrastructure
  - $2 million for regional readiness
Accelerating Fleet Turnover – MD/HD Related Funding
About 30 Percent of Total Program Funding

<table>
<thead>
<tr>
<th>Technology</th>
<th>Funding ($ Millions)</th>
<th>No. of Vehicles, Fueling Stations or Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Natural Gas Trucks</td>
<td>67.9</td>
<td>2,400 Trucks</td>
</tr>
<tr>
<td>Natural Gas Infrastructure</td>
<td>21.0</td>
<td>65 Stations</td>
</tr>
<tr>
<td>Commercial Propane Trucks</td>
<td>6.4</td>
<td>514 Trucks</td>
</tr>
<tr>
<td>Commercial ZEV Trucks (Class 6 package delivery)</td>
<td>4.0</td>
<td>160 Trucks</td>
</tr>
<tr>
<td>Advanced Technology Truck Demonstration or Manufacturing</td>
<td>146.7</td>
<td>64 Projects</td>
</tr>
<tr>
<td><strong>Total Funding</strong></td>
<td><strong>$246 M</strong></td>
<td></td>
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</table>
Cummins Westport ISL G Near Zero Natural Gas Engine

- Production to start Q2 2016
- 8.9 Litre (540 cu. In.)
- In line 6 cylinder
- Spark ignition
- Peak Rating:
  - HP - 320 hp
  - Torque - 1000 lb-ft
- **Certified to CARB Optional Low NOx 0.02 Standard (Near Zero)**
  - NOx: 0.02 g/bhp-hr
  - PM: 0.01 g/bhp-hr
- Certified to 2016 EPA / DOT GHG standards
- Three Way Catalyst Aftertreatment
- Manufactured by Cummins in Cummins Engine Plant- Rocky Mount, North Carolina
Energy Commission Funded Medium- and Heavy-Duty Projects

1. EPRI-Odyne retrofit of 5 work trucks to PHEV drive
2. Transpower Class 8 Electric Truck
3. Wrightspeed Inc. hybrid-electric
Energy Commission Resources

- The Alternative and Renewable Fuel and Vehicle Technology Program Investment Plan:
- Energy Commission grant funding opportunities for transportation:
  http://www.energy.ca.gov/contracts/transportation.html#GFO-15-603
- Energy Commission ZEV Action Plan Implementation Activities:
  http://www.energy.ca.gov/2013-ALT-01/index.html
- DRIVE website for the Alternative and Renewable Fuel and Vehicle Technology Program:
  http://www.energy.ca.gov/drive/index.html