



Technology Merit Review: Medium- and Heavy-Duty Vehicles

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Alternative and Renewable Fuel and Vehicle Technology Program
UC Davis
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Assembly Bill 8

(Perea, Chapter 401, Statutes of 2013)

Extended ARFVTP funding through January 1, 2024 at \$100 million/year

Transform California's transportation market into a diverse collection of alternative fuels and technologies that 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))



MHD Vehicle Demonstration Portfolio

Vehicle/Technology Type	Project #	Units	ARFVTP \$ (M)
Medium-Duty Hybrids, PHEVs and BEVs	8	164	\$ 15.8
Heavy-Duty Hybrids, PHEVs and BEVs	10	30	\$ 23.3
Electric Buses	7	31	\$ 14.6
Natural Gas Trucks	5	11	\$ 11.3
Fuel Cell Trucks and Buses	6	12	\$ 12.2
Vehicle-to-Grid	3	6	\$ 5.3
Off-Road Hybrids	2	2	\$ 4.5
E85 Hybrids	1	1	\$ 2.7
Total	42	257	\$ 89.7



PON-14-605 Demonstration Results

Recipient	Project Title	Partners	NOPA	Class / Fuel
Transportation Power Inc.	Heavy-Duty Electric Yard Tractors	IKEA; Harris Ranch; Grimmway Enterprises	\$3,000,000	8/BEV
Motiv Power Systems	Class C Electric-Quest School Bus Demonstration	Starcraft Bus; LAUSD; Kings Canyon USD; SCAQMD	\$2,760,391	6/BEV
Transportation Power Inc.	Advanced Battery-Electric Port Vehicles	EPC Power; Port of San Diego; Dole Fresh Fruit; BAE Systems	\$3,000,000	4-8/BEV
Transportation Power Inc.	Heavy-Duty Electric Refuse Trucks	EPC Power; Peterbilt Motors; County of Sacramento; Waste Management	\$2,884,812	8/BEV
CALSTART, Inc.	LADOT-BYD Battery Transit Bus	LADOT; BYD Motors	\$2,886,248	8/BEV



PON-14-605 Demonstration Results (Cont.)

Recipient	Project Title	Partners	NOPA	Class / Fuel
Motiv Power Systems	Electric Refuse and Loader Truck Demonstration	Roush; Heil Co.; City of Sacramento	\$2,980,875	8/BEV
North American Repower, LLC	Sectran Security PHEV-Renewable Natural Gas Truck Demonstration Project	Sectran Security; Efficient Drivetrains Inc; McLaren Performance	\$3,000,000	5/RNG-PHEV
Hydrogenics USA Inc.	Hydrogenics Advanced Fuel Cell Demonstration for Drayage Truck	TTSI; Siemens; ACTIA; Port of LA	\$2,679,417	8/H2
Hydrogenics USA Inc.	New Flyer Advanced Fuel Cell Vehicle Technology Demonstration for Bus	New Flyer of America; Siemens; Sunline Transit	\$2,148,177	7-8/H2
CALSTART, Inc.	H2Ride Hydrogen Shuttle Bus Demonstration Project	US Hybrid; Sunline Transit; CSULA	\$2,998,948	5-6/H2
Gardena Municipal Bus	Zero Emission Re-power	Complete Coach Works	\$2,780,903	8/BEV

Total Funds = \$31,119,771

Total Vehicles = 42

Total Miles = 1,093,572

Total Hours = 530,000

Total Months = 648

GHG Reduced (MT) = 10,441

Petroleum Displaced (GGE &DGE) = 314,697

Jobs Created/Retained = 173

Disadvantaged communities



PON-14-604 Manufacturing Results

Applicant	Project Title	NOPA
Proterra	California Zero Emission Transit Bus Manufacturing Project	\$3,000,000
Transportation Power, Inc.	Heavy-Duty Electric Vehicle Manufacturing Initiative	\$2,999,880
Efficient Drivetrains, Inc	EDI Advanced Vehicle Manufacturing Facility	\$2,990,900
Zero Motorcycles, Inc.	California Manufacturing Acceleration for Electric Motorcycles	\$1,009,220
	Total	\$10,000,000



Natural Gas Vehicles Deployment Portfolio

Funding Agreement / Solicitation	Vehicle Type	# Vehicles	Amount \$ (M)
San Bernardino Association of Governments (ARV-09-001)	Heavy Duty Trucks	202	\$9.30
South Coast Air Quality Management District (ARV-09-002)	Heavy Duty Drayage Trucks	120	\$5.10
Buy Down Incentives Approved (PON-10-604 and PON-11-603)	Up to 8,500 GVW	245	\$0.70
	8,501-14,000 GVW	137	\$1.10
	14,001-26,000 GVW	211	\$4.20
	26,001 GVW and up	446	\$12.90
Buy down Incentives (PON-13-610; approved reservations)	Up to 8,500 GVW	1,616	\$1.60
	8,501-16,000 GVW	628	\$3.80
	16,001-26,000 GVW	314	\$1.90
	26,001-33,000 GVW	0	\$0.00
	33,001 GVW and up	551	\$13.80
UC Irvine Natural Gas Vehicle Incentive Project	TBD	TBD	\$10.20
TOTAL		4,470 (+TBD)	\$64.60



Proposed 2016-17 Investment Plan

Category	Funded Activity	2014-2015	2015-2016	2016-2017 (Proposed)
Alternative Fuel Production	Biofuel Production and Supply	\$20	\$20	\$20
Alternative Fuel Infrastructure	Electric Charging Infrastructure	\$15	\$17	\$17
	Hydrogen Refueling Infrastructure	\$20	\$20	\$20
	Natural Gas Fueling Infrastructure	\$1.5	\$5	\$2.5
Alternative Fuel and Advanced Technology Vehicles	Natural Gas Vehicle Incentives	\$10	\$10	\$10
	Light-Duty Electric Vehicle Deployment	\$5	-	-
	Medium- and Heavy-Duty Vehicle Technology Demonstration & Scale-Up	\$15	\$13.7	\$23
Related Needs and Opportunities	Manufacturing	\$5		
	Emerging Opportunities	\$6	\$3	\$3
	Workforce Training and Development Agreements	\$2.5	\$3	\$2.5
	Regional Alternative Fuel Readiness and Planning	-	\$2	\$2
	Total	\$100	\$100	\$100



About Yesterday....

“commercialization ecosystem”

“we provide technology/kit sales/technology to OEMs”

“ARFVTP is a success as developed technologies are being sold”

“vehicle integrator versus a powertrain supplier”

“discussions with GO-Biz”

“technology will exceed Phase II EPA rules now”

“encourage technology competition which will lead to commercialization”

“flexibility, redesign infrastructure”

“\$150 million in capital raised but grant helped us make siting a California manufacturing decision”

“what problem are we solving?”

“when possible, remove barriers to product acceptance”

“must match performance of diesel”

“align product and business strategy”

“manufacturing highly customized”

“develop robust / reliable supply chain”