

SCAQMD Clean Fuels Program Advisory Meeting Summary

Cory Shumaker, Development Specialist, California Hydrogen Business Council

On February 6, the South Coast Air Quality Management District (SCAQMD) held their semi-annual Clean Fuels Program Advisory Meeting to provide an annual report on the Clean Fuels Program for 2019 and an update on the Clean Fuels Program Plan for 2020. It was also an opportunity to solicit feedback and comments from stakeholders, State agencies, industry groups and technology providers. The Clean Fuels Program Plan takes into account feedback from various conferences (ACT Expo, DOE Annual Merit Review, CALSTART Symposium) as well as from clean technology partnerships such as the California Hydrogen Business Council, VELOZ, and the California Fuel Cell Partnership. The Clean Fuels Program Plan for 2020 will be submitted to the SCAQMD Board on March 6 and to the State Legislature on March 31. The Clean Fuels Program Plan (CFPP) contains the various incentive programs to advance alternative technologies and move the region closer to achieving EPA required NO_x attainment by 2023.

The CFPP contains the following incentive programs that are designed to incentivize equipment owners by helping to offset the cost of near-zero and zero emission technologies:

- Carl Moyer (On-road and off-road vehicles and vessels)
 - Currently oversubscribed
 - Executed 35 contracts for \$22 million in 2019
 - New solicitation coming in March
 - 0 zero emission trucks funded in 2019
 - Provides 50% of funding for infrastructure
- Prop 1B - Goods Movement emissions reduction program
 - Winding down, tail end of funding cycle
 - All currently going to heavy-duty trucks
 - 10 contracts executed for \$6.6 million in 2019
 - 86 ZE trucks funded over lifetime of the program.
- Replace Your Ride - Light duty
 - Target low and moderate income motorists to trade in their older vehicles for newer, cleaner vehicles.
- Lower Emission School Bus Program
- Community Air Protection Program Incentives
 - Incentives for engine replacement for newer, cleaner engines
 - \$275M coming from AB74
 - \$245M available for financial incentives
 - Used to support AB617 Community Emission Reduction Plans
- On-Road Heavy-Duty Vehicles Voucher Incentive Program (HVIP)
 - Currently oversubscribed
 - Designed for fleets of 10 trucks or less
- VW Environmental Mitigation Program

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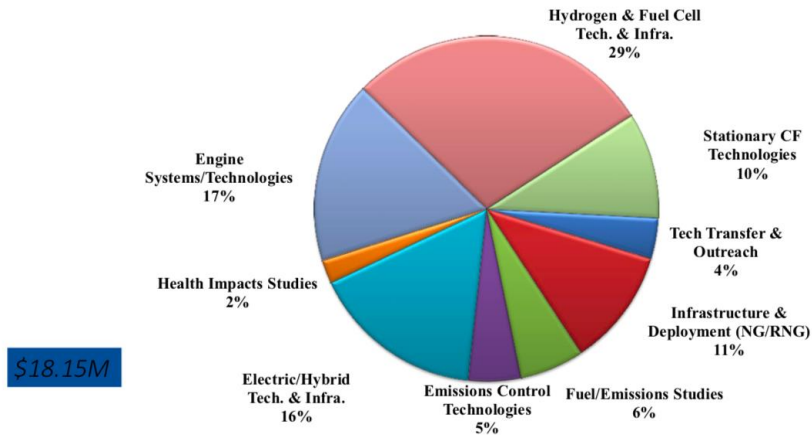
- 10 Year program
- Launched website
- Released 1st solicitation for Combustion Freight and Marine Projects
- Zero-Emission Transit, School, and Shuttle Bus \$130M
- Zero-Emission Class 8 Freight and Port Drayage Trucks \$90M
- No funding for infrastructure

The following is an overview of the 2020 Clean Fuels Program Plan:

- Looking at development, demonstration and deployment for accelerating to commercialization.
 - TRL 3-8
- Program Core Technologies; 72 total projects executed in 2019 (% of total 2019 funding for executed contracts)
 - Hydrogen/Fuel Cell Technologies and Infrastructure (6%)
 - Engine Systems/Tech (2%)
 - Electric/Hybrid Technologies and Infrastructure (64%)
 - Fueling and Infrastructure and Deployment (0%)
 - Stationary Clean Fuel Technologies (0%)
 - Fuels/Emission Studies (4%)
 - Emission Control Technologies (0%)
 - Health Impacts Studies (15%)
 - Technology Assessment/Transfer and Outreach (9%)
- Key 2019 Projects Executed
 - Volvo Lights
Zero Emission Container Handling Equipment Demo
 - Battery Electric Shuttle Bus
 - Natural Gas Engine Efficiency and Emissions Improvement
 - SOFC and gas turbine hybrid technology
 - UCI Hydrogen Refueling Station expansion
 - UCR Emission studies
- 2020 Distribution Plan

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\$18.15M

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	2019 Plan	Draft 2020 Plan
H2 & Fuel Cells & Infra	32%	29% ↓
Electric & Hybrids & Infra	23%	15% ↓
Engine Systems/Technologies	16%	↑ 18%
Infrastructure & Deployment (NG)	12%	11% ↓
Fuels & Emissions Studies	5%	↑ 6%
Stationary CF Tech	4%	↑ 10%
Emissions Control Technologies	2%	↑ 4%
Health Impacts Studies	2%	↑ 3%
Tech Transfer/Assessment & Outreach	4%	4%
	100%	100%

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Project Updates:

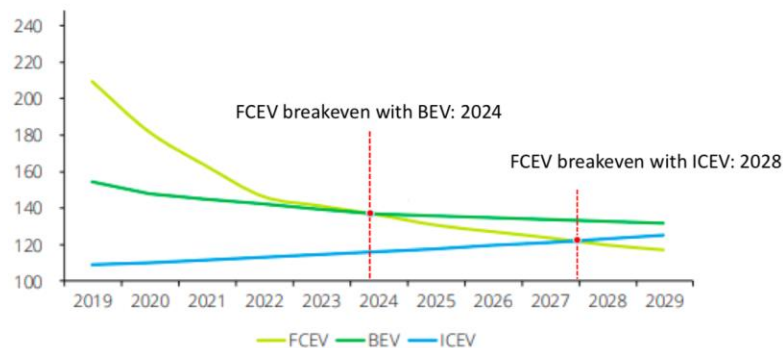
- Volvo Lights
 - Funded by \$44.8M from California Climate Investments, \$4M from SCAQMD, \$41.6M from project partners)
 - Develop 8 pilot and 15 production Class 8 battery electric trucks and 29 battery electric forklifts/yard tractors
 - Operated by NFI and DHE
 - 5 trucks (2 on-road; 3 yard tractors) delivered to California in December 2019; accumulated 10,000 miles to date.
 - Two 150kW public fast charging stations by Trillium in Placentia - will be completed Feb 2020.
- Daimler 15 Class 8 eCascadia and 5 eM2 eM2 battery electric trucks
 - Operated by Penske Logistics (5), Penske Truck Leasing (5) and NFI (5)
 - \$31,340,000 funded by SCAQMD, POLA, POLB, EPA with 50% from Daimler
 - 400kWh battery with 160 mile range for eCascadia; 150 mile range for eM2
 - First deployed in August 2019; last deployed mid-January 2020

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- All CARB & EPA Certified
- 50,000 miles accumulated from vehicles so far
 - 2.3kWh/mile for Penske Logistics; 1.84kWh/mile for NFI
 - 3.6 charging hours/day for NFI
- ZECT II
 - Two technologies: (6) FCETs, (1) CNG
 - All deployed; data collection by NREL in progress.
 - OEMs: Transpower, U.S. Hybrid, Hydrogenics, BAE/Kenworth
 - \$20M project; \$10M from DOE, \$7.1M match share
 - Using mobile refueler from Air Products with 300kg/day at 350 bar
 - Kenworth FCET accumulated over 10,000 miles with 10,000-39,000lb load for 20-25 mile route up to four times a day. Range approximately 150 miles.
 - Transpower FCET #1 deployed Q4 2017; FCET #2 deployed Q2 2019.
 - FCET #2 has been reliable and has seen increasing use in service as the truck continued to provide reliable drayage service.
 - U.S. Hybrid increased range of FC #2 from 150 miles to 280 miles range by increasing hydrogen storage from 25kg to 35kg. FCET #1 is increasingly reliable.
 - Hydrogenics FCET expected July 2020
 - All hydrogen for project is being refueled by mobile refuelers with SCAQMD working on a permanent solution with a renewable hydrogen source.
 - Expected that TCO (\$/100km) for FCET will breakeven with BET in 2024 and breakeven with ICE in 2028

Total TCO /USD per 100km



■ <https://info.ballard.com/hubfs/Other%20Reports/Deloitte%20Volume%201%20Powering%20the%20Future%20of%20Mobility.pdf>

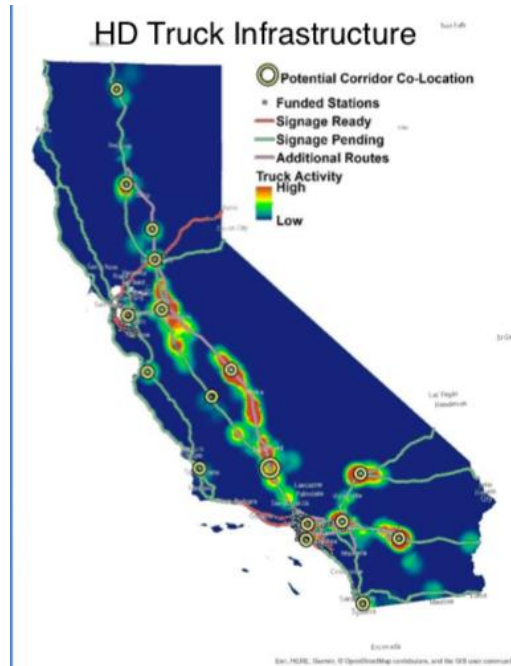
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Hydrogen Infrastructure for Heavy Duty Vehicles

- SCAQMD is looking at CaFCP 2030 Vision for 1,000 hydrogen stations and how it overlaps with freight corridors.

SCAQMD Clean Fuels Program Advisory Meeting Summary

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- OCTA with Air Products liquid hydrogen delivery station; officially opened on Jan 31, 2020.
 - Fueling time 6-10 minutes per bus with 350 bar for 35.6kg to provide 300 mile range. Total of 280kg peak back-to-back fills totaling 1,450kg/day
 - Will service 10 40' FCEBs; each with a 85kW Ballard FC and 80kWh battery pack.
- UCI improvement will be expanded to 800kg/day to provide fueling for buses and cars.
 - Liquid hydrogen delivery; 4 fueling positions.
 - Funding from AQMD (\$400k from Clean Fuels), CEC (\$400k from ARFVTP), MSRC (\$1M from PON 2018-02)
- California Hydrogen Infrastructure Research Consortium formed by U.S. DOE, CA GO-BIZ, CEC, SCAQMD and CARB. It is a joint agreement led by NREL to continue hydrogen infrastructure research efforts, focused on California near-term priorities.
 - Project management Plan 2020 Tasks
 - HRS Data Collection
 - Medium/Heavy Duty Fueling data
 - Hydrogen Containment Detection
 - Nozzle Freeze Lock
 - CA Hydrogen Integration
 - Technical Assistance
- CEC will announce funding for MD/HD ZEV Infrastructure by way of 6 different solicitations for \$47.5 M

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Update from SCE: The utility will be waiving demand charges for MD/HD EVs until 2024, after that slowly ramping up to 100% demand charge by 2029; 2024: 16.67%, 2025: 33.33%, 2026: 50%, 2027: 66.7%, 2028: 83.33%

The agenda and full presentation from the advisory meeting can be found [here](#).