Hydrogen Infrastructure Challenges for Heavy Duty

Fuel Cell Seminar, H2@Scale Meeting
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Adopted and Pending On-Road ZEV Regulations

**Innovative Clean Transit** – fleet requirement
- Starting in 2023 – 25% of annual new bus purchase must be ZEBs (large TAs), 100% by 2029 (all TAs)
- ZEB Roll-Out Plans due June 2020 for large TAs, June 2023 for small
- Early purchase counts toward future compliance
- [https://arb.ca.gov/msprog/ict/ict.htm](https://arb.ca.gov/msprog/ict/ict.htm)

**Zero-Emission Airport Shuttle** – fleet requirement
- Phased in fleet turn-over beginning in 2027 (33%)
- Full implementation in 2035
- 2022- Annual fleet reporting
- [https://ww2.arb.ca.gov/our-work/programs/zero-emission-airport-shuttle](https://ww2.arb.ca.gov/our-work/programs/zero-emission-airport-shuttle)

**Zero-Emission Powertrain Certification** – manufacturer requirement
- Required for medium and heavy duty vehicles model year 2026 and later
- Support advanced-technology measures and ensure performance and reliability
- [https://ww2.arb.ca.gov/our-work/programs/zero-emission-powertrain-certification](https://ww2.arb.ca.gov/our-work/programs/zero-emission-powertrain-certification)

**Advanced Clean Trucks (Pending)** - manufacturer requirement
- Manufacturer ZE truck sales requirement for 2024-2030 MY
- Large companies and fleets must report on vehicle operations and trucking service contracts
- Board hearing December 12-13, 2019, final vote in spring 2020
- [https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks](https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks)
CARB Incentive Programs

- Low Carbon Transportation
  - Demonstration and Pilot Projects: $362M awarded since FY 2014-15
    - Includes infrastructure when matched with vehicles and equipment
    - $20M in FY2019-20 budget for drayage pilot
  - Voucher programs – include infrastructure enhancements with vehicle/equipment vouchers

- Volkswagen Settlement – Appx D: Environmental Mitigation Trust
  - $5M each for light-duty charging and hydrogen infrastructure

- Community Air Protection Program
  - Community guided program - $740M appropriated since 2017
  - Fuel cell technology and hydrogen infrastructure eligible for competitive funding

- Low Carbon Fuel Standard
  - Earn LCFS credits for hydrogen fuel dispensed
  - Greater value with low carbon intensity hydrogen
• Fuel Cell Demonstrations in Rail and Marine Solicitation - $6.6M
  • Scoping workshop held October 17 [https://www.energy.ca.gov/event/workshop/2019-10/staff-workshop-identify-research-needs-and-opportunities-demonstrating-fuel](https://www.energy.ca.gov/event/workshop/2019-10/staff-workshop-identify-research-needs-and-opportunities-demonstrating-fuel)
  • Specifically targeting hydrogen fuel cell demonstrations for rail and commercial harbor craft at California ports.
  • Targeting early 2020 release date
  • Contact: Peter.Chen@energy.ca.gov

• MD/HD ZEV Infrastructure Solicitation - $47.5M
  • Includes funding for infrastructure for both MD/HD battery-electric and hydrogen fuel cell vehicles
  • Workshop held October 25 to discuss solicitation concepts:
    1. Supporting charging and/or hydrogen infrastructure for MD/HD freight demonstration
    2. Capital expense assistance for infrastructure deployment for transit and fleets
    3. ZEV blueprints for MD/HDV infrastructure,
    4. Support hydrogen infrastructure for rail and marine application
    5. Miscellaneous/innovative applications.
  • Contacts: Marc.Perry@energy.ca.gov and Esther.Odufuwa@energy.ca.gov