Hydrogen & Fuel Cell-Related Activities at EPA

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June 14, 2018
Overview

• EPA Office of Transportation and Air Quality
• Clean Diesel Funding Assistance Program
• Renewable Fuel Standard
• Partnerships & External Engagement
• Consumer Education & Resources
OTAQ’s mission is to protect human health and the environment by:

• reducing air pollution from mobile sources and the fuels that power them
• advancing clean fuels and technology and
• encouraging business practices and travel choices that minimize emissions
OTAQ’s Programs

Assessment and Standards

Compliance

Vehicle and Engine Testing

Transportation Activity and Planning
Clean Diesel Funding Assistance Program

- Enables EPA to offer funding assistance for projects that achieve significant reductions in diesel emissions and exposure, particularly from fleets operating at or servicing goods movement facilities located in areas designated as having poor air quality.

- Includes grants and rebates funded under the Diesel Emissions Reduction Act (DERA)
  - FY18 RFP for Clean Diesel National Grants ($40 Million) closed on June 12
  - Eligible Entities
    - Regional, state, local, tribal or port agency with jurisdiction over transportation or air quality; and
    - Nonprofit organization or institution which
      - Represents or provides pollution reduction or educational services to persons or organizations that operate diesel fleets; or
      - Has, as its principle purpose, the promotion of transportation or air quality
Clean Diesel Funding Assistance Program

Eligible Vehicles, Equipment & Engines

May include, but are not limited to

– Buses;
– Class 5 – Class 8 heavy-duty highway vehicles;
– Marine engines;
– Locomotives engines; and
– Non-road engines, equipment or vehicles used in:
  • Construction; Handling of cargo (including at a port or airport); Agriculture; Mining; or Energy production (including stationary generators and pumps)

Eligible Projects

– Verified Exhaust Control Technologies
– Verified/Certified Engine Upgrades and Remanufacture Systems
– Verified Cleaner Fuels
– Verified Idle Reduction Technologies
– Verified Aerodynamic Technologies & Low Rolling Resistance Tires
– Certified Clean Alternative Fuel Conversion
– Certified Engine Replacement
– Vehicle and Equipment Replacement
Clean Diesel Funding Assistance Program

• Certified Engine Replacement:
  – EPA will fund up to 60% of the cost (labor and equipment) of replacing a diesel engine with a zero emission power source, including hydrogen fuel cells for the following applications
    • Urban Transit Bus
    • Shuttle Bus
    • Drayage Truck

• Certified Vehicle and Equipment Replacement
  – EPA will fund up to 45% of the cost of a new fuel cell transit bus, shuttle bus, terminal tractor/yard hostler, stationary generator or forklift
  – EPA will fund up to 50% of the cost of a fuel cell drayage truck
Renewable Fuel Standard (RFS)

- Requires a certain volume of renewable fuel to replace or reduce the quantity of petroleum-based transportation fuel, heating oil or jet fuel
  - Volume requirements vary by category and year
- Each category of renewable fuel must meet a minimum lifecycle GHG reduction compared to the baseline gasoline or diesel

Renewable Fuels
- Advanced & Biomass-based Diesel Fuels
  - GHG Reduction: 50%
- Cellulosic Fuels
  - GHG Reduction: 60%

- Obligated parties: refiners or importers of gasoline or diesel fuel
- Renewable identification numbers (RINs) are credits that obligated parties use to demonstrate compliance with the standard
RFS: What is a Fuel Pathway?

• A fuel pathway in the RFS includes three components:

  **Feedstock**
  A feedstock is a type of "Renewable biomass," as defined under CAA 211(o)(1), that is converted into a renewable fuel.

  **Production Process**
  The production process is the type(s) of technology used to convert renewable biomass into renewable fuel.

  **Fuel**
  Renewable fuels include liquid and gaseous fuels and electricity derived from renewable biomass energy sources. To qualify for the RFS program, the fuel must be used as transportation fuel, heating oil, or jet fuel.
RFS: Pathway Approval Options

1. Generally applicable pathway
   - Listed in Table 1 to 40 CFR 80.1426
   - Requires rulemaking

2. Facility-specific pathway
   - Approved through a letter signed by Office Director, posted on EPA website
   - Originally used only for slightly different processes for plants using previously-evaluated feedstocks (e.g., corn ethanol)
   - After LEAN, we began to use a Federal Register Notice to provide public notice and comment opportunity on the upstream analysis for new feedstocks (e.g., biomass sorghum)
   - After public notice process, could then approve a facility-specific petition using this new feedstock
RFS: Hydrogen Petitions Under Review

• Currently there are no approved hydrogen pathways eligible for RINs
• Four petitions are under review

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Feedstocks</th>
<th>Production Processes</th>
<th>RIN Code Requested</th>
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<tbody>
<tr>
<td>Hydrogen</td>
<td>• Landfill Biogas</td>
<td>• Steam Methane Reformation (SMR)</td>
<td>D3—Cellulosic</td>
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<tr>
<td></td>
<td>• Agricultural Digester Biogas</td>
<td>• Methane Cracking</td>
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- Air Liquide Centralized Production
- Air Liquide On-site Production
- FuelCell Energy
- LytEn

• To learn about the petition process, or to submit a petition:
Partnerships & External Engagement


• **Clean Air Technology Initiative (CATI)** – EPA is a partner agency & helps support various zero emission vehicle (ZEV) demonstration projects

• **UC Davis Sustainable Transportation Energy Pathways (STEPS) Program** – EPA co-funds related research projects through STEPS membership including:
  • Hydrogen infrastructure needs for California freight
  • Medium- and heavy-duty vehicle low/zero emission technology & fuel assessment
  • Consumer awareness & education on ZEV technologies
Consumer Education

- **Fuel Economy & Environment Label**—Includes
  - Both MPGe & kg H₂ per 100 miles
  - Driving Range
  - Fuel cost information
  - GHG & Smog Ratings (tailpipe only)

- Compare vehicles at joint DOE–EPA website [fueleconomy.gov](http://fueleconomy.gov)

- General information on hydrogen & fuel cell vehicles at EPA’s [Green Vehicle Guide](http://greenvehicle.epa.gov) website
Resources

- DERA: [www.epa.gov/cleandiesel](www.epa.gov/cleandiesel)
- RFS: [www.epa.gov/renewable-fuel-standard-program](www.epa.gov/renewable-fuel-standard-program)
- Volkswagen Settlement information: [www.epa.gov/vw](www.epa.gov/vw)
- Green Vehicle Guide: [www.epa.gov/greenvehicles](www.epa.gov/greenvehicles)
- DOE – EPA website: [www.fueleconomy.gov](www.fueleconomy.gov)

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<tr>
<th>Year</th>
<th>Model</th>
<th>Type</th>
<th>Image</th>
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| 2018     | Honda Clarity  | Fuel Cell Vehicle | ![Honda Clarity](image1)
| 2017     | Hyundai Tucson Fuel Cell | ![ Hyundai Tucson Fuel Cell](image2)
| 2018     | Toyota Mirai   | Fuel Cell Vehicle | ![Toyota Mirai](image3)
Appendix
Clean Air Act Definition of Lifecycle GHG Emissions

• CAA 211(o)(1) Definitions

• The term ‘lifecycle greenhouse gas emissions’ means the aggregate quantity of greenhouse gas emissions (including direct emissions and significant indirect emissions such as significant emissions from land use changes), as determined by the Administrator, related to the full fuel lifecycle, including all stages of fuel and feedstock production and distribution, from feedstock generation or extraction through the distribution and delivery and use of the finished fuel to the ultimate consumer, where the mass values for all greenhouse gases are adjusted to account for their relative global warming potential.

The term ‘baseline lifecycle greenhouse gas emissions’ means the average lifecycle greenhouse gas emissions, as determined by the Administrator, after notice and opportunity for comment, for gasoline or diesel (whichever is being replaced by the renewable fuel) sold or distributed as transportation fuel in 2005.