Presentation to Utah Public Service Commission

- Certification Process and Standards
- Observations on CNG Fueled Vehicles
- New Regulations for Fuel Converters

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Vehicle Certification Process

- Submit exhaust and evaporative emission data to show compliance with standards
- Obtain EPA or Carifornia Air Resources Board (CARB) approval of on-board diagnostic system (OBD)
- Submit all vehicle/control system descriptive information in EPA Verify data system
- Fee payment
- EPA may conduct confirmatory testing at Ann Arbor test facility
- Process differs for engine certification
- Passing vehicle with required information yields an EPA Certificate of Conformity on test group specific basis. In 2009 MY:
  - ≈500 certificates issued to Light Duty (LD) OEMs
  - ≈80 certificates issued to on-highway Heavy Duty Engine (HDE) OEMs
  - ≈40 certificates issued to LD fuel converters
  - ≈10 certificates issued to on-highway HDE fuel converters

In-use Vehicle Verification Program

- LD Test Groups w/sales volume > 5000 vehicles subject to passing in-use standards
- Nominally test 2-5 vehicles per test group
  - A low mileage group tested with nominal 10K miles
  - A high mileage group tested with nominal 50K miles
- Manufacturer conducted program with annual EPA review of data
- EPA also conducts its own in-use test program nominally targeting 1 to 2 year old vehicles

Tier 2 FTP Fuel Neutral Standards at 120,000 Miles for Vehicles < 8500 GVW

	Bin 8	Bin 5	Bin 2
NMOG g/mi	0.125	0.090	0.010
CO g/mi	4.2	4.2	2.1
NOx g/mi	0.20	0.07	0.02
PM10 mg/mi	20	10	10

EPA Heavy Duty Vehicle Chassis Standards at 120,000 Miles

	8.5K-10K GVW	10K-14K GVW
NMHC g/mi	0.195	0.230
CO g/mi	7.3	8.1
NOx g/mi	0.2	0.4
PM10 mg/mi	20	20

2010 Heavy Duty Engine Gasoline and Diesel Stds for Vehicles > 14,000 GVW

NMHC	0.14 g/bhp-hr
NOx	0.20 g/bhp-hr
PM	10 mg/bhp-hr

Useful life varies from 110K miles to 435K

Plus Not-to-Exceed (NTE) Standards

EPA Certified Natural Gas Vehicles

- OEM CNG vehicles:
  - Honda Civic GX is the only currently certified OEM light-duty vehicle
    - Ranks very high on EPA qualitative rankings for criteria and greenhouse gas emissions
    - Criteria emission rankings based on certification standards selected by the manufacturer
    - Greenhouse gas rankings based on CO2 equivalent emissions (includes CH4 and N2O) measured during cert tests
  - Must make comparisons based on best current technology comparison e.g. CNG vs. gasoline or diesel hybrids
- Aftermarket conversions:
  - Aftermarket fuel converters have certified dedicated Bin 4 OEM products to Bin 2 standards
  - Baytech and BAF have certified with CARB and met SULEV standards

OEM Heavy-Duty CNG Engines

- HDEs account for about 85% of CNG used in transportation sector (70% by buses)
- Cummins ISL G engine was first to meet 2010 EPA 0.2 NOx standard – low PM and NOx at time of certification
- Emission control technology for CNG HDEs is less complicated than current clean diesel engine (PM traps and SCR)
  - Life cycle costs may be attractive for CNG vs. clean diesel
- Other studies show CNG HDEs have advantage over diesels when comparing PM and NOx levels
  - Must be careful to base comparisons on best and newest technologies

Potential Benefits of CNG Vehicles and Engines

- Limited data show low emissions of criteria pollutants
  - OEM and fuel conversion products must meet fuel neutral standards
  - Fuel converted vehicle need not be cleaner than OEM certified product, just meet the OEM standard
- Lower emissions of GHG emissions
- 99% reduction of petroleum use on life-cycle basis
- Zero evap emissions
- Reduced air toxics such as benzene
- Possible lower life cycle costs due to operation and maintenance

More Data Desired to Prove Emissions Benefit of CNG LD Vehicles and HDEs

- Important to have current and adequate LD vehicle data to prove emissions are low over time/mileage
  - Unlike gasoline OEM products, currently no in-use test data for the Honda GX or fuel conversions
    - EPA air models have inadequate exhaust emission data to assess impact of CNG vehicles other than assuming they have zero evap
  - Technology has evolved and cert data look promising, but comparative studies of alt fuel conversions vs. OEM gasoline vehicles in the mid-90s showed problems w/LPG and CNG fuel conversion kits

- Even more important on HDE side as market potential is greater
  - Durability, maintenance, and life cycle costs also desired
  - Must compare latest CNG technology vs. clean diesel, and gasoline and diesel hybrids

Concerns with Current Cert Process for Fuel Converters

- Test group level certification doesn't fit converters' business model
  - Unrestricted test groups do not provide assurance of air quality compliance
  - OEM mfrs frequently create test groups for their own strategic reasons
- Certification requirement may drive some conversion activity underground
- Difficult for converters to obtain important OEM information
  - Catalyst loading
  - Software driven fuel control strategy
  - OBD specifics
- Certification process never designed for higher mileage older vehicles
- Converter application review requires disproportionate EPA time

Common Misconceptions

- Vehicle combustion of alternative fuels is always cleaner than combustion of petroleum-based fuels
- Fuel conversion to an alternative fuel is easily done and without emissions consequences
- Certification of an alternative fuel conversion demonstrates that the vehicle is cleaner than it was before the fuel conversion
- New test data must be obtained and submitted every year for the same OEM vehicle
- Converters pay higher fees due to obtaining a new certificate each year
- Vehicles certified as EPA LEV (Low Emission Vehicle) compliant are meeting the EPA's cleanest emission standards

Other Misconceptions

- "Successful" alternative fuel conversion programs in other countries means alternative fuel conversion must be clean and good for the U.S.
- Demonstrating compliance with a state Inspection Maintenance (I/M) test ensures the fuel converted vehicle is low emitting
- If you convert less than 5 vehicles per year you do not have to certify the conversions with the EPA
- If the "basic engine" is the same from one model year to the next, successful certification on one OEM test group is proof that conversions of all similar vehicles will be low-emitting
- Passing emission standards at an independent laboratory ensures the test vehicle will pass the required confirmatory testing at EPA

New Regulations For Fuel Conversions

- Regulatory process underway
  - Stakeholder input received
  - Expect proposal (NPRM) in December, 2009
- Objectives of new regulation:
  - Clarify and streamline process
  - Ensure fuel conversions are clean
  - Reduce current reporting requirements
  - Reduce EPA administrative burden
  - Maintain EPA oversight and enforcement authority
- Information updates available at:
  - http://epa.gov/otaq/consumer/fuels/altfuels/altfuels.htm
    - Sign-up for e-mail updates using link to “Enviroflash”