Transitioning the Transportation Sector: Exploring the Intersection of Hydrogen Fuel Cell and Natural Gas Vehicles

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Nearly 600,000 AFVs on the road in the US
Over 14,500 alternative fueling and charging stations
Long term goal of 2.5B gal/year by 2020

Nearly 6.5 Billion Gallons of Petroleum Reduction since 1993
Natural Gas dominates current alt-fuel use

Clean Cities 2013 Petroleum Reduction by AFV Type
(CNG + LNG > 60%)

- CNG: 56%
- BD: 15%
- E85: 12%
- LPG: 7%
- LNG: 5%
- ELEC: 5%
- H2: 0.1%

(based on reported fuel use in Clean Cities territories – for EPACT defined alternative-fuels)
Natural Gas use in Vehicles is Increasing

Clean Cities Petroleum Savings by AFV Type

Million GGEs

250
200
150
100
50
0


CNG
E85
Biodiesel
LNG
Propane
Electric

www.afdc.energy.gov/data/
Low & Stable NG Prices = powerful market motivator

Source: Clean Cities Alternative Fuel Price Reports
Nearly every domestic truck/bus/car OEM now has LNG and CNG models serving important niche markets.
(2009 to present) $300 M Clean Cities ARRA Awards - 20 Awards in 36 states (~$10 - $15M per award); helped deploy over 150 CNG and LNG stations and over 3,600 NGVs (Projects included EVs, CNG, LNG, LPG, H2, E85, and Biodiesel).

(2012) $11 M Clean Cities Alternative Fuel Implementation Awards - 20 projects in 30 states + DC (~ $500k - $1M per award); to help communities establish action plans, implement sustainable policies, address barriers, and develop incentives (Projects included EVs, CNG, LNG, LPG, H2, E85, and Biodiesel - did not fund vehicle costs or hardware).

(FY14 FOA) $4.5M – current funding opportunity for three topic areas

1. Alternative Fuel Vehicle Demonstration and Enhanced Driver Experience Projects
2. Alternative Fuel Training for First Responders, Public Safety Officials, and Critical Service Providers
3. Incorporating Alternative Fuels into Emergency Response and Preparedness Operations

October 1, 2014 – deadline for proposals
Anticipated Awards:

$4.5 million of Federal funding available for new awards under this FOA, subject to the availability of appropriated funds. This may allow 7 - 15 awards under this FOA ranging from $250,000 to $1,000,000.

EERE intends to issue awards in the following topic areas:

- AOI 1: 2-4 awards, $250,000 to $500,000.
- AOI 2: 4-10 awards, $250,000 to $1,000,000.
- AOI 3: 1 award, up to $1,000,000.
Vehicle Technology Forums & User Groups

- **Natural Gas Transit and School Bus Users Group:**
  - Transit agencies, school bus fleets, and government agencies come together to receive technical assistance and share information about using natural gas.

- **Natural Gas Vehicle Technology Forum:**
  - Supports development and deployment of commercially competitive natural gas engines, vehicles, and infrastructure.
  - Stakeholders include equipment manufacturers, national laboratories, government agencies, vehicle fleets, and industry groups.
Lessons Learned from CNG

• Develop Design and Integration Best Practices
• Develop Operational Best Practices
• Develop and Update Codes & Standards
• Create Effective Training Programs
• Establish Professional Certification Protocols
• Develop CNG Fuel Tank Tracking Procedures
• Enforce Code & Standard Compliance