Compressed Natural Gas Fleet Technologies Workshop

Centralina Clean Fuels Coalition
Carolinias Climate Resilience Conference
Charlotte, NC

Sean Flaherty
Centralina Clean Fuels Coalition
Centralina Council of Governments
The **U.S. Department of Energy's Clean Cities** program advances the nation's economic, environmental, and energy security by supporting local actions to cut petroleum use in transportation.

- A national network of nearly 100 Clean Cities coalitions brings together stakeholders in the public and private sectors to deploy:
  - Alternative and renewable fuels (biodiesel, electricity, ethanol, hydrogen, natural gas, propane)
  - Idle-reduction measures
  - Fuel economy improvements
  - Emerging transportation technologies.
Beyond a Billion

• Nationwide, Clean Cities activities have saved more than 5 billion gallons of petroleum and averted more than 34 million tons of greenhouse gas emissions over the course of the program's history.

• Centralina Clean Fuels Coalition and its stakeholders have led the charge in the 9-county Charlotte area, saving over 1.8 million gallons of petroleum in 2012 alone.
Clean Cities – History of Getting Results

• Nationwide, more than 20,000 stakeholders in the public and private sectors count themselves as members in a local Clean Cities coalition.

• Though a voluntary program, the number of stakeholders continues to increase.
Time for Clean Cities to reduce billion gallon increments

Billion GGE’s of Petroleum Reduced

- <1 yr
- <1 yr
- 2 yrs
- 3 years
- 11 years

Billion Gallons Gasoline

1993 - 2012
Clean Cities’ Total Petroleum Reduction

Million Gallons Gasoline Displaced per Year

- Program Goal for 2020
- Actual

Graph showing the displacement of million gallons of gasoline from 1994 to 2020, with a goal line for 2020 and an actual line illustrating the progress.
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- CCFC
  - Serves 9-county Charlotte area
  - Officially designated in 2004
  - **9.6 million gallons** of gasoline equivalents from 2006 – 2012
  - Led NC PEV Readiness Planning
  - 1 of 7 selected Mentoring Coalitions in National Partnership
Locally, CCFC has displaced over 9.6 million GGE since 2007.
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• Core-Stakeholders:

Private Sector:
• Dave Navey, Duke Energy*
• Rich Deming, Power Resource Group*

Fleet Managers:
• Ronnie Kidd, Frito Lay Transportation
• Robert Taylor, City of Charlotte*
• Gary Price, Rowan County Transit

Local / Regional Governments:
• Roger Cable, City of Gastonia*
• Marcie Smith, Gaston Co. Solid Waste*
• Daniel Nuckolls, City of Concord*

Federal and State Government / Universities:
• Joey Cochran, UNC Charlotte
• Jim Burke, Gaston County Extension*
• Laurie Walker, Central Piedmont Community College

* Members that have served as an active Core-Stakeholder for at least 5 years
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• Core-Stakeholders:

Fuel Providers / Infrastructure:
• Greg Johnson, Piedmont Natural Gas*
• Jim Cole, PSNC Energy
• Joseph Weathers, Mecklenburg County Permitting

Air Quality:
• Alan Giles, Mecklenburg County Air Quality*
• Johnny Wear, Western Piedmont Council of Governments*

Others / Special Interest:
• Cynthia Moseley, NC State Energy Office*
• Jason Lawrence, Charlotte Area Transit*
• Eric Swanger, Fontaine Modifications

School Districts / Education:
• Bryan Steiner, Charlotte-Mecklenburg Schools
• Douglas Coler, Discovery Place

* Members that have served as an active Core-Stakeholder for at least 5 years
Clean Cities Strategies

- **Replace** petroleum with alternative and renewable fuels

- **Reduce** petroleum use through fuel efficiency measures, smarter driving practices, and idle reduction

- **Eliminate** petroleum use by promoting mass transit, trip elimination, and congestion mitigation
Clean Cities Portfolio of Technologies

**Alternative and Renewable Fuels**
- Biodiesel
- Ethanol (E85)
- Electricity
- Hydrogen
- Natural gas
- Propane

**Fuel Economy**
- Fuel efficient vehicles
- Driving habits
- Vehicle maintenance

**Idle Reduction**
- Technologies
- Behavioral changes

**Trip Elimination**
- Telecommuting
- Ridesharing
Benefits of Alternative Fuels

• **Biofuels**
  – Non-toxic & biodegradable
  – Greenhouse gas and air quality benefits
  – Positive energy balance
  – Good for the economy

• **Electric Vehicles**
  – No tailpipe emissions
  – Range of 50-130 miles
  – Fueling costs reasonable compared with gasoline, especially off-peak rates

• **Hydrogen**
  – Pure hydrogen contains no carbon thus burns to form water with no CO$_2$ or CO emissions.
  – Fuel-cell vehicle’s have the potential to be 2 to 3 times more efficient than gasoline vehicles.
Benefits of Alternative Fuels

• **Natural Gas**
  – Domestically available, clean-burning fuel.
  – Available in compressed or liquefied form
  – A CNG-powered vehicle gets about the same fuel economy as a gasoline vehicle

• **Propane**
  – Nontoxic and no threat to soil, surface water, or groundwater
  – High energy density = good driving range
  – A gallon of propane about 25% less energy than a gallon of gasoline
  – Widespread infrastructure—most common alt fuel in the world

All alt fuels have emissions and petroleum reduction benefits!
Challenges of Alternative Fuels

• **Biofuels**
  – Cold storage of biodiesel: heaters
  – Some warranty issues with blends higher than B20
  – Food vs. Fuel
  – Decreased energy content compared with petroleum

• **Electricity**
  – Infrastructure and vehicles: chicken & egg problem
  – Peak electricity issues: Smart Grid is coming
  – Range anxiety

• **Hydrogen**
  – Very difficult to find: California is the most prolific
  – Education is needed for safety concerns
Challenges of Alternative Fuels

• **Natural Gas**
  – Additional safety modification for facilities is required by NEC and NFPA.
  – NG vehicles cost more because of tank configuration and engine requirements.

• **Propane**
  – Range vs. payload reduction issue caused by larger fuel tanks
  – A gallon of propane about 25% less energy than a gallon of gasoline
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2012 Greenhouse Gas Emissions Reduced
9,755 tons

- Vehicle Miles Traveled Reductions (0%)
- Off-Road Vehicles (1%)
- Idle Reduction (35%)
- Alternative Fuel Vehicles (43%)
- Electric & Plug-In Vehicles (0%)
- Hybrid Vehicles (16%)
- Fuel Economy Improvements (5%)
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Historical Greenhouse Gas Emissions Reduced

- Off-Road Vehicles
- Fuel Economy Improvements
- Vehicle Miles Traveled Reductions
- Idle Reduction
- Hybrid Vehicles
- Electric & Plug-In Vehicles
- Alternative Fuel Vehicles

Year
- 2009
- 2010
- 2011
- 2012

Greenhouse Gas Emissions Reduced (tons)
- 0k
- 2.5k
- 5k
- 7.5k
- 10k
- 12.5k
- 15k

- 9,814 tons
- 7,275 tons
- 14,252 tons
- 9,755 tons
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