Clean Cities Program Overview

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Clean Cities

Clean Cities Mission
To advance the energy, economic, and environmental security of the U.S. by supporting local decisions to reduce petroleum use in transportation.

- Provides a framework for businesses and government agencies to work together
- Goal: Reduce U.S. petroleum use by 2.5 billion gallons per year
Clean Cities Coalitions

- Nearly 100 coalitions in 45 states
- 775,000 AFVs using alternative fuels
- 6,600 fueling stations
Coalitions are made up of local and national stakeholders.

- 8,400 stakeholders nationwide
- 49% private-sector stakeholders
- 51% public-sector stakeholders
<table>
<thead>
<tr>
<th>National Clean Fleets Partnership</th>
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</thead>
<tbody>
<tr>
<td>• AT&amp;T</td>
</tr>
<tr>
<td>• Best Buy</td>
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<tr>
<td>• Coca-Cola</td>
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<td>• Enterprise Holdings</td>
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<tr>
<td>• FedEx</td>
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<tr>
<td>• Frito-Lay</td>
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<tr>
<td>• GE</td>
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<td>• Johnson Controls, Inc.</td>
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<td>• OSRAM SYLVANIA</td>
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<td>• Pacific Gas and Electric Company</td>
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<td>• PepsiCo</td>
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<tr>
<td>• Ryder</td>
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<td>• Schwan's Home Service</td>
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<td>• Staples</td>
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<tr>
<td>• ThyssenKrupp Elevator</td>
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<td>• UPS</td>
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<td>• Veolia Environmental Services</td>
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<tr>
<td>• Verizon</td>
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</tbody>
</table>
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 has saved well over 4 billion gallons of petroleum since 1993.
Clean Cities Portfolio of Technologies

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

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

Idle Reduction
- Technologies
- Behavioral changes

Trip Elimination
- Telecommuting
- Ridesharing
Online Information Resources

Clean Cities
www.cleancities.energy.gov

Alternative Fuels & Advanced Vehicles Data Center
www.afdc.energy.gov

FuelEconomy.gov
www.fueleconomy.gov

Clean Cities Coordinators and Coalitions
www.afdc.energy.gov/cleancities/coalitions/coalition_locations.php

Maine Clean Communities
http://mainecleancommunities.gpcog.info/
Natural Gas Basics

Natural Gas

• Hydrocarbons, predominantly methane (CH₄)
• High octane rating
• Nontoxic, noncorrosive, and noncarcinogenic
• Not a threat to soil, surface water, or groundwater
• Lower ozone-forming emissions than gasoline
• Extracted from gas and oil wells
• Existing pipeline distribution system
Compressed Natural Gas (CNG)
- Stored in onboard tanks under high pressure
- Fuel economy similar to gasoline
- 1 GGE = 5.7 lb CNG

Liquefied Natural Gas (LNG)
- Kept at cold temperatures
- Stored in double-wall, vacuum-insulated pressure vessels
- Heavy-duty vehicles
- 1 GGE = 1.5 gal LNG

GGE – Gasoline Gallon Equivalent
Dedicated Natural Gas Vehicles (NGV)
- Run only on natural gas
- Better performance
- Lower emissions
- Increased cargo capacity

Bi-fuel NGVs
- Two fueling systems
  - Natural gas
  - Gasoline
- Fueling flexibility

Dual-fuel NGVs
- Run on diesel and natural gas
- Heavy-duty vehicles only
Use: Fleet Applications

Light-Duty NGVs
- Suitable for light-duty needs in private and government fleets
- Honda Civic GX

Medium-Duty NGVs
- Vans and shuttles
- Airports and taxi fleets

Heavy-Duty NGVs
- Refuse haulers
- Transit buses
- School buses
- Long-haul trucks
- Street sweepers
- Snowplows
- Short-haul delivery trucks

Natural Gas Vehicles for America
www.ngvamerica.org
Use: Fueling Stations

**Offsite, Public Access**
- Utilize an existing public station
- Operated by retailer, utility, or fleet
- Anchor fleet or pool of multiple fleets

**Onsite, Private Access**
- Exclusive use by fleets
- Time-fill stations always private access

**Onsite, Public Access**
- Often located outside of restricted areas
- Benefit from economy of scale
- Promotes public use of NGVs
- Must have fast-fill capabilities for public
Fleet-Owned and -Operated
• Fleet works with vendors on station development
• Fleet owns and operates station

Outsourced to Independent Provider
• Outside development, ownership, and operation
• Fleet provides demand threshold
• Long-term price agreement
• Public access possible

Fleet-Owned, Contractor-Operated
• Reduces fleet risk
• Fleet relies on experienced operator
• Usually a 5-7 year contract
Use: CNG Fueling

**Time-Fill Fueling**
- Good for centrally-based fleets with consistent schedules
- CNG is dispensed slowly, often overnight
- Lower cost investment

**Fast-Fill Fueling**
- Fueling takes place in minutes
- Necessary for public-access stations
- Good for vehicles with little downtime

**Combo-Fill Fueling**
- Time-fill and fast-fill
- More flexibility in fueling
Use: LNG Fueling

Mobile Fueling
- Tanker truck with metering and dispensing equipment
- Provides temporary fueling option

Starter/Containerized System
- Complete fueling station, including storage tank, dispensing, metering, and required containment
- Turn-key solution

Custom Station
- Larger storage tanks
- Multiple dispensers
- LNG and/or CNG dispensing
# Growing Selection of NGVs from OEMs, SVMs

## OEMs
- American Honda
- General Motors
- VPG/MV-1
- Thomas Built Bus
- Blue Bird Bus
- Optima/NABI
- El Dorado
- New Flyer
- Orion
- Foton
- Gillig
- Elgin
- Allianz/Johnston
- Schwarze
- Tymco

## OEM/Repower Engines
- Freightliner Truck
- Freightliner Custom Chassis
- International
- Kenworth
- Peterbilt
- Mack
- ALF Condor
- Crane Carrier
- Autocar Truck
- Capacity

## SVMs (LDV/MDV/HDV)
- Altech-Eco
- BAF Technologies
- Landi Renzo/Baytech Corp
- IMPCO Technologies
- Natural Drive
- NGV Conversions/Motori
- NatGasCar

## SVMs
- GM
- Ford
- Dodge
- Workhorse
- Isuzu
- FCCC
Natural Gas Costs

Natural Gas Spot Prices at the Henry Hub
2004 - 2012

Price per mmbtu

$15.00
$14.00
$13.00
$12.00
$11.00
$10.00
$9.00
$8.00
$7.00
$6.00
$5.00
$4.00
$3.00
$2.00
$1.00

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Each Wednesday

2012 2011 2010
2009 2008 2007
2006 2005 2004
Components of CNG Cost

- Gas Bill: $.81-.89/GGE
- Electric compression costs: $.10/GGE
- Maintenance/Repair/Service: $.40/GGE
- Capital amortization of equipment: $.35-.65/GGE
- Net federal excise tax credit of either $.317 or $.50/GGE

- Tax exempt makes and uses their own fuel for net $1.66-2.04/GGE

- Taxable entity makes and uses fuel for net $2.09-2.47
  - Includes $.183 fed excise tax and $.243 state excise tax
Greater Portland METRO
- 13 of 30 Transit Buses run on CNG
- Acquiring four to five more ASAP

Portland School Department
- Nine Transit Style Buses run on CNG
- Refuel at METRO
- Acquiring four more next year

Bangor Gas
- Time-Fill NG dispenser
- Honda Civic NGV + 2 or 3 other NGVs
- Planning Fast-fill infrastructure
ANGH Targeted and Planned LNG Northeast Stations as of October 2012
### Table: Population (2010)

<table>
<thead>
<tr>
<th>Town</th>
<th>Population</th>
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<tbody>
<tr>
<td>Auburn</td>
<td>23,055</td>
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<td>Augusta</td>
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<td>Bangor</td>
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<td>Bath</td>
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<td>Biddeford</td>
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<td>Bowdoin</td>
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<td>Westbrook</td>
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<tr>
<td>Windham</td>
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</tbody>
</table>

**Total Population:** 546,848

### Natural Gas Service Areas in Maine

#### MAINE NATURAL GAS
- Bangor Gas Company
- Unitil Gas Company
- Kennebec Valley Gas Company

#### State of Maine Population

- Total: 1,328,361
Contact Information

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http://mainecleancommunities.gpcog.info/