

**WELCOME  
To:**

# Athens CNG Workshop & Tour

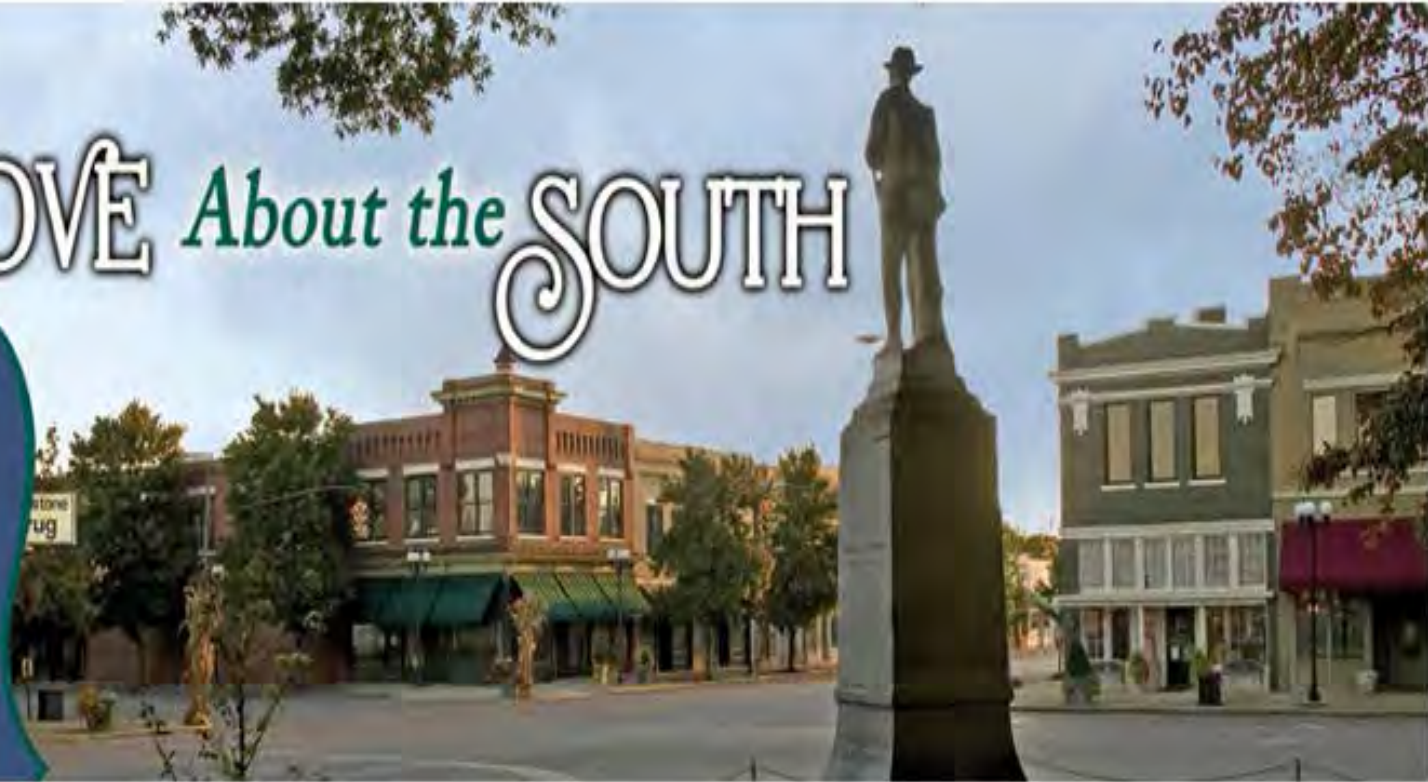


*It's What You LOVE About the SOUTH*

LIMESTONE COUNTY

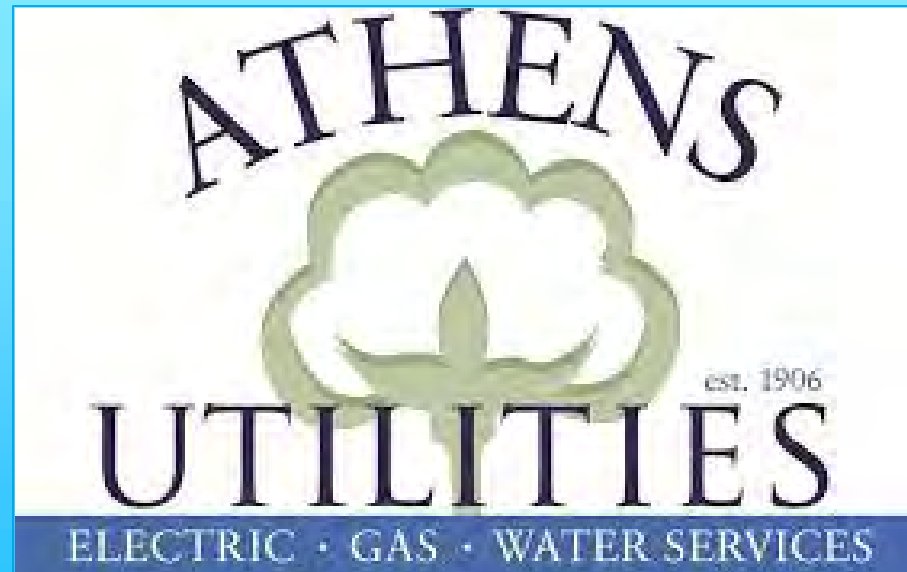
**Athens**

[VisitAthensAL.com](http://VisitAthensAL.com)



**Mark Bentley**  
**Executive Director**

# Athens CNG Workshop & Tour



• **>25%**

Of World's Petroleum is consumed by the US

• **<5%**

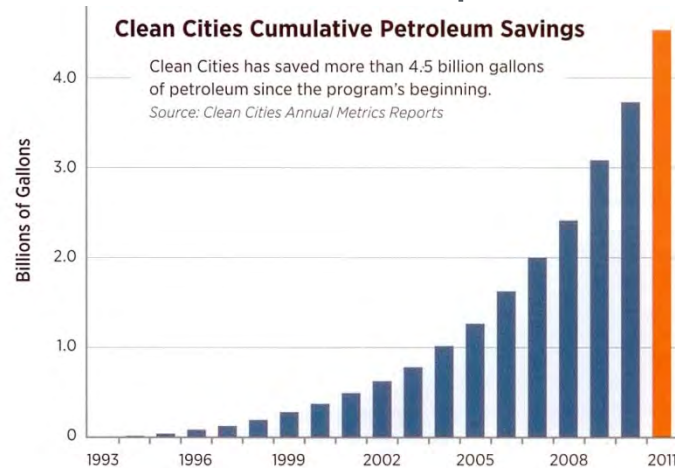
- The US represents less than 5% of world's population

• **\$1,000,000,000**

- More than a Billion Dollars a day leaves the US to pay for petroleum
  - ***70% Goes to Transportation Sector***

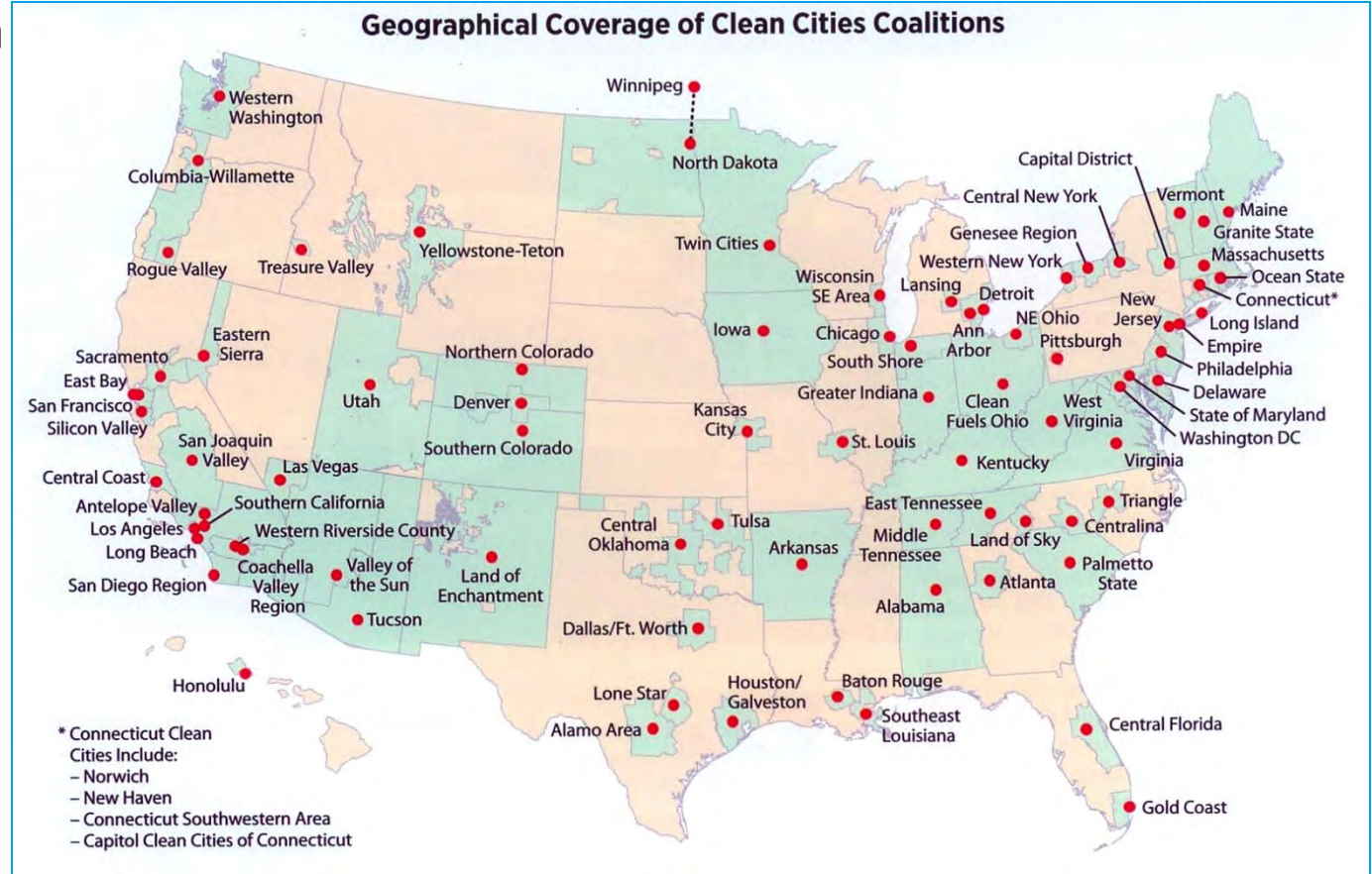
## Clean Cities Mission

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

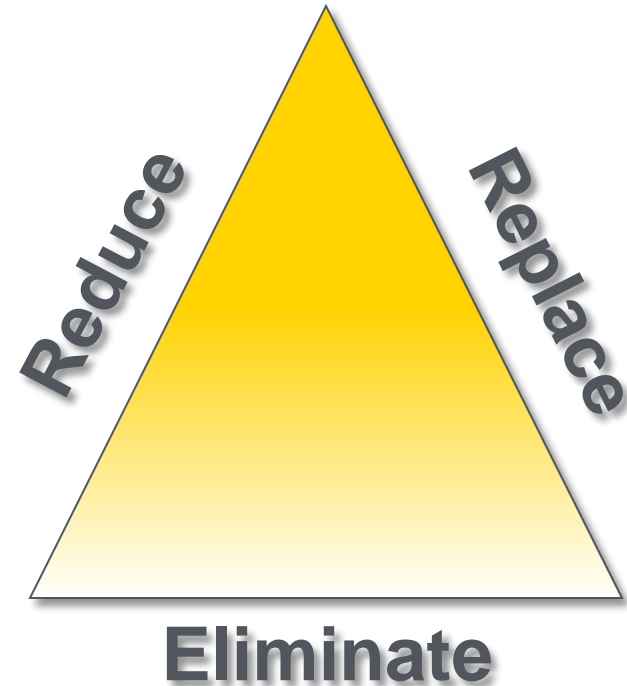


- Energy Policy Act of 1992 (EPAAct)
- Provides a framework for businesses and government agencies to work together
- Goal: Reduce U.S. petroleum use by 2.5 billion gallons per year

- Nearly 100 coalitions in 45 states
- Over 13,000 Stakeholders
- 775,000+ AFVs using alternative fuels
- 11,342 fueling stations



- **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 nearly 3 billion gallons of petroleum since 1993.**



- **Founded in 2002 ACFC is a non-profit, membership based organization serving the state of Alabama**
- **ACFC's objectives are:**
  - **To reduce our dependence on foreign petroleum**
  - **To expand the market for alternative fuel and advanced technology vehicles**
  - **To improve air quality on Alabama thru increasing the use of cleaner alternative fuels**
  - **To create economic development (jobs) in Alabama**
- **ACFC is funded by member dues and grants**



- **ACFC strives to do four things well!**
  - 1. Be a clearinghouse for information about alternative fuels and advanced technology vehicles**
  - 2. Receive and provide grants for alternative fuel infrastructure projects**
  - 3. Conduct public education and outreach**
  - 4. Work on State and National Alternative Fuel/Vehicle Policy**



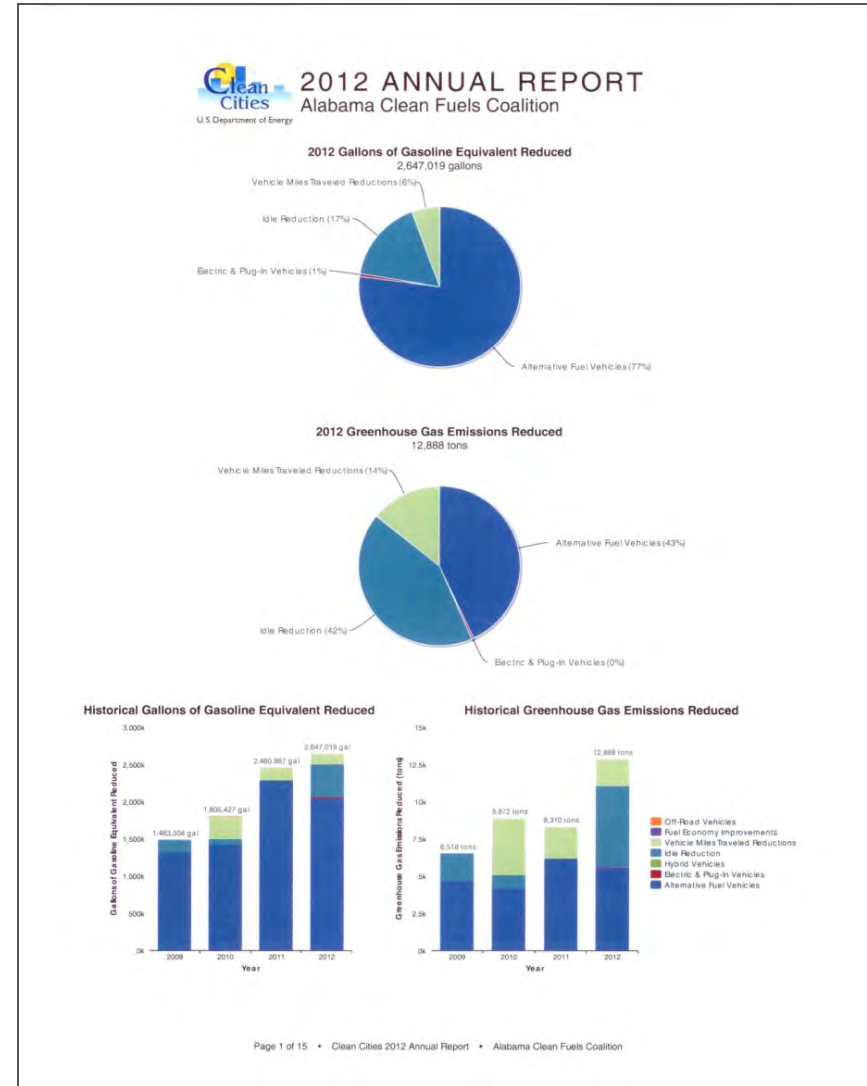
# Making A Difference One Fuel at a Time!



- Annual Report submitted to DOE
- Aggregates alternative fuel and vehicle activity in Alabama
- It is Alabama's "Report Card"!

## In Alabama

- 11.7 Million gallons of alternative fuels reported used in AL since 2009
- 26,065 Tons of Greenhouse gas emissions reduced since 2009 through use of alternative fuels



**As a  
Transportation  
Fuel!**



# Cynergy's Mission



To Develop, Own, and Operate Compressed Natural Gas (CNG) Fueling Stations for the purpose of providing the transportation industry with a less expensive, cleaner burning, domestically produced alternative to foreign supplied petroleum.

**[www.cynergyfuels.com](http://www.cynergyfuels.com)**



# Natural Gas as a Transportation Fuel



- Clean
- Safe
- Affordable
- Domestic
- Abundant
- Reliable
- Economic Development (Jobs)



**CNG** – Compressed Natural Gas

**LNG** – Liquefied Natural Gas (-260 degrees F)

**NGV** – Natural Gas Vehicle

**GGE** – Gasoline Gallon Equivalent

**DGE** – Diesel Gallon Equivalent

**Slow Fill** – Compressor directly to NGV tank

**Fast Fill** – High pressure storage fills NGV tank

# What is CNG (compressed natural gas)?



- Natural gas that is compressed at CNG fueling stations
- Fuel dispensed into vehicles at 3600 psi at 70°F
- High pressure allows more fuel to be stored in vehicle on-board cylinders
- Fuel value:
  - ~125 cubic feet per gasoline gallon equivalent (GGE)
    - 1 thousand cubic feet (mcf) = roughly 8 GGE
  - ~140 cubic feet per diesel gallon equivalent (DGE)
    - 1 thousand cubic feet (mcf) = roughly 7.2 DGE

# Natural Gas – Clean



- Cleanest burning alternative transportation fuel commercially available today.
- Reduces emissions of :
  - CO2 (25%)
  - Carbon Monoxide (90%)
  - Mercury (100%)
  - Sulfur Dioxide (99.9%)
  - Particulates (91.3%)
  - Nitrogen Oxide (78.4%)
- Replacing one diesel garbage truck with a natural gas garbage truck can reduce emissions equivalent to removing 325 cars from the road.



Source: Environmental Protection Agency, [naturalgas.org](http://naturalgas.org)



# Saddle Creek Transportation - Lakeland, FL Switched 102 Trucks from Diesel to Nat Gas



- They reduced their **carbon footprint** by **11,400,000** pounds annually, which is the
- Equivalent weight of **6,000 Volkswagens**
- Equivalent of recycling **150 million plastic bottles**
- Equivalent of planting **219,000 trees**







- Lighter than air (doesn't puddle)
- Higher ignition temperature (1,100° vs. 600° for gasoline)
- Stronger components and storage systems than diesel or gasoline

- U.S. retail CNG prices range from around \$1.00 to \$2.00 per gallon equivalent below gasoline and diesel fuel.
- April 2013 National Averages
  - CNG - \$2.10
  - Diesel - \$3.99
  - Gasoline - \$3.59



Pricing source: April 2013 AFDC Alt Fuel Price Report.  
[http://www.afdc.energy.gov/uploads/publication/alternative\\_fuel\\_price\\_report\\_april\\_2013.pdf](http://www.afdc.energy.gov/uploads/publication/alternative_fuel_price_report_april_2013.pdf)

- Research shows the cost of diesel fuel is projected to increase at a linear rate of 5.6% per year
- Increase in natural gas = 1.6% per year

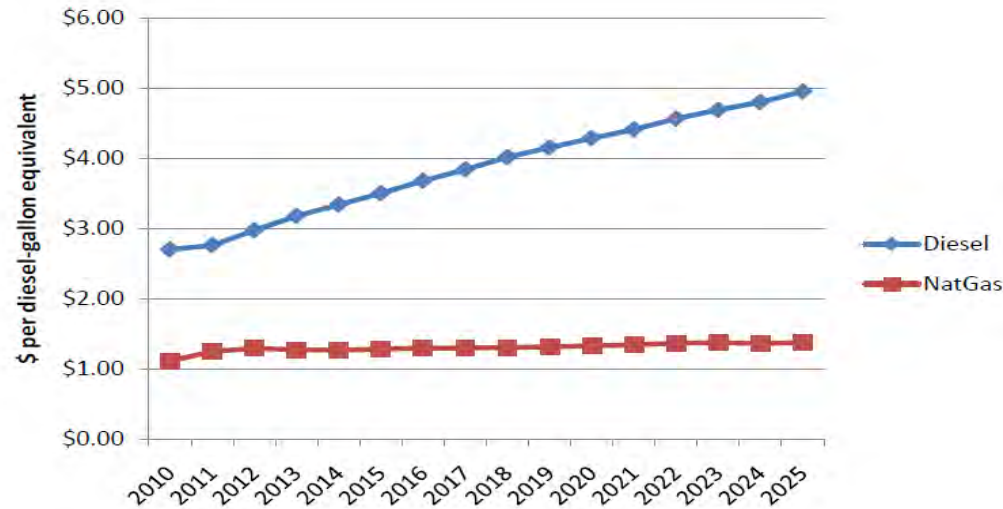


Figure 5: EIA Fuel Price Projections. Source: EIA.

# Natural Gas – Domestic



- U.S. has largest natural gas resource in the world
- 98% of natural gas consumed in the U.S. is produced in North America
  - 86% from U.S.
  - 14% from Canada



# Natural Gas – Abundant



- 32 of 50 states produce natural gas
- Estimated 120+ years of supply
- U.S. has more natural gas reserves than Saudi Arabia has oil reserves.



Source: NGV America. EIA



# Natural Gas – Reliable

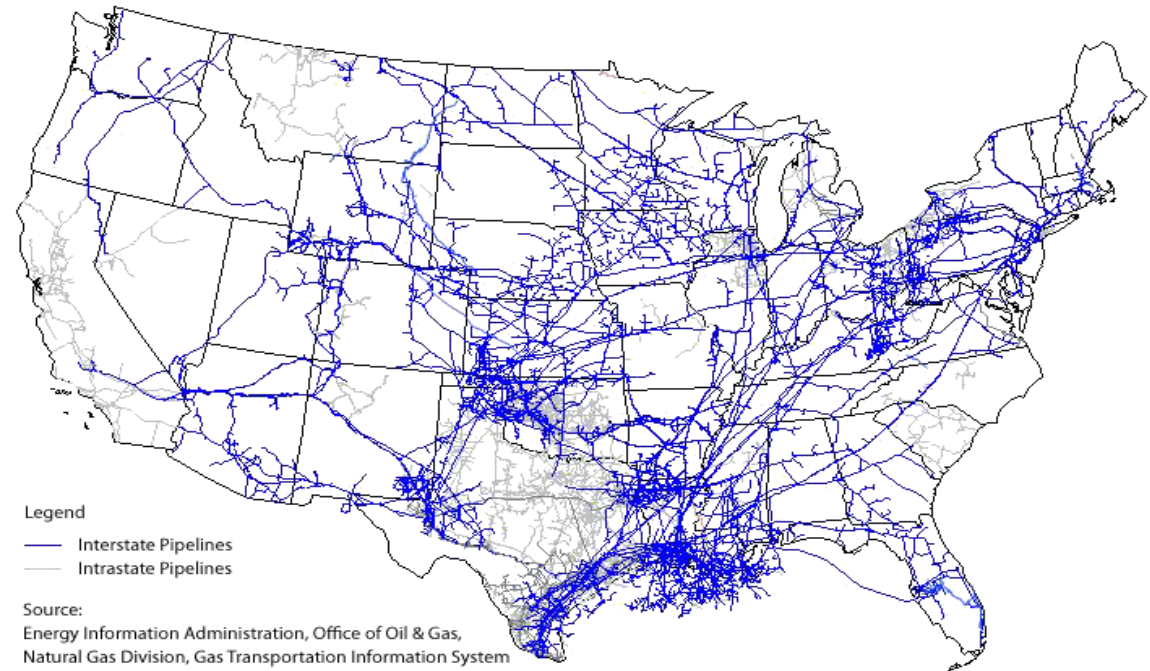


Nationwide natural gas infrastructure already in place

Pipeline system is like interstate highway to driveway

No Underground Storage Tanks!!!

No trucking of natural gas because it is compressed at filling station



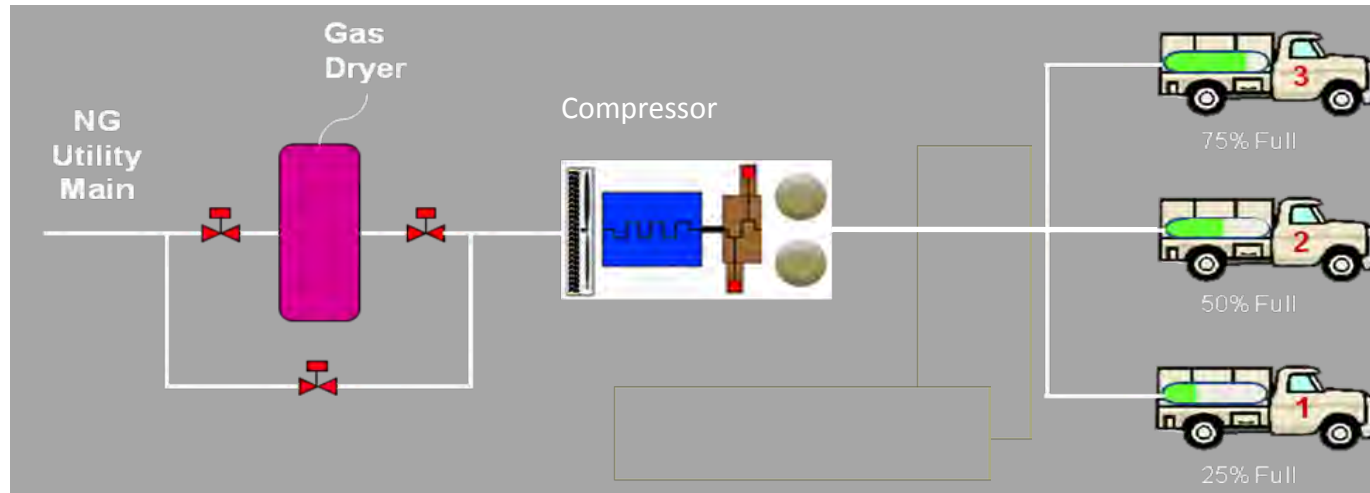
# Fueling Infrastructure



- Time-fill
- Fast-fill
- Gas and Electricity Required
- CNG Station Costs



# Time-fill



- Vehicle returns to same location each day and connects to fill hose
- Vehicle can travel all day on single fill up
- Fueling over 6-10 hour period, typically overnight





# Time-fill



- Refuse trucks
- Regional Haul (Food/Beverage/Logistics)
- School Buses



# Fast-fill Station Components



Two hose fueling dispensers with internal sequencing

Typical 200 cfm Station  
30,000 Gallons/Month

Compressor Enclosure

Single tower natural gas dryer

3 bank CNG storage cascade

Natural gas service



## Outside the Fence at BJCTA CNG Public Access Station in Birmingham



Estimated 149,000 gal of CNG pumped at Public Access Station in 2013 – 50% increase over 2012!

- Happy Hollow Chevron – Trussville, Alabama (I-59)
- City of Trussville, Trussville Utilities & McCullough Oil Company



Compressor  
And Storage



Mayor Melton  
and Officer  
Fueling Tahoes



# On a Gas Utilities Property



- Great Station at East Alabama Gas Location in Ashland, Alabama



Advertising – Coming



Advertising – Going





- Based on many factors:
  - Number of vehicles
  - Fueling patterns (sized for peak filling time)
  - Supply pressure and resulting compressor sizes
  - Storage needed
- Small Time-fill (2-3 vehicles): \$40,000-\$60,000
- Time-fill Station (fleets): \$400,000 and up
- Fast-fill Station: \$750,000 and up



# Federal Support for NGVs?



- Unlike for other alt fuels, federal incentives are *not* essential for the NGV market to succeed:
  - But the market will grow much faster with federal government support.
- If foreign oil import reduction is a federal priority for energy independence and deficit reduction, the most effective policy is for Congress to provide incentives for the purchase and use of NGVs.

Currently the only federal NGV fuel related incentive, which expires at the end of 2013, is a \$.50 credit for each equivalent gallon of natural gas fuel dispensed. This is paid quarterly following submission of simple report.

For Qualified Alternative Fuel Infrastructure there is a 30% up to \$30,000 tax incentive available through the end of 2013.



- Waste Management (Garbage Trucks)
- AT&T (Service Vans)
- Saddle Creek Logistics (Class 6, 7, & 8)
- Alagasco (Service Trucks and Vans)
- Trussville – (Tahoes for Police; Dump Trucks)







## Light and Medium Duty NGV Options:

- GM currently provides OEM CNG vans, 2500 series natural gas pickup trucks (Bi-fuel)
- Dodge - CNG Bi-Fuel Dodge Ram
- Ford has Natural Gas F-250,350,650 trucks available (Bi-fuel)
- Honda, GMC, GM produce CNG vehicles (Dedicated)
- Aftermarket Conversions



# Natural Gas Vehicles



Source: Natural Gas Vehicles for America (NGVA)

## Heavy Duty NGV Options:

- 8.9L Engine – Currently Available
- 11.9L Engine – Summer/Fall 2013

## Major OEMs:

- Freightliner
- Volvo
- Mack
- Kenworth



## Why Consider Natural Gas?

- Fewer emissions than conventional fuels
- Historically \$1 - \$2 less per gallon than gas/diesel
- Established distribution network
  - Pipeline and trucks used for transport
- Produced domestically
- Natural gas vehicle engines often last longer and require less frequent service than conventional vehicles

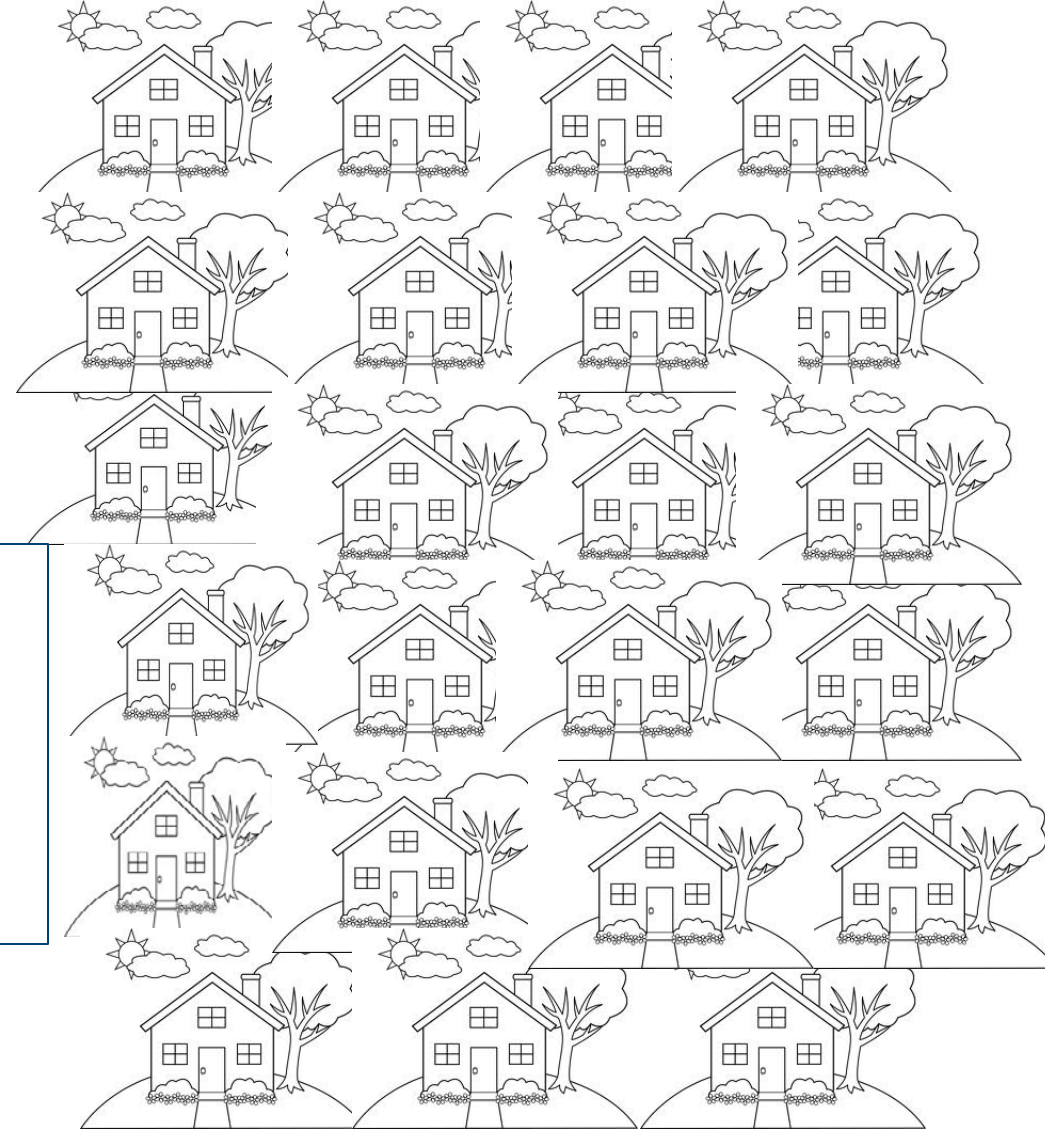
Consider just one CNG fueled pickup's potential Purchases.....



- 1 pick-up truck averages 1,333 gallons of gas a year.  $1,333 / 8.0 = 167$  Mcf.
- 1 House (in SE) uses +/- 55 Mcf of natural gas per year
- $167 \text{ Mcf} / 55 \text{ Mcf} = 3$  houses natural gas usage

1 pickup = 3 houses! With no individual gas lines, meters, billing etc.

# Math and Market Share for CNG



- 1 Waste vehicle averages 9,250 gallons of diesel fuel a year.  $9,250 / 7.19 = 1,287$  Mcf.
- 1 House (in SE) uses +/- 55 Mcf of CNG per year
- $1,287 \text{ Mcf} / 55 \text{ Mcf} = \underline{23.4}$  houses CNG usage

10 waste trucks = 234 houses! With no individual gas lines, meters, billing etc!

## Additional Points to Consider

- 120,000 natural gas vehicles on U.S. roads
- 15 million NGV's worldwide
- Just over 1,200 natural gas vehicle fueling stations in the U.S.



## The Future of Natural Gas

- Natural gas is a critical element in energy strategy for the U.S.
- Advances in exploration and production technologies have led to new sources of natural gas in U.S.
  - Combined application of horizontal drilling and hydraulic fracturing techniques that have made the country's vast shale gas resources accessible
  - Helps reduce dependence on foreign oil
  - Promotes job growth



## Federal and State Incentives Available

- Your Source for all laws & Incentives – Nationally and by State  
<http://www.afdc.energy.gov/laws/>
- 30% up to \$30,000 tax incentive available for qualified alternative fuel infrastructure projects, and, YES, tax exempt companies can participate as well!
- 50 cents per gallon for each CNG Gallon pumped! Retro to 2012!
- **New** Alabama Low interest Loan programs for vehicle conversion to CNG, LNG & LPG
  - **AlabamaSaves** – 1% revolving loan money available to companies, industry etc. \$50,000 minimum > \$4,000,000 maximum for conversions and infrastructure,
  - **Local Government Energy Loan Program** – ZERO % revolving loan money available to colleges, universities, school systems and local governments. Maximum > \$500,000
- Alabama Incentive Legislation

# Online Information Resources



Alabama Clean Fuels Coalition  
[www.AlabamaCleanFuels.org](http://www.AlabamaCleanFuels.org)

Clean Cities  
[www.cleancities.energy.gov](http://www.cleancities.energy.gov)

Alternative Fuels & Advanced Vehicles Data Center  
[www.afdc.energy.gov](http://www.afdc.energy.gov)

FuelEconomy.gov  
[www.fueleconomy.gov](http://www.fueleconomy.gov)

NGV America  
[www.ngvc.org/](http://www.ngvc.org/)

Clean Cities Coordinators and Coalitions  
[www.afdc.energy.gov/cleancities/coalitions/coalition\\_locations.php](http://www.afdc.energy.gov/cleancities/coalitions/coalition_locations.php)

# Questions?



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