Enabling Energy Independence

OGA Market Conditions Conference

July, 2013

Natural Gas Vehicle Terminology?

- **CNG** = Compressed Natural Gas
- **NGV** = Natural Gas Vehicle

- **GGE** ≈ 125 cubic feet of natural gas
- **DGE** ≈ 140 cubic feet of natural gas

- **Dedicated**: Vehicle that runs on CNG only
- **Bi-Fuel**: Runs on CNG or Gasoline
- **Dual-Fuel**: Runs on CNG and Diesel

What is CNG?

One GGE of CNG ≈ 125 cubic feet of natural gas @ 3,600 psi

=

Gasoline
Volume: 1 gallon
BTUs: ~114,000 LHV
Cost: $3.69/gallon

Compressed Natural Gas
Volume: Roughly 3.5 gallons
BTUs: ~114,000 LHV
Cost: $2.10/GGE

CNG provides just as much energy as Gasoline at a reduced cost but it does take up more physical space.

What is CNG?

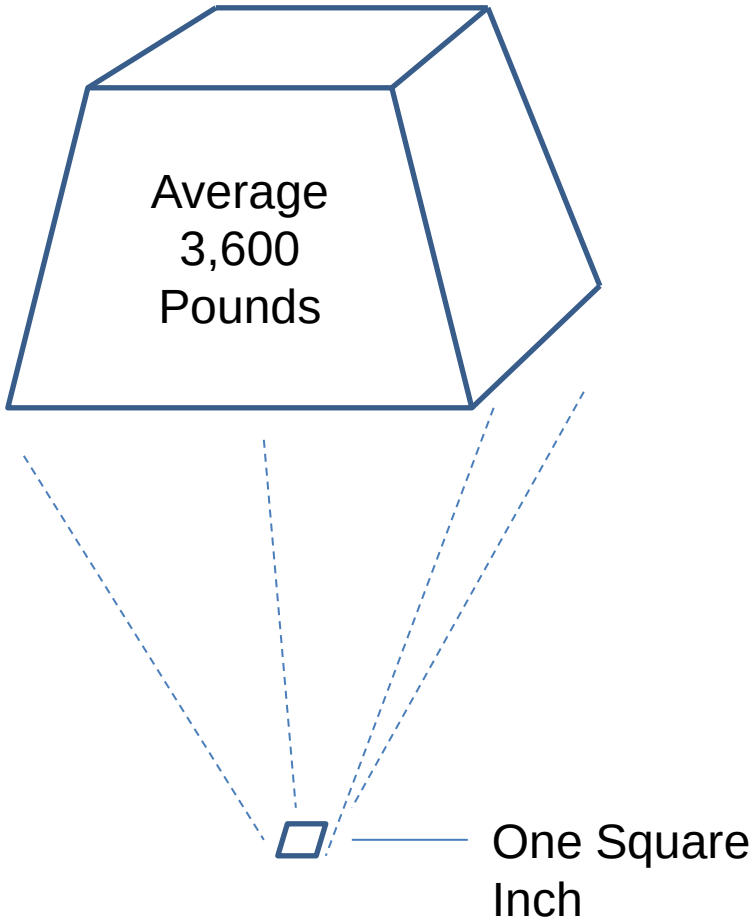
CNG is stored onboard vehicles at **3,600 psi** (US Standard)

Comparable Pressures:

CO2 tanks used in some high-end paintball guns can go up to **4,500 psi**

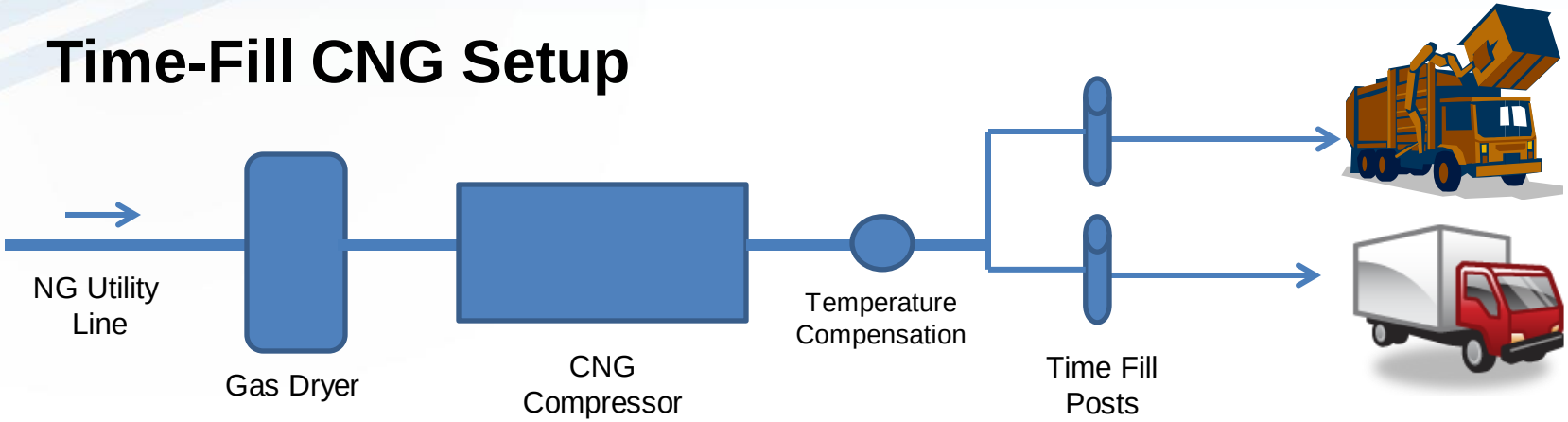
Scuba tanks are pressurized up to **3,000 psi**

Pressure washers can dispense water between **1,000 and 4,000 psi**

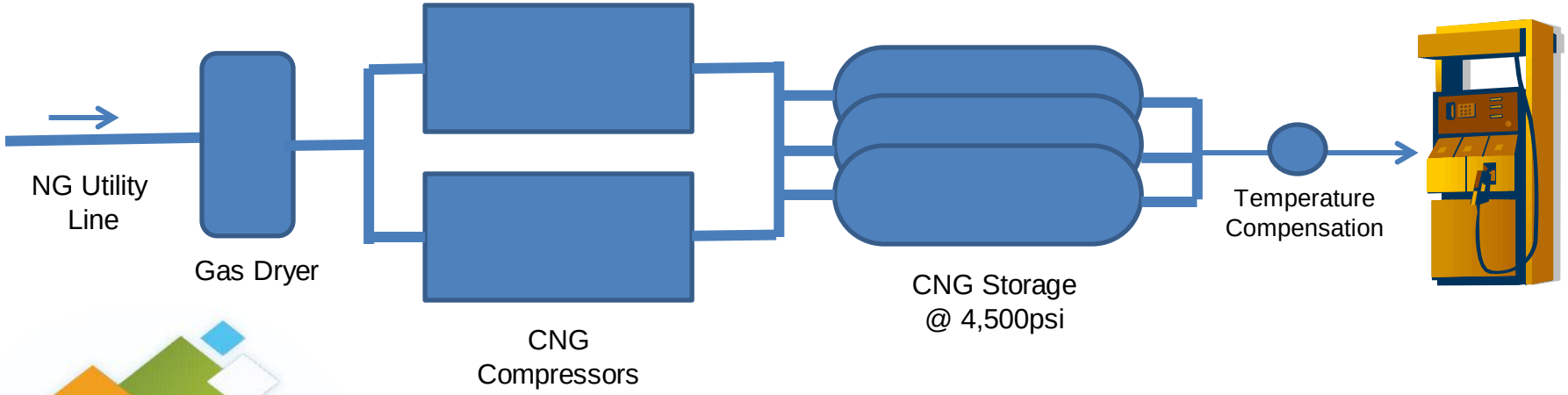


CNG Station Layout

Time-Fill CNG Setup



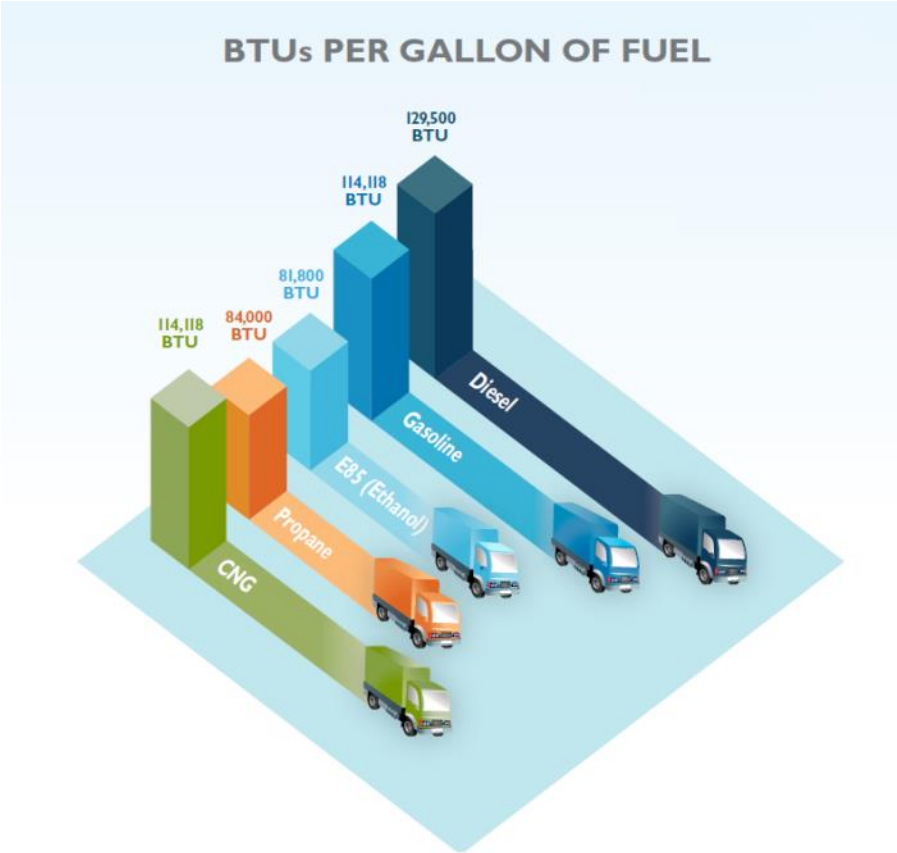
Fast-Fill CNG Setup



CNG vs. Other Fuels

NATIONWIDE AVERAGE PRICE (IN GGEs)

Diesel:	$3.99
E85 (Ethanol):	$4.48
Propane:	$3.70
Gasoline:	$3.69
CNG:	$2.10



Source: U.S. Department of Energy - Clean Cities Alternative Fuel Price Report

Natural Gas Vehicle Use?

Of the 15 million NGVs in the world only 123,000 are located in the United States

People per NGV

South America: 88.8

Europe: 419.95

Asia-Pacific: 517.16

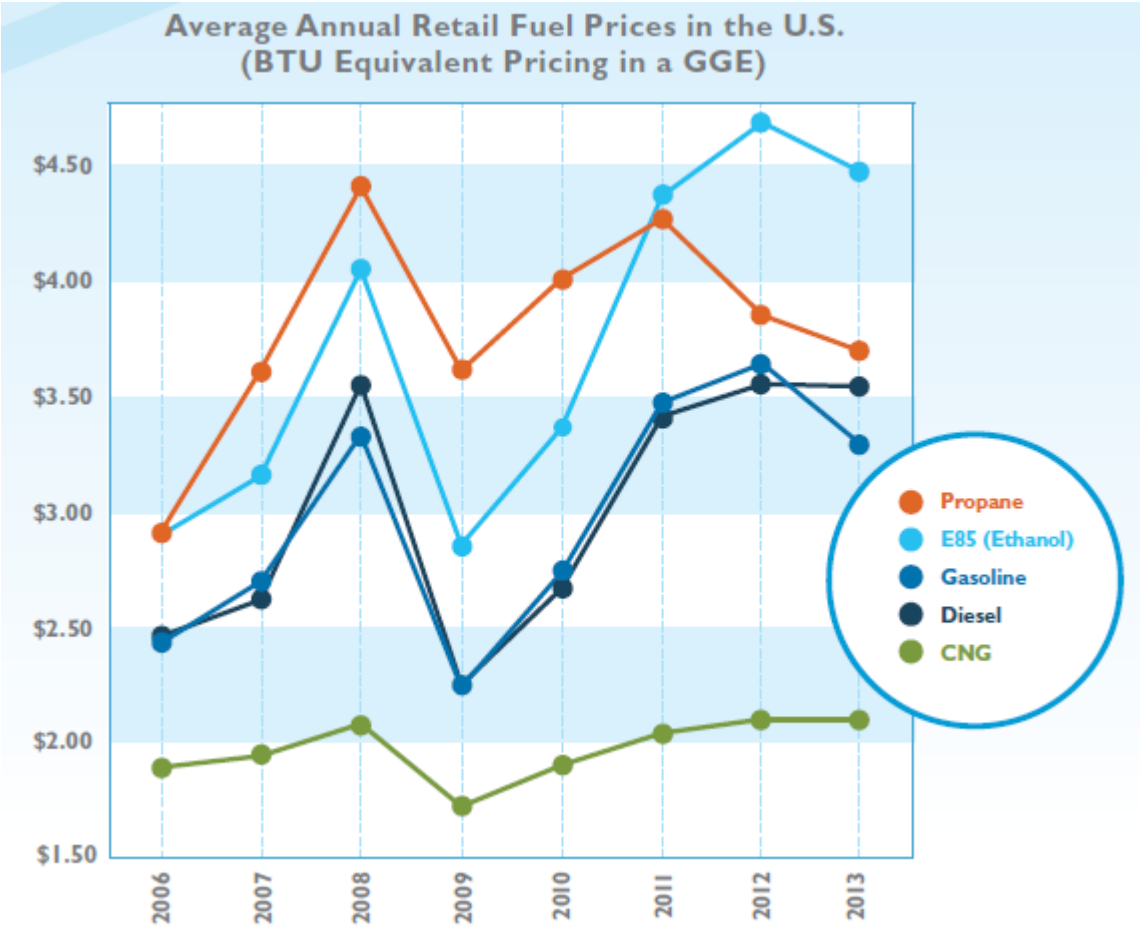
North America: 3,853.5

Africa: 6,496.6

Source: International Association for Natural Gas

Why CNG?

Affordable



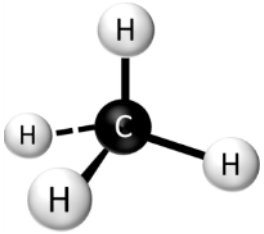
We expect this trend to continue through the foreseeable future.

Source: U.S. Department of Energy - Clean Cities Alternative Fuel Price Report

Why CNG?

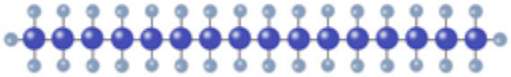
Clean

Methane



CH_4

Diesel



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Emissions Reduction

NGVs improve air quality through dramatic reductions in emissions, such as:

- Reducing carbon dioxide emissions by up to 30%
- Reducing carbon monoxide emissions up to 75%
- Reducing nitrogen oxide emissions by approximately 50%
- Reducing up to 90% of particulate matter emissions

SOURCE: TIAX Report – Full Fuel Cycle Assessment: Well-to-Wheels Energy Inputs, Emissions, and Water Impacts, 08/07 (Prepared for California Energy Commission).

Why CNG?

Domestic

- Barrels of Oil Imported by the U.S.
  - 296 Million (In March 2013)
- Money Sent Overseas:
  - $32.1 Billion (In March 2013)

CNG Vehicles

Transit Buses
Brands: Gillig
Incremental Cost: $40,000+

Refuse Trucks
Brands: McNeilus, Autocar, others
Incremental Cost: $32,000+

Light Duty Vehicles
Brands: GM, Honda, Ford, Chrysler
Incremental Cost: $10,000+

CNG Vehicles

(Light Duty)

OEM CNG Vehicles

- Honda Civic
- Chevy Silverado 2500
- Chevy Express Van
- Dodge Ram 2500

EPA Certified Kits for

- Chevy Impala, Malibu
- Ford Focus, Fusion
- Ford Transit Connect
- GMC Sierra
- Chevy Silverado
- Ford F-Series
- Ford E-Series
- Ford Expedition
- Chevy Tahoe, Avalanche
- Dodge Ram
- GM Savanna & Express

… And More

CNG Vehicles

(Heavy Duty)

Cummins ISX12 G

The much anticipated release of this 12L engine is scheduled for August of 2013. This engine will have more power than any other truck CNG engine on the market and dramatically increase CNG penetration.

Cummins ISL-G

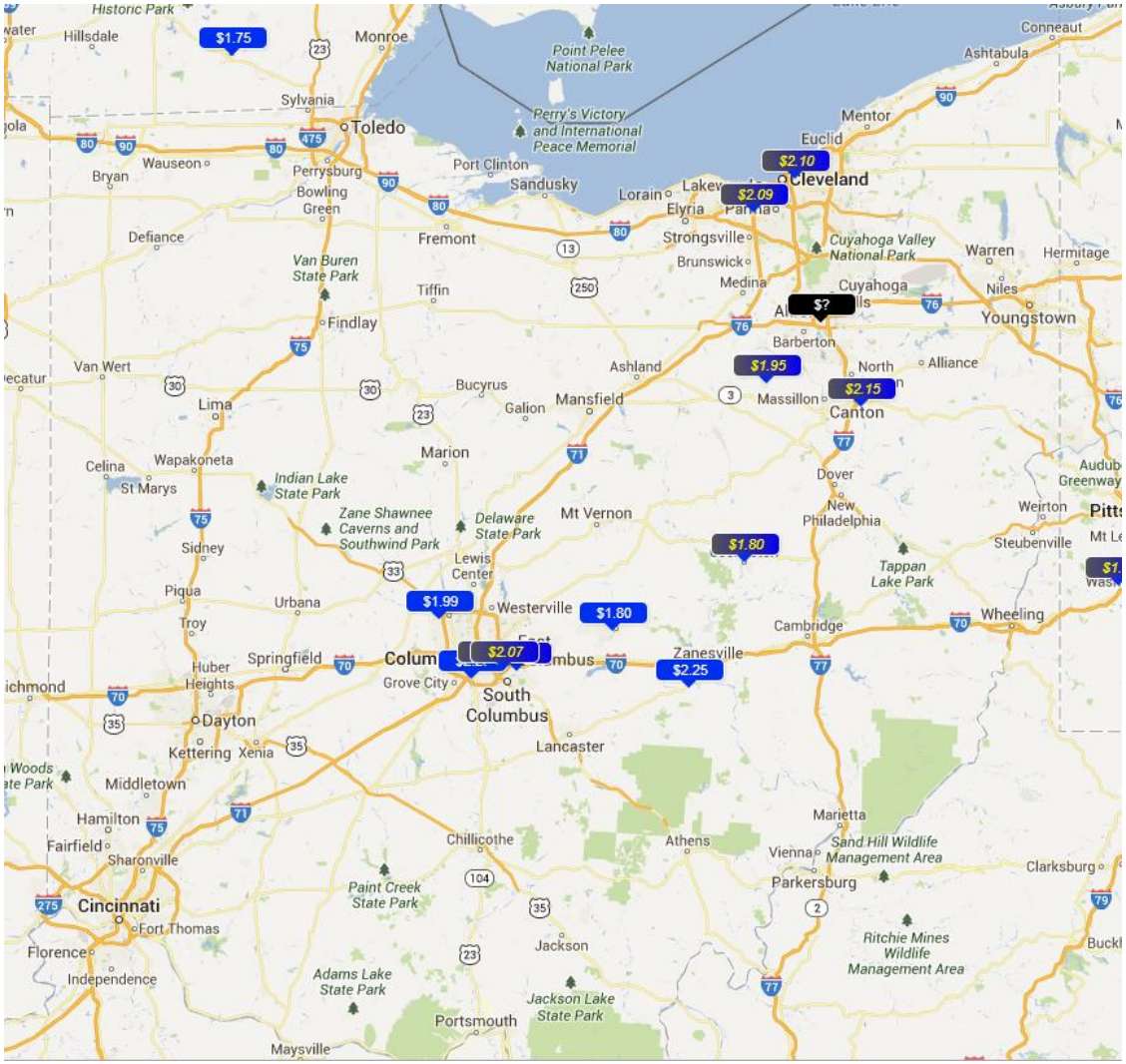
8.9L Engine has been the only viable option in the market up until this year. Max payload of 66,000lbs. Ideal for Refuse and Transit markets

Heavy-Duty Trucking

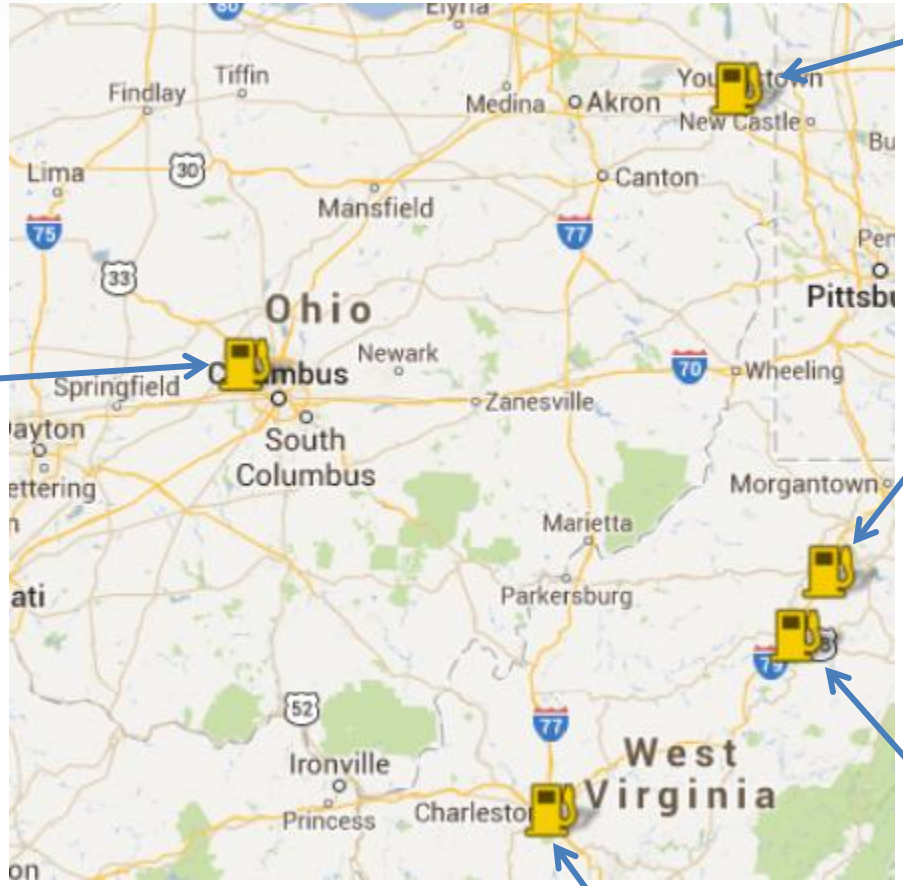
Many CNG options available in the OEM heavy duty truck market. You can by “off the factory line” CNG trucks from brands like Kenworth, Freightliner, Volvo, etc. Incremental Cost: $40,000 +

CNG Stations in Ohio

12 Active Public CNG Stations with more to come!



IGS Energy Station Locations (Existing and Future)



IGS Energy/City of Dublin CNG Station

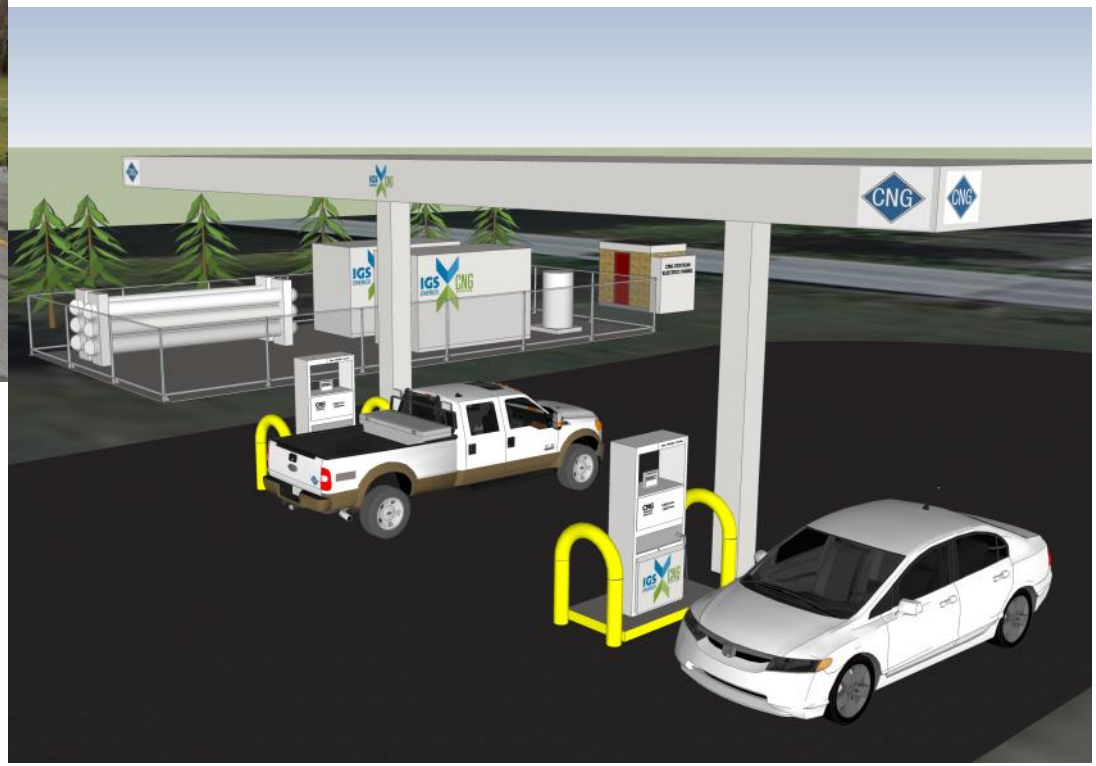
- Example of a public-private partnership
- Large station with 3 dispensers and room to expand
- IGS Energy CNG Services is providing CNG to the public for $1.99 through a fleet card access system

Bridgeport, WV Station

- Two CNG hoses at existing gasoline station/convenience store
- Large Compressor and Storage
- Expected to open in September 2013
- Commitments from EQT, Chesapeake, Antero Resources, State DOH

Charleston, WV Station

- Expected to open November, 2013



Jane Lew, WV Station

Expected to open in December, 2013

Youngstown, OH Station

- Located at Mr. Fuel, existing gasoline/diesel station
- Excellent Freeway access and user experience
- Target opening in first quarter of 2014

The Future... ?

Where do we go from here?

What can you do to make a difference?

Thank You!

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