

Contributing Factors to CNG Decline during the 2000's

Short range of early vehicles, less than 100 miles (current technology is 200-300 miles)

Which comes first the OEM, the bi-fuel conversions, the infrastructure or the education?... Yes

Problems with early CNG systems performance ex. fumigation / aspirated systems

Lack of CNG fueling stations

Reliability issues with existing fueling stations

Increase in Natural Gas commodity cost

After market cost and inconvenience to convert vehicles / lack of production of CNG vehicles (except Honda Civic) / Big 3 focused on SUV's and hybrids

Lack of marketing, advertising, and educating customers

Lack of State and Federal incentives (current Federal incentives enacted in 2006)

Other states, mostly in West and South, have had varying success with CNG

Lack of public and fleet education

Resurgence In NGVs

- Increased price spread between crude oil and natural gas
- Federal tax incentives (personal and business) and grants (institutional) – proposals in both House of Representatives and Senate to extend and enhance current NGV incentives
- Environmental and emission benefits (alternative to new 2010 diesel emission standards)
- Large, national corporate fleet announcements
- Economic stimulus through the American Recovery and Reinvestment Act
- Commercially available equipment – expectation of increased capacity, options, and improvement in conversion cost
- Education and advertising ex. T. Boone Pickens has spent over \$50 million in 18 months

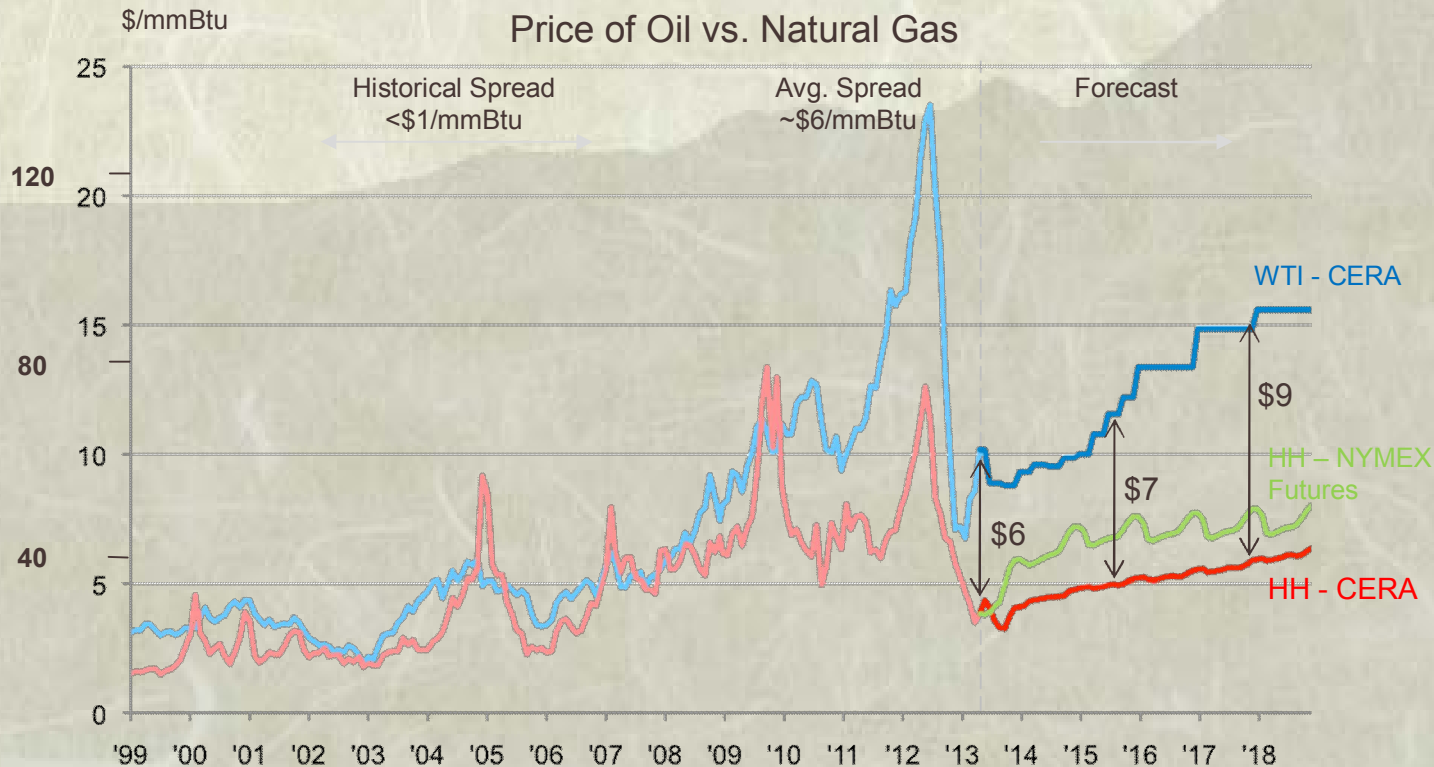
Target Vehicle Market

- Medium Duty gasoline or diesel vehicles (ex. Larger vans, larger pickups, delivery vehicles, shuttle vans, etc.)
 - Typically 8-12 mpg and 20k+ miles per year
 - Simple payback: 2 - 4 years (depends on annual mileage)
- Certain heavy duty diesel/gasoline vehicles (ex. Transit buses, airport shuttles, school buses, garbage trucks, utility distribution trucks, etc.)
 - Typically 4-8 mpg and 30k+ miles per year
 - More stringent diesel emission standards starting in 2010
 - DOE grants typically focused on this market segment
 - Greater capital investment for vehicles and refueling infrastructure
 - Simple payback: typically < 3 years
- Limited Light Duty Vehicle application
 - Potential for large sedans with high annual mileage (ex. Taxis, metro cars, etc.)
- Semis / 18-Wheelers – potential for CNG or LNG depending on length of routes
- Passenger Vehicles- Potential for large sedans and SUVs with high annual mileage

Vehicle Classes & Potential for Savings

Truck Type	Classification	# of Trucks in MI ¹	Avg. Annual Truck Miles ¹	
	Class 1 < 6,000 lbs	2,700,000	14,000	Low Potential Market
	Class 2 6,000 – 10,000 lbs	700,000	15,000	
	Class 3 10,001 – 14,000 lbs	20,000	10,000	High Potential Market
	Class 4 14,001 – 16,000 lbs	6,000	17,000	
	Class 5 16,001 – 19,500 lbs	5,000	20,000	Medium-High Potential Market
	Class 6 19,501 – 26,000 lbs	30,000	13,000	
	Class 7 26,001 – 33,000 lbs	14,000	14,000	
	Class 8 > 33,001 lbs	65,000	20,000	Medium-High Potential Market

Oil to Natural Gas Spread



- Next 3 – 5 years are expected to see increasing spreads due to strong shale production and NG & LNG surplus
- Spreads could depart from current outlook as evidenced by past spreads <\$1
- A \$6 spread between oil and natural gas approximately equates to a spread of \$0.75 per gasoline gallon equivalent between gasoline and natural gas

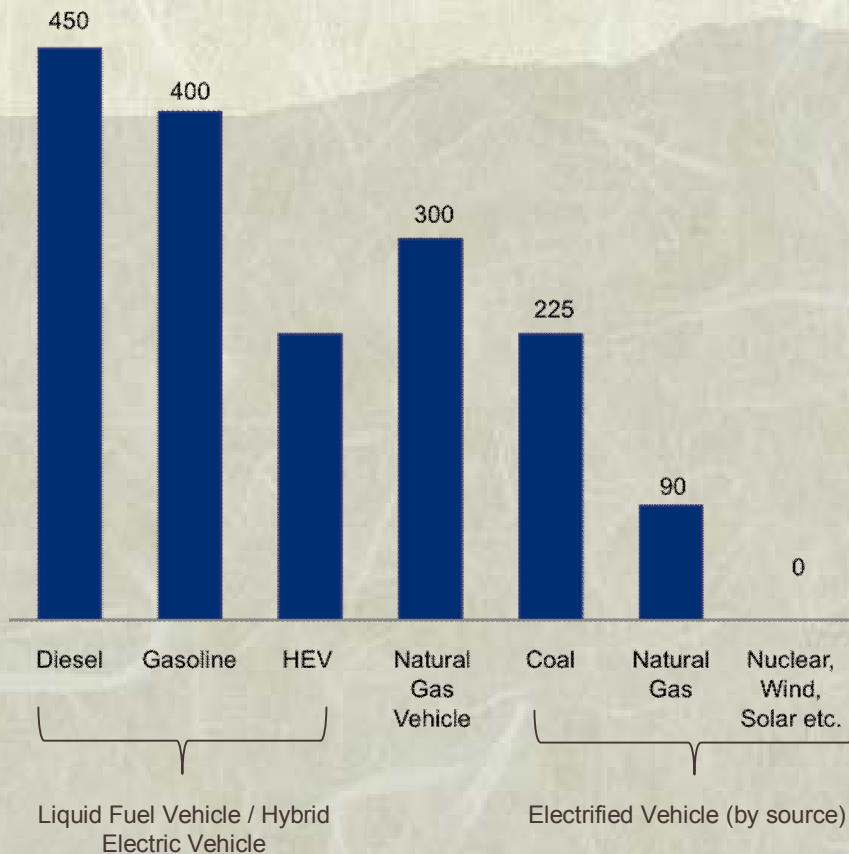
Current Federal Incentives

Light Duty Vehicles		Fleet Vehicles		
Incentive	Expires	Incentive	Expires	
NGV	• Vehicle – 50-80% of incremental cost and is capped depending on gross vehicle weight	• Dec 31, 2010	• Vehicle - credit covers 50-80% of incremental cost and is capped depending on gross vehicle weight	• Dec 31, 2010
	• Infrastructure – \$2,000 for private equipment	• Dec 31, 2010	• Infrastructure – credit covers 50% of commercial equipment, capped at \$50,000	• Dec 31, 2010
	• Fuel - \$0.317/gge if owned refueling unit	• Dec 31, 2009	• Fuel - \$0.50/gge if owned fueling station	• Dec 31, 2009
	• Additional stimulus dollars for demo (\$300MM max)			

- Proposal in House of Representatives and Senate to extend and modify current tax incentives

Emission / Environmental Benefits

CO₂ Emissions (Gm/mile)



Pollutant	% Reduction (CNG vs. Gasoline)
Volatile Organic Compounds	87%
Carbon Monoxide	76%
NOx	87%
Particulate Matter	82%

Source: NGVAmerica.org – Honda Civic NGV vs. gasoline

Why is Now Different Than Back Then

➤ Fuel Cost

- Recent crude/gasoline price increases & volatility is forcing businesses & public to explore more economical options
- Spread differential between natural gas and crude has widened

➤ Federal and in some areas, State, tax incentives

➤ Technological improvements and additional vehicle options for conversion kits (also, cost is decreasing due to additional sales)

➤ Federal Stimulus funding and DOE grants

➤ Large anchor customers that can drive the market – ex. AT&T

➤ Increasing emission standards and EPA requirements (especially towards diesel)

What Needs To Happen

More widespread public education on natural gas vehicles, and other alternative fuels.

Mandate Federal, State, county and city fleets use of AFV's

- Make employees accountable and invested
- Set realistic implementation goals

Make Utah more alternative fuel vehicle friendly.

- Create incentives for growing AFV's
- Highway signage on alternative fuel availability
- Alternative fuels Utah map at welcome centers

Mandate that all public transportation, i.e. buses, taxis and local delivery vehicles be run 50% CNG by 2012.

Alternative fuel stations be required for every city with a population of over 100,000 by 2011.

Put a \$3 fee on vehicle registrations to be used for tax credits, loans and grants.

Additional Information

- www.ngvamerica.org
- www.cleanvehicles.org
- www.afdc.energy.gov/afdc
- www.aacleancities.org
- www.micleancities.org
- www.nextenergy.org/services/collaborativeprograms/wg_cleancities.aspx
- http://autos.yahoo.com/green_center-tech-fuel_natural_gas/