Now is the Right Time for Natural Gas

CLEAN
– Emits 2/3 less emissions than gasoline; 1/3 less GHG’s*

ABUNDANT
– The latest numbers show our current reserves supplying the U.S. for ~118 years
  (Navigant Consulting Study 2008 – American Clean Skies Foundation)

AFFORDABLE
– CNG retails an average $2 less than gasoline

AMERICAN
– 98% of U.S. consumption is produced in North American
By 2020, the IEA predicts oil consumption will increase 60%.

During that period, China’s consumption of oil will increase 7.5% each year.

India’s will increase 5.5% each year.

Oil at that pace could be $200/bbl by 2030.

To keep up with the demand, OPEC countries will have to add 64 million barrels of production per day in the next 22 years*.

- This projected growth will require $350 billion per year on new projects.
- OPEC only spent $390 billion on new projects from 2000-2007.
ENGTHS – A Century of Abundant Natural Gas Supply Has Been Confirmed

### Total Gas Supply Resource Base (Tcf)

<table>
<thead>
<tr>
<th>2006 Potential Gas Committee Supply Estimate (82 Years’ Supply at 2006 Production Levels)</th>
<th>2008 NCI Supply Update of PGC Supply Estimate, Inclusive of Shale Assessment (88 Years’ Supply at 2007 Production Levels)</th>
<th>2008 NCI Supply Update Adjusted for Industry Input (Maximum as of June 2008) (118 Years’ Supply at 2007 Production Levels)</th>
<th>47% Increase over Column 1</th>
</tr>
</thead>
</table>

- Already 20% greater than the 2004 report
- 10% Increase over Column 1

**Legend**
- Proved Reserves
- Unproved Technically Recoverable Resource
Extraordinary Natural Gas Deposits Have Been Discovered Across the U.S.
Natural gas is needed most in poor air quality areas which includes most of the major urban areas. Automobiles account for 70% of the emissions, CNG can be an immediate answer in these areas.

The EPA just recently increased the standard for ground level ozone and a conservative estimate will re-classify 400 new counties nationwide into non-attainment.

Cities like Houston, Austin, Dallas and Ft. Worth will be required to use more clean fuels like natural gas to improve their air quality. Surrounding attainment counties may also fall under EPA scrutiny.
**LENGTHS – Efficient Consumption Process Means Less Total Emissions**

**Well to Wheels” Total Energy Consumption of Select Alternative Fuel Choices**

The chart shows the total energy consumption (Btu/mile) for various fuel sources.

- **Compressed Natural Gas**
- **Baseline Conventional and L S Diesel**
- **Baseline CNG and RFG**
- **Gasoline Vehicle: Low-Level E85 Blend with Gasoline**
- **Grid-Connected SI HEV: Gasoline and Electricity**
- **FCV: G. H2**
- **Grid-Connected SI HEV: G. H2 and Electricity**
- **EIOH FV: E85, Corn**
- **Electricity**

Compared to traditional fuel sources, alternatives like electricity and grid-connected systems show significantly lower energy consumption per mile, indicating more efficient and environmentally friendly options.
Time for Stimulating Demand Growth is **NOW**!

- **Our country is faced with a challenging economic environment**
  - Natural gas production is an economic development driver
  - Keep capital in U.S. plus creates new jobs

- **Our nation’s energy policy is going to be a top priority**
  - Natural gas is the best energy answer – Clean, American, Affordable, Abundant,

- **2009 is the start of a new energy/environment linkage administration in Washington**
  - Obama recognizes the many benefits of natural gas
  - Obama’s new Chief-of-Staff Rahm Emanuel is an advocate of CNG and author of supportive legislation
  - Clinton Administration favored natural gas demand, so should Obama’s

- **Carbon regulation will be one of Obama’s first initiatives**
  - Natural gas is the cleanest traditional fuel

- **Natural Gas is increasingly recognized to be clean and abundant**
  - Natural gas will continue to be a stable energy option for American consumers
A Call to Arms

The Issues:

- Our industry has cracked the code in developing significant new reserves of natural gas from unconventional formations in the U.S. and Canada.
- Brought this new production on just as the U.S. economy has significantly weakened and may weaken further in 2009.
- Never embarked on a serious public opinion campaign to increase demand for its product.
- A clean, green, renewable-compatible domestic alternative for U.S. consumers.
- Use less energy per unit of output and use a lot more of our own.
- There is indeed plenty of market for all U.S. Energy Sources if we back out foreign sources.
● Number 1 Natural Gas Driller in the Nation
● Exceptional Drilling Success Rate – 98%
● The Largest Independent Producer of Natural Gas
● Exclusively Onshore and Domestic
● Exclusively Focused on Natural Gas
● Growth through Drill Bit and Acquisitions
● Founded in 1989  NYSE: CHK
conventional Natural Gas Development
What is Shale Gas?

Gas is found in Organic-rich Sedimentary Rocks (Shales) that were originally Deposited as Sands within Tidal Flats in Deep Water Basins.

These Shales have Low Permeability and Typically Require a Combination of Horizontal Drilling and Hydraulic Fracturing for the Gas to be Released in Economic Quantities.
The Gas Distribution

Natural Gas is Found Throughout the Eastern, Southern and Western parts of the Country within Major Sedimentary Basins.

Black Shales within the Appalachian Basin, such as the Marcellus, are the Primary Focus of Shale Gas Development in Pennsylvania.
There are Five Basics Steps in the Production Process:

1. Site Selection and Well Pad Preparation
2. Drilling the Well
3. Completing the Well
4. Marketing the Gas
5. Reclaming the Site
Site Selection – A Number of Factors are Considered in Selecting a Drilling Site

- Favorable Geology
- Topography
- Access Roads
- Routes for Pipelines and Utilities
- Proximity to Schools or Residential Areas
- Environmental Factors such as Wetlands and Sensitive Wildlife Habitat
- Available Water Source(s)
Well Pads can be Located in Rural or Urban Areas

- Pad Preparation Requires Approximately One to Three Weeks
- Typically Requires 1 - 3 Acres to Construct
Natural Drilling – Multiple Well Pads

Multiple Wells

Up to 16 Well pads (2 acres) needed to recover the natural resource from 640 acres.

Multiple Roads with pipelines, utilities required to access the wells.

Total surface disturbance is 5 acres.
Horizontal Drilling - Reduced Footprint

Horizontal Wells

Up to 8 Horizontal Wells anticipated drilled from each 1 to 3 acre pad on 3ac Road with pipeline and utilities to well pad approximately 85% less surface disturbance than vertical Wells
Horizontal Well Pad
Rig #240 – Victory Prospect

Horizontal Well Drilled in Northern West Virginia

Well Pad can Accommodate 6 to 8 Horizontal Wells
Five or more Layers of Protection are installed in the Well to Isolate the Well Bore from its Surroundings and Protect Groundwater and the Environment

- Surface Casing
- Cement, sealing the Surface Casing in Place
- Production Casing
- Cement, sealing Production Casing in Place
- Production Tubing
- On some Wells, an Additional String of Casing and Cement (Intermediate Casing) is installed
Surface casing and cement extends below fresh water aquifers... Depth of casing below BTW is set by the state to Protect Groundwater.

Base of Treatable Water (BTW) is basis for surface casing depth requirements. Average BTW in Marcellus wells is ~850’.

Production depth is ~4,000 - 8,500’ for Marcellus Shale wells... Approximately 3,100’ to 7,600’ of Non Productive Rock between production and BTW...
By utilizing Horizontal Drilling, the shale gas reservoir can be accessed economically, thus making shale gas development feasible.
Horizontal Drilling allows Energy Companies to avoid Homes and Schools by Drilling from a Mile, or more, away.

Where Avoidance is Not possible, Measures can be implemented to Reduce Disturbances due to Drilling Activities such as Noise and Lighting.
Haulic Fracturing

...the Rig leaves, Hydraulic Fracturing ("Fracing") Begins

Fracing is a Process to Stimulate Natural Gas from the Hard Shale

Water is Mixed with Proppant (such as Sand or Bauxite) and Pumped into the Shale Reservoir under High Pressure

This Process Fractures the Shale and Releases the Gas

Several Days to Complete... Only Conducted during Daylight Hours
Common Fracture Mixtures are made up of greater than 85% Water by Weight (including weight of the sand proppant) and are 98% or more Water by Volume (sand proppant not included).

The Additives that are incorporated to Control corrosion, reduce friction, Prevent bacterial growth, etc. represent approximately 2% or less of the mixture.
Estimated Water use by Chesapeake for the Marcellus Shale Area

- 2,000 BBLS used for Drilling
- 60,000 BBLS used for Fracturing **

62,000 Total BBLS Used

CHK Projected Wells per Year: 700*
Projected Total Water Use per Year: 43 Million BBLS
Water use in Marcellus Shale Area

Water Use (Surface Water and Ground Water) in Central PA (32 County Area), Southern NY (10 County Area), Northern WV (29 County Area), Western ND and MD (5 County Area), and Eastern OH (3 County Area) by Sector

Notable Other Uses (too small to show on chart):
- CHK Projected Use: 0.06%
- Livestock: 0.01%

Total Water Use in Marcellus Area: 85 Billion Board feet

Source: USGS Estimated Use of Water in US
Fracture Fluid for Marcellus Shale Percent by Volume (No Proppant)

- Water: 95.51%
- Surfactant: 0.085%
- Other: 0.49%
- KCL: 0.06%
- Friction Reducer: 0.088%
- Acid: 0.123%
- Gelling Agent: 0.056%
- Scale Inhibitor: 0.043%
- pH Adjusting Agent: 0.011%
- Breaker: 0.01%
- Crosslinker: 0.007%
- Iron Control: 0.004%
- Corrosion Inhibitor: 0.002%
- Biocide: 0.001%
Flowback Water consists of the Initial Water that is returned to the surface after Hydraulic Fracturing is completed. Consists of Frac Make-up Water combined with Natural Formation Water with a higher TDS.

Flowback Water is piped to Steel Frac Tanks onsite and transported offsite for Treatment or Disposal in Permitted Class II Wells.
Onsite Tanks are used to Store Produced Water

Produced Water is Naturally Occurring Water found in the Shale Formation...It Typically has a High Chloride Content requiring either Treatment or Disposal in a Permitted Class II UIC Well.

Berms and Containment Structures are used to Contain any Release of Produced Water
Production/On-going Operations

Production to Sales

Well is completed
Connected to sales line
Gas and fluids reach surface
Gas and fluids are separated by the “Separator”
Gas travels thru sales meter to pipeline
Pipeline carries gas to market
Fluids are retained on location in tanks until removed via pipeline or truck
aiming the Site

Site is reclaimed and landscaped

Install appropriate permanent fencing as needed

Energy company returns regularly to:

– Maintain equipment
– Monitor production rate
WORKFORCE CHALLENGES AND OPPORTUNITIES

Drillers
Drilling & Service Rig Hands
Oil Field Truck Drivers
Oil Field equipment operators
Geologists and geophysical staff
Production workers (pumpers and well tenders)
Engineers
Landmen
Lobbyists
Lawyers
Accountants
Compressed Natural Gas (CNG)
Natural Gas is America’s Own Energy Answer

THE TIME FOR CLEAN FUELS

Solar, Wind, and Natural Gas (Including Natural Gas Vehicles) are what the U.S. needs to turn back the clock on GHG emissions and reduce our dependence on foreign oil.
CNG – The Basics

- Utility quality gas
- Compressed at 3000 – 3600 psi
- 130 octane
- Comparable performance
- Can power both heavy and light-duty vehicles
- Used since World War II
Natural Gas Can Be Ramped Up Now - No 10 Year Wait!

The United States increased its usage of NGV vehicles (10-15 million vehicles), US natural gas demand would only increase 4%

Calculation: (1 Mcf = 8 gallons equivalent)
Average gallon usage of fuel per car per year: 700 gallons
New implementation of vehicles: 10 million vehicles
Annual fuel usage of 10 million natural gas vehicles: 7 Billion gallons (875 Bcf)
Annual consumption for NGVs at 10 million vehicles: 2.3 Bcf
Annual consumption of natural gas in the United States (2007): 23 Tcf

Source: Southern Counties of Governments and the National Automobile Dealers Association
Obstacles

Fueling Infrastructure

Vehicles/conversions

Misconceptions/misinformation

Awareness
Work with the schools and government fleets to use CNG

Pass prudent legislation to encourage CNG’s adoption

Incentivize fueling infrastructure

Incentivize vehicle conversion

Learn more about alternative fuels
<table>
<thead>
<tr>
<th></th>
<th>Country</th>
<th>CNG Vehicles</th>
<th>Stations</th>
<th>NGVs / Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Argentina</td>
<td>1,650,000 (12%)</td>
<td>1,400</td>
<td>1,180</td>
</tr>
<tr>
<td>2</td>
<td>Pakistan</td>
<td>1,550,000 (54%)</td>
<td>1,606</td>
<td>965</td>
</tr>
<tr>
<td>3</td>
<td>Brazil</td>
<td>1,425,513 (26%)</td>
<td>1,442</td>
<td>988</td>
</tr>
<tr>
<td>4</td>
<td>Italy</td>
<td>432,900 (12%)</td>
<td>558</td>
<td>775</td>
</tr>
<tr>
<td>5</td>
<td>India</td>
<td>334,820 (34%)</td>
<td>321</td>
<td>1,043</td>
</tr>
<tr>
<td>6</td>
<td>Iran</td>
<td>263,662 (82%)</td>
<td>179</td>
<td>1,472</td>
</tr>
<tr>
<td>7</td>
<td>Colombia</td>
<td>203,292 (65%)</td>
<td>310</td>
<td>655</td>
</tr>
<tr>
<td>8</td>
<td>USA</td>
<td>146,876 (9%)</td>
<td>1,340</td>
<td>109</td>
</tr>
<tr>
<td>9</td>
<td>China</td>
<td>127,120 (24%)</td>
<td>355</td>
<td>358</td>
</tr>
<tr>
<td>10</td>
<td>Ukraine</td>
<td>100,000 (33%)</td>
<td>147</td>
<td>680</td>
</tr>
</tbody>
</table>
Natural gas is Today’s Green Energy Answer

The clean, American, abundant, and affordable fuel:
- Scalable quickly and affordably
- Proven technology and viable fuel
- Vehicles in all shapes and sizes can run on CNG
- Safe and easy to use product
- The only alternative fuel that can power both heavy-duty and light-duty vehicles efficiently
- Our existing pipeline system is the basis of the delivery infrastructure; we only lack the “last 10 feet”
- GM and Ford produce 18 models around the world that run on CNG, none in the U.S.
G provides a clean and affordable fuel for our schools, cities, states, law enforcement and business partners:

- School Busses
- Taxi Cabs
- Mass Transit
- Government/Industry Fleets
- Family Vehicles
- Municipal Heavy-Duty Vehicles

Great opportunity for new partners and exceptional third-party endorsements.

Remember: 1 mmbtu provides 8 gallons of fuel, so $6.40/mmbtu
Natural Gas Vehicles Scalable With Today’s Domestic Supply

<table>
<thead>
<tr>
<th>US NGVs</th>
<th>% of US autos</th>
<th>BCF/year</th>
<th>BCF/day</th>
<th>U.S. Gas Annual Demand Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>50,000 *</td>
<td>0.06%</td>
<td>13</td>
<td>0.03</td>
<td>0.05%</td>
</tr>
<tr>
<td>800,000</td>
<td>0.12%</td>
<td>26</td>
<td>0.07</td>
<td>0.11%</td>
</tr>
<tr>
<td>700,000</td>
<td>0.3%</td>
<td>61</td>
<td>0.17</td>
<td>0.26%</td>
</tr>
<tr>
<td>5,000,000</td>
<td>0.4%</td>
<td>88</td>
<td>0.24</td>
<td>0.38%</td>
</tr>
<tr>
<td>10,000,000</td>
<td>2%</td>
<td>438</td>
<td>1.2</td>
<td>1.9%</td>
</tr>
<tr>
<td>10,000,000</td>
<td>4%</td>
<td>875</td>
<td>2.4</td>
<td>3.8%</td>
</tr>
<tr>
<td>10,000,000</td>
<td>8%</td>
<td>1,750</td>
<td>4.8</td>
<td>7.6%</td>
</tr>
<tr>
<td>9,000,000</td>
<td>20%</td>
<td>4,375</td>
<td>12</td>
<td>19%</td>
</tr>
<tr>
<td>5,000,000</td>
<td>50%</td>
<td>10,938</td>
<td>30</td>
<td>47%</td>
</tr>
</tbody>
</table>

Consumption numbers – EIA 2007
*Current US NGV total
Based on average annual fuel demand per driver – 700 gallons & 1 mmbtu = 8 gallons of CNG fuel
250 million vehicles on the road in the US

A challenging yet achievable target for the next 10 years
Water Use in the Susquehanna River Basin

Maximum Approved Daily Consumptive Use

Source: Susquehanna River Basin Commission
### Natural Gas vs. Other Energy Emission Levels

<table>
<thead>
<tr>
<th>POLLUTANT</th>
<th>NATURAL GAS</th>
<th>OIL</th>
<th>COAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Dioxide</td>
<td>117,000</td>
<td>164,000</td>
<td>208,000</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>40</td>
<td>33</td>
<td>208</td>
</tr>
<tr>
<td>Nitrogen Oxides</td>
<td>92</td>
<td>448</td>
<td>457</td>
</tr>
<tr>
<td>Sulfur Dioxide</td>
<td>1</td>
<td>1,122</td>
<td>2,591</td>
</tr>
<tr>
<td>Particulates</td>
<td>7</td>
<td>84</td>
<td>2,744</td>
</tr>
<tr>
<td>Mercury</td>
<td>0.000</td>
<td>0.007</td>
<td>0.016</td>
</tr>
</tbody>
</table>

Source: www.naturalgas.org