Natural Gas in Transportation
Market Development Update

April 10, 2012
GE/CHK Joint Venture

» Initiative targets natural gas fueling infrastructure development

» Agreement designed to develop products and services for CNG and LNG transportation and home fueling solutions

» CHK to deploy more than 250 of GE’s ecomagination-qualified “CNG in a Box” fueling systems across the US through 2015 via PEAKE FUEL SOLUTIONS

» First units will be installed at CHK facilities, open to the public, and available 4Q 2012.

» 400 HP performance (7 gpm) at 200 HP price point (3 gpm)
CHK and 3M will enter into a commission arrangement for the design, certification, and ultimate sale of Type IV composite pressure vessels. CHK will provide an upfront investment which will be returned via a commission on tanks sold.

This investment is intended to stimulate the market for economies of scale to develop in the production of the most costly component of NGVs – fuel storage.

3M is pursuing CHK because they want to: bring in a partner, access our market development efforts, achieve brand recognition/validation, share the risk with another company.

The current market is fragmented, production is constrained, and no new technological enhancements are in a position to threaten our ability to capture this market. CHK/3M are poised to take over a large percentage of market share with a highly competitive product.

CHK’s OEM partners (Ford, Chrysler, GM), as well as largest players in conversion/upfitting are interested and would be key buyers.

Although projections are based on US sales only, CHK’s commissions would come from global sales.
Governors led by Hickenlooper sign pledge to purchase compressed natural gas vehicles

Governors sign “Memorandum of Understanding” on November 9, 2011 to convert their states’ transportation fleets to CNG.

11 states - CO, KY, ME, NM, OH, OK, PA, TX, UT, WV, WY

Goal is to create a critical mass of fleet vehicle purchases to entice auto makers to manufacture more affordable NGVs.

Total fleet between states of more than 60,000 vehicles

Continued efforts will be made to bring other Governors into the MOU
Ram 2500 Bi-Fuel CNG Pickup
Ford F-Series QVM Process
Natural Gas: A Foundation Fuel For Our Energy Security And Public Fueling Convenience

Source: EIA

Over 8,800 Potential Locations From Existing Partners
National LD Fleet Targets
National HD Trucking Targets
0.3 miles from existing Cox Communications service facility in Norman, OK
City of Norman station is new, open 24/7, has multiple dispensers and redundant compressors
Oklahoma tax incentives of 50% of incremental cost of CNG vehicle
Service territory supported by growing number of CNG stations (10-12 nearby)
### Fuel Demand Comparison

- **Average US home natural gas usage:** 73 MCF
- **US housing units (occupied):** 112 million
- **US housing units with a garage or carport:** 74.3 million (66.4%)
- **US housing units utilizing natural gas:** 61.6 million (55%)

<table>
<thead>
<tr>
<th></th>
<th>Household LD Cars</th>
<th>Household LD Trucks</th>
<th>Fleet LD Trucks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. fuel economy</td>
<td>22.5 mpg</td>
<td>18 mpg</td>
<td>18 mpg</td>
</tr>
<tr>
<td>Avg. annual mileage</td>
<td>11,300</td>
<td>11,300</td>
<td>30,240</td>
</tr>
<tr>
<td>Natural gas consumed</td>
<td>63 Mcf/yr</td>
<td>78 Mcf/yr</td>
<td>210 Mcf/yr</td>
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### Natural Gas Consumption (expressed in Bcf/day)

<table>
<thead>
<tr>
<th></th>
<th>Household LD Cars</th>
<th>Household LD Trucks</th>
<th>Fleet LD Trucks</th>
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</thead>
<tbody>
<tr>
<td>10,000 vehicles</td>
<td>0.0017</td>
<td>0.0022</td>
<td>0.0058</td>
</tr>
<tr>
<td>1 million vehicles</td>
<td>0.17</td>
<td>0.22</td>
<td>0.58</td>
</tr>
<tr>
<td>10 million vehicles</td>
<td>1.73</td>
<td>2.15</td>
<td>5.75</td>
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**Sources:**
- US Bureau of the Census – American Housing Survey
- US Department of Energy – Transportation Energy Data Book
- American Gas Association
### Home Refueling Economics

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<tr>
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<th>The Phill</th>
<th>New HRA</th>
<th>Public Station</th>
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<tbody>
<tr>
<td>HRA cost</td>
<td>$5,000</td>
<td>$1,500</td>
<td></td>
</tr>
<tr>
<td>Installation</td>
<td>$1,000</td>
<td>$1,000</td>
<td></td>
</tr>
<tr>
<td>Life (Hours)</td>
<td>6,000</td>
<td>12,000</td>
<td></td>
</tr>
<tr>
<td>Dispense rate (gge/hour)</td>
<td>0.42</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>Life (GGEs)</td>
<td>2,520</td>
<td>6,000</td>
<td></td>
</tr>
<tr>
<td>Amortized cost (per GGE)</td>
<td>$2.38</td>
<td>$0.42</td>
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<tr>
<td>Commodity (per GGE)</td>
<td>$0.65</td>
<td>$0.70</td>
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<tr>
<td>Electricity</td>
<td>$0.10</td>
<td>$0.10</td>
<td></td>
</tr>
<tr>
<td><strong>Total cost per GGE</strong></td>
<td><strong>$3.13</strong></td>
<td><strong>$1.22</strong></td>
<td><strong>$1.85</strong></td>
</tr>
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Natural Gas Energy Development Program

As a part of Act 13 of 2012, which provides enhanced environmental protections for the development of unconventional natural gas resources, Chapter 27 provides a comprehensive plan for the use of natural gas as a transportation fuel.
Eligibility

• Eligible Applicant
Commonwealth or municipal authority, Turnpike Commission, Local Transportation Organization, nonprofit entity, state-owned or state related university or company

• Eligible Vehicle
Dedicated compressed natural gas vehicle (CNG) at least 14,000 pounds

Dedicated liquefied natural gas vehicle (LNG) at least 14,000 pounds

Bi-Fuel Vehicles - no minimum weight requirement
Section 2703 – Program Requirements

Funds shall be used for grant eligible applicants who meet the following criteria:

- Plan to convert 5 or more eligible vehicles, which will be financially viable with 4 years

- Cost of Project/Source of Matching Funds

- Intend to maintain operations in the Commonwealth for not less than 6 months

- Registering all purchased vehicles within the Commonwealth

- Whether the project includes utilization of a natural gas fueling facility accessible to the public
Financial Assistance

Allocates the following for grants under the program established in section 2703:

$10 million in FY 2012-2013
$7.5 million in FY 2013-2014
$2.5 million in FY 2014-2015

50% of funds shall be dedicated to grants for local transportation organizations

Any remaining funds not awarded in a fiscal year shall be made available to eligible applicants in subsequent years.