The Case for NGVs:

Clean, Proven, Cost-Effective Solutions Available TODAY

Sustainable Fleet Technology Conference
Durham, NC
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**The Continued Case for NGVs**

- Abundant domestic supplies of natural gas well into foreseeable future assures predictable, stable pricing. NGVs’ economic value proposition over diesel and gasoline continues to grow as crude oil market rebounds.

- Well-to-wheel emissions are far superior to petroleum fuels and very competitive with EV technologies on a dollar-per-pound reduction basis.

- Fueling infrastructure continues to expand and improve, filling in gaps and building greater fleet and consumer confidence.

- National, regional and local fleets are logging millions of miles of solid, reliable performance on vehicles available through OEMs and qualified aftermarket suppliers.
Existing NGV inventory: ~165-170K
- ~53,000 HDVs
- ~35,000 MDVs
- ~80,000 LDVs

Annual NGV fuel use (GGE):
- ~500MM (‘14)
- ~620MM (‘15)
- ~650MM (‘16)
- ~740MM+ (‘17)

Infrastructure Growth
- ~1700 CNG stations; (growth spurt between 2011-2015; leveled out now)
- ~140 LNG Stations (~30 more ready to pump as new lanes opened)
What are you paying for diesel fuel? How do you plan for volatility?

Weekly Lower Atlantic (PADD 1C) No 2 Diesel Ultra Low Sulfur (0-15 ppm) Retail Prices

Dollars per Gallon

$4.70

$3.09
What are you paying for fuel?
Impact of Commodity on Pump Price

Gasoline and diesel pump prices heavily influenced by oil price.

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Pump Price</th>
<th>Refining/Compression, Distribution, Taxes</th>
<th>Retail Markup</th>
<th>Raw Commodity</th>
</tr>
</thead>
<tbody>
<tr>
<td>$4.00 Diesel ($86 WTI)</td>
<td>$4.00</td>
<td>2%</td>
<td>33%</td>
<td>65%</td>
</tr>
<tr>
<td>$2.00 Natural Gas</td>
<td>$1.50</td>
<td>22%</td>
<td>60%</td>
<td>18%</td>
</tr>
<tr>
<td>$3.50 Natural Gas</td>
<td>$1.74</td>
<td>20%</td>
<td>52%</td>
<td>28%</td>
</tr>
<tr>
<td>$7.00 Natural Gas</td>
<td>$2.30</td>
<td>19%</td>
<td>39%</td>
<td>42%</td>
</tr>
</tbody>
</table>

Impact of Commodity on Pump Price: Gasoline and diesel pump prices heavily influenced by oil price.
Gas Supply Impact on CNG Pump Price*

Component Costs of CNG
(based on $2.15/GGE Retail Price)

- Natural Gas at Source Hub, $0.35
- Transmission, Storage & Balancing, $0.05
- Local Gas Company Distribution, $0.25
- Real Estate, Equipment & Construction, $0.50
- Compression Energy, $0.13
- Station Maintenance, $0.28
- Federal and State Taxes, $0.40
- Margin, $0.19

*Representative sample of CNG pump price components; does not reflect Raleigh-Durham-market-specific component pricing.
Gas Supply and Impact on Commodity Price

Natural Gas NYMEX (Henry Hub) Pricing
11/2007 – 08/2018

$2.96/MMBtu (8/21)
$.37/GGE
$.41/DGE
Promise of RNG: North America has abundant sources of renewable natural gas that can be harnessed.
RNG provides environmental and economic benefits for urban, suburban and rural America

### RNG and RIN Values from Sacramento BioDigester (food waste)

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commodity Gas Value</td>
<td>$3.00/mmBtu</td>
</tr>
<tr>
<td>R-CNG (D5) RIN Value</td>
<td>$1.00/RIN</td>
</tr>
<tr>
<td>RINs/mmBtu</td>
<td>11.71*69</td>
</tr>
<tr>
<td>LCFS Value/GGE</td>
<td>$1.34 (based on $95/ton LCFS value)</td>
</tr>
<tr>
<td>GGEs/mmBTU</td>
<td>7.8</td>
</tr>
<tr>
<td>Total R-CNG Value/mmBtu</td>
<td>$3.00 + ($1.00 * 11.7) + (1.34 * 7.8) = $25.15</td>
</tr>
</tbody>
</table>

### RNG and RIN Values from Fair Oaks Project (dairy farm)

<table>
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<tr>
<th>Attribute</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commodity Gas Value</td>
<td>$3.00 / mmBtu</td>
</tr>
<tr>
<td>R-CNG (D3) RIN Value</td>
<td>$2.60 / RIN (February 2017)</td>
</tr>
<tr>
<td>RINs/mmBtu</td>
<td>11.7</td>
</tr>
<tr>
<td>Total R-CNG Value</td>
<td>$3.00 + ($2.60 * 11.7) = $33.42 / mmBtu</td>
</tr>
</tbody>
</table>

*Slide provided courtesy of NGVAmerica and CRNG*
Renewable natural gas (RNG) production is steadily increasing to meet growing demand throughout the U.S. (Source: Coalition for Renewable Natural Gas, 2017)

**RNG Market Growth**

**RNG Production for Transportation Fuel**

- **Grew by 5X between 2013 and 2015**
  - 2013: 25.9 M EGE
  - 2014: VS
  - 2015: 139.8 M EGE

- **Is on pace to triple in volume by 2018**
  - 2017: VS
  - 2018: 481.5 M EGE Projected

- **2017:** RNG was 24% of all NGV fuel use (90% of CA NGV use!)
- **2018:** RNG projected to be as much as 38% of all NGV fuel use

*Slide provided courtesy of NGVAmerica and CRNG*
Light- and Light-Medium-Duty Vehicles
OEM or Retrofits via several select QVMs/Tier 1 suppliers

- Transit Connect 2.5L cargo/pass
- F250/350 6.2L pick-up; F350 avail as C/C
- F450/550 6.8L C/C;
- Ram 2500 CNG 5.7L
- F59 3.8L strip chassis
- FCCC 6.0L MT45/55
- Chevy/GMC 6.0L 2500/3500; 5.3 1500
- E450 6.8L cutaway
- F650/750 6.8L C/C;
- G4500 6.0L Cutaway
- Chevy 5.3L Tahoe/ Sub. GMC Yukon/Yukon XL
- F250/350 6.8L C/C;
- G59 3.8L strip chassis
- FCCC 6.0L MT45/55
- Chevy/GMC 6.0L G2500/3500
- Transit 3.7L cargo/pass
- Transit 3.7L cutaway
- F650/750 6.8L C/C;
- G4500 6.0L Cutaway
- Chevy 5.3L Tahoe/ Sub. GMC Yukon/Yukon XL
- E450 6.8L cutaway
- F59 3.8L strip chassis
- FCCC 6.0L MT45/55
- Chevy/GMC 6.0L 3500 C/C
OEM HD Natural Gas Powertrains via CWI

NEW ULTRA-LOW NOx ENGINE LINE UP

- Newest generation of engines utilizes same stoichiometric cooled EGR technology with “heavier loaded” TWC, plus closed crankcase to achieve near zero NOx emissions.
- Reduces NOx by 90%! ARB certified to just 0.02 g/bhp-hr*

CWI 8.9L L9N
- Spark Ignition
- CNG or LNG
- Peak Rating: 320 hp/1,000 ft-lbs

CWI 11.9L ISX12N
- Spark Ignition
- CNG or LNG
- Peak Rating: 400 hp/1,450 ft-lbs

CWI 6.7L B6.7N
- Spark Ignition
- CNG
- Peak Rating: 240 hp/560 ft-lbs

* B6.7N achieves 0.1g/bhp-hr NOx, which is 50% below federal standard.
OEM Vocational/Specialty Trucks

Freightliner M2-112, 114SD
Kenworth T440, T470, W900S, T880S
Peterbilt LCF 520, 348, 384, 365, 567
Mack TerraPro LE, LR
Autocar ACXpeditor, XSpotter
Elgin Broom Bear
Schwarze A7000
Tymco 500X
Capacity TJ900
Kalmar Ottawa 4x2
OEM Local-Regional Haul Class 8 Tractors

Freightliner New Cascadia, M2-112
Kenworth T440, T680, T880,
Volvo VNL
Peterbilt 337, 365, 567, 384, 589,
Mack Pinnacle, Anthem*
Autocar Xpert
OEM Transit/School Bus

New Flyer/NABI 30/35/40 LF, BRT
ElDorado Axess, ER II, TMR
ARBOC Equess
Grande West Vicinity
Gillig LF
Nova Bus LF
MCI Coach
Thomas Built Saf-T-Liner HDX (IV), C2 (III)
Blue Bird All-American RE (IV) and Vision (III)
Myriad of Onboard Fuel Package Options/Configurations to Meet Every Need

- 30 DGE single tank side mount
- 45 DGE single tank side mount
- 160 DGE BTC 4-cylinder + 1 side mount package
- 42 DGE 2-cylinder IBOX package
- 116 DGE package behind the sleeper
- 60 DGE 4-cylinder BTC package
- 60 DGE 3-cylinder BTC package
- 60 DGE 4-cylinder BTC package
- 39 GGE 4-cylinder frame-rail package on E450 cutaway
NGVs Deliver the Largest & Most Cost-Effective NOx Emissions Reductions

Examples:
- Heavy Duty Trucks
- Refuse Trucks
- Transit Buses
- School Buses

Data Source: Emission comparisons based on ANL - HDVEC tool with low-NOx engines and higher in-use diesel emissions taken into account. Useful life, cost and mileage vary by applications. Additional details available from NGVA upon request.
Innovation Drives Improvement

- Improvements in manufacturing, engineering and processes
  - Roll-out of next generation of ultra-low-NOx engines
  - Improved powertrain spec’ing and performance to specific applications (eng./trans. mapping, gearing, etc.)
  - Advances in CNG cylinder mfg have lowered costs
  - Optimization of fuel delivery system from cylinders to injectors improves performance, reduces costs, increases available fuel
  - Stronger, lighter materials reduce fuel system weight
  - M&A/integration of key supply channel players and co-locating at/near OEM plants reduces costs, shortens order-to-delivery times
  - Improved coordination between suppliers, OEMs and dealers enhances diagnostic support, parts inventory/delivery and service responsiveness.