Successful Development of LNG Supply Chain: A Case for “Regionalism”

LNG 17 – NGV Seminar Series
April 16-19, 2013
Agenda

- Company Overview
- Industry Drivers/Dynamics
- Lessons Learned
- Reality Check: U.S. LNG Supply
- LNG Fuel Pricing
- “Regionalism” vs. Nationalism
We are hearing two sets of voices; great enthusiasm and some concern…

- **Voice of enthusiasm**
  - Increased production of natural gas equipment offerings driving down costs
  - Fuel savings
  - Energy security
  - Lower emissions/carbon footprint reduction

- **Voice of concern**
  - Fuel pricing and transparency
  - Reliability of fuel source
  - Safety and training
  - Operating cost benefits
  - Infrastructure strategy deployment (public and/or private)
**Second largest producer of Liquefied Natural Gas (LNG) for transportation and industrial use in the United States**

| Production          | Facility in Topock, AZ  
|                    | Close to Southern California market  
|                    | Capacity 30 million gallons per year  
| Distribution        | 34 company owned cryogenic trailers  
|                    | Through a mix of internal mobility units  
|                    | and 3rd third party carriers  
| Advisory            | Station design / permitting / construction  
|                    | Equipment maintenance  
|                    | Training  
| Wholesale           | Refuse  
|                    | Transit  
|                    | Industrial  
|                    | Trucking  
| Retail              | Public stations in Ontario and Barstow  
|                    | LNG and LCNG  

Most customers’ tenure with Applied is 5+ years
LNG Supply

- First LNG facility for transportation in the country (1995)
- Located in Topock, Arizona, close to Southern California
- Highly automated; 24/7 production all year round
- Capacity 30 million gallons per year
- Second liquefier will double production; estimated completion mid-2014
LNG Industry Dynamics

- **Growth drivers**
  - Engine and Chassis OEMs’ offerings are increasing
  - Cost advantage vs. other fuels
  - Environmental benefits
  - Government incentives
  - Customers desiring alternatives to diesel to reduce operating costs

- **Historical challenges**
  - Fuel from reliable sources at reasonable prices not available
  - Public fueling infrastructure not sufficient to support widespread adoption
  - Vehicle availability, performance and functional variety not up to par
  - Federal excise tax rate for on-road LNG is higher than Diesel
The industry must develop and deliver complete solutions
- LNG supply
- Fueling station equipment
- Fueling station maintenance services
- End user/consumer of LNG

Dependability is key and is a function of a network of production facilities and robust operations/logistic services

Need to strike balance between ‘biting off more than you can chew’ and becoming irrelevant by doing too little too late

Deploying scalable solutions is key to support a mature market (i.e. production, equipment, etc.)
Price gap between Diesel and LNG is over $1.50 per gallon

LNG vs. Diesel price over time

Dollars per Diesel gallon equivalent

Source: EIA; LNG price based on SoCal spot price and adjusted for liquefaction, transportation, wholesale margin, and taxes.
## LNG Supply Reality

U.S. LNG supply is dwarfed by current Diesel consumption for transportation

### Current LNG Transportation Fuel Supply

<table>
<thead>
<tr>
<th>Plant</th>
<th>Location</th>
<th>Production gpd</th>
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<tbody>
<tr>
<td>CLNE Boron†</td>
<td>Boron, CA</td>
<td>240,000</td>
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<tr>
<td>ANGF Topock†</td>
<td>Topock, AZ</td>
<td>170,000</td>
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<tr>
<td>CLNE Pickens</td>
<td>Willis, TX</td>
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<td>Williams Four Corners</td>
<td>Ignacio, CO</td>
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<td>DGS Ehrenberg</td>
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<tr>
<td>Exxon Shute Creek</td>
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<tr>
<td>Prometheus Moab</td>
<td>Lisbon, UT</td>
<td>20,000</td>
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<tr>
<td>WM Altamont Landfill</td>
<td>Altamont, CA</td>
<td>13,000</td>
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<tr>
<td>AGL/Pivotal</td>
<td>Trussville, AL</td>
<td>60,000</td>
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<tr>
<td>Metropolitan Utilities,</td>
<td>Omaha, NE</td>
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</tbody>
</table>

**Daily LNG Production**: 853,000
**Daily DGE equivalent**: 501,000
**U.S. HD Class 8 Market**: 30,000,000

† After expansion

Peak shaving facilities not included

$gpd = LNG$ gallons per day

Source: Company research; public filings

U.S. LNG supply is dwarfed by current Diesel consumption for transportation.
~50% discount to Diesel represents significant economic benefit for customers

Current LNG vs. Diesel price
Dollars per Diesel Gallon Equivalent

<table>
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<tr>
<th></th>
<th>$/LNG gal</th>
<th>$/DGE†</th>
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</thead>
<tbody>
<tr>
<td>Gas cost ‡</td>
<td>0.41</td>
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<tr>
<td>Transportation</td>
<td>0.15-0.20</td>
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<tr>
<td>Taxes</td>
<td>0.41</td>
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<tr>
<td>Wholesale margin</td>
<td>0.45-0.55</td>
<td></td>
</tr>
<tr>
<td>Wholesale Price</td>
<td>$1.42-1.52</td>
<td>$2.41-2.58</td>
</tr>
</tbody>
</table>

† DGE = Diesel Gallon Equivalent
‡ Index of $4.15/MMBtu divided by 12.1

Current natural gas price is $4.15/MMBtu (4/13 Socal Gas Index)
U.S. EIA Weekly Diesel price is 4.15 DGE (Week of 4/15/13)
Success Factors

- Optimal plant size
- Detailed understanding of market dynamics
- Leveraging specialized technical know how
- Effective management of supply/demand balance for economically viable infrastructure build out

WHAT IS THE SOLUTION TO OUR CHALLENGE....
"Regionalism" not Nationalism?

- **Production**
  - Supply/demand management within an effective radius around the plant (i.e. 300 to 400 miles)

- **Distribution**
  - Trailer utilization/asset intensity requirement (i.e. longer distance delivery requires more trailers to deliver same amount of fuel)

- **Fueling Infrastructure**
  - Matching fuel consumption with end user
  - Private versus Public fueling stations

- **Operations and Maintenance support**
  - Local dealer support for user is critical
  - Proper O&M of fueling infrastructure
    - Amortization of human capital
    - Adequate supply of parts and services require concentration of assets
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