Market Overview for VX™ Cycle

“Mobile LNG™” Production Plants

LNG, CNG & CCNG™ for Transportation Fuel

www.expansion-energy.com
Market Size & Growth

Global Market for Natural Gas Vehicles (NGVs) & Stations

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2008</th>
<th>2010</th>
<th>2016 (est)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global NGVs</td>
<td>2,800,000</td>
<td>8,600,000</td>
<td>12,600,000</td>
<td>19,900,000</td>
</tr>
<tr>
<td>Global NGV Stations</td>
<td>6,455</td>
<td>13,000</td>
<td>18,000</td>
<td>26,000</td>
</tr>
</tbody>
</table>

Source: Pike Research

» 7.9% CAGR for NGVs (2010-2016)
  - By 2016, market will add 3.2 MM NGVs per year

» 5.9% CAGR for NGV Stations (2010-2016)

» Average of 685 vehicles per L/CNG fueling station

U.S. Market

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2016 (est)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. NGVs</td>
<td>110,000</td>
<td>177,400</td>
</tr>
<tr>
<td>U.S. NGV Stations</td>
<td>1,327</td>
<td>1,972</td>
</tr>
</tbody>
</table>

Sources: IANGV.org, Pike Research

» Average of 90 vehicles per L/CNG fueling station
## Largest Global NGV Markets

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>NG Vehicles</th>
<th>L/CNG Fueling Stations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pakistan</td>
<td>2,300,000</td>
<td>3,068</td>
</tr>
<tr>
<td>2</td>
<td>Argentina</td>
<td>1,807,186</td>
<td>1,851</td>
</tr>
<tr>
<td>3</td>
<td>Iran</td>
<td>1,665,602</td>
<td>1,021</td>
</tr>
<tr>
<td>4</td>
<td>Brazil</td>
<td>1,632,101</td>
<td>1,704</td>
</tr>
<tr>
<td>5</td>
<td>India</td>
<td>935,000</td>
<td>560</td>
</tr>
<tr>
<td>6</td>
<td>Italy</td>
<td>628,624</td>
<td>730</td>
</tr>
<tr>
<td>7</td>
<td>China</td>
<td>450,000</td>
<td>870</td>
</tr>
<tr>
<td>8</td>
<td>Colombia</td>
<td>300,000</td>
<td>460</td>
</tr>
<tr>
<td>9</td>
<td>Ukraine</td>
<td>200,000</td>
<td>285</td>
</tr>
<tr>
<td>10</td>
<td>Bangladesh</td>
<td>177,555</td>
<td>500</td>
</tr>
<tr>
<td>11</td>
<td>Thailand</td>
<td>162,023</td>
<td>391</td>
</tr>
<tr>
<td>12</td>
<td>Bolivia</td>
<td>121,908</td>
<td>128</td>
</tr>
<tr>
<td>13</td>
<td>Egypt</td>
<td>119,679</td>
<td>119</td>
</tr>
<tr>
<td>14</td>
<td>USA</td>
<td>110,000</td>
<td>1,300</td>
</tr>
<tr>
<td>15</td>
<td>Armenia</td>
<td>101,352</td>
<td>214</td>
</tr>
<tr>
<td>16</td>
<td>Russia</td>
<td>100,000</td>
<td>244</td>
</tr>
<tr>
<td>17</td>
<td>Germany</td>
<td>85,000</td>
<td>860</td>
</tr>
<tr>
<td>18</td>
<td>Peru</td>
<td>81,024</td>
<td>94</td>
</tr>
<tr>
<td>19</td>
<td>Bulgaria</td>
<td>60,270</td>
<td>77</td>
</tr>
<tr>
<td>20</td>
<td>Uzbekistan</td>
<td>47,000</td>
<td>43</td>
</tr>
</tbody>
</table>

*Source: Pike Research*
Market Size & Growth – L/CNG Fueling Stations

NGV Refueling Stations, World Markets: 2010-2016

(Source: Pike Research)
Market Size & Growth – NGV Sales

Annual Natural Gas Vehicle Sales (Including Conversions), World Markets: 2010-2016

(Source: Pike Research)
**NGV OEMs (sample)**

**Heavy Duty Trucks & Buses**

<table>
<thead>
<tr>
<th>Freightliner</th>
<th>Cummins Westport</th>
<th>Mack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navistar/International</td>
<td>Volvo</td>
<td>New Flyer Bus</td>
</tr>
</tbody>
</table>

**Light Duty / Passenger Vehicles**

<table>
<thead>
<tr>
<th>Honda</th>
<th>Ford</th>
<th>Fiat</th>
<th>Volkswagen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toyota</td>
<td>GM/Opel</td>
<td>Hyundai</td>
<td>Renault</td>
</tr>
<tr>
<td>Mercedes-Benz</td>
<td>Citroen</td>
<td>Peugeot</td>
<td>Mitsubishi</td>
</tr>
<tr>
<td>Nissan</td>
<td>Volvo</td>
<td>Isuzu</td>
<td>Tata</td>
</tr>
</tbody>
</table>
Market Segments

» Light & Medium Duty Vehicles
  • Corporate and Government light/medium duty trucks & vans
  • Corporate and Government passenger vehicles
  • Consumer passenger vehicles

» Heavy Duty Vehicles & Fleets
  • Long-Haul Trucks
  • Short-Range Delivery & Refuse Trucks
  • Bus Fleets

» Off-Road Vehicles (a new fast-growing category)
  • Port vehicles (driven by EPA and state clean air standards near coastlines)
  • On-base Military vehicles
  • Airports
  • Rail Yards
  • Mining vehicles

» Inland Marine & Ocean-Bound Marine
  • Major initiatives are underway to create a global fleet & infrastructure for LNG ship fueling (“bunkering”)
  • New N. American environmental regulations are pushing inland vessel operators (barges, etc.) to convert to LNG fueling
Market Drivers

» Economics (paybacks due to savings vs. diesel, etc.)

» Environmental advantages (lower GHGs, NOX and particulate matter)

» Energy independence / energy security (NG primarily sourced domestically)

» Availability  L/CNG Fueling Infrastructure is a key hurdle
  • Market will grow far faster if widespread L/CNG fueling infrastructure is developed
  • Ability to refuel w/ LNG (vs. CNG) is critical for long-haul Heavy Duty truck market
    – Today, only ~ 60 of 1,300 US NG fueling stations are LNG. Hundreds more are needed.

VX™ Cycle “Mobile LNG™” production plants are the solution! The “missing link.”

  – Skid- or trailer-mounted “Mobile LNG™” technology that can be used on any low (or high) pressure NG pipeline or local NG distribution system
  – Would allow a nationwide / global network of L/CNG fueling stations to be developed and operated cost-effectively
U.S. Market Growth

» U.S. market will be the fastest-growing in the world from 2011-2016
  • 25.4% CAGR from 2011-2016 (Source: Pike Research)

U.S. Market Drivers

» Attractive economics
  • Recent rapid expansion of U.S. shale gas production has led to a very large increase in recoverable domestic gas reserves + a low, stable price
  • Nearly 100 years of domestic supply
  • L/CNG fuel price is quite low vs. diesel fuel (even on a BTU-adjusted basis)

» Regional/state government incentives for NGVs and L/CNG fueling stations

» Potential for federal government incentives, etc. for NGVs and L/CNG fueling stations (e.g., NAT GAS Act)

» Environmental advantages
L/CNG Prices vs. Diesel-Equivalent Prices – 2000 to 2035

Figure 21. Delivered energy prices for diesel and natural gas transportation fuels in the Reference case, 2000-2035 (2008 dollars per gallon of diesel equivalent)

Source: U.S. Energy Information Administration (DOE); Annual Energy Outlook 2010
U.S. Market Potential – L/CNG Station Infrastructure

Source: Clean Energy

Heavy Duty Trucks Segment

» Primarily LNG for Class 7/8 trucks
» Network of 2,000 to 5,000 stations nationwide
  • For reference, there are 9,000 truck stops in U.S. today
» $14-20 billion for station infrastructure
» $20-30 billion for (centralized) LNG production facilities (not necessary w/ VX™!)

Light Duty Vehicles Segment

» Primarily CNG
» Network of 20,000 to 45,000 stations nationwide
  • For reference, there are 170,000 retail gasoline stations in U.S. today
» $40-70 billion for station infrastructure
Competition – L/CNG Fueling Infrastructure & Equipment

» The field of suppliers of L/CNG fueling stations is quite fragmented

» No company currently holds a significant % share of the total global market

» The suppliers of L/CNG fueling stations are primarily small companies that are regionally focused

» This provides an attractive opportunity for a large global company(s) to become the dominant competitor(s) in this industry.

  • Particularly if they have a differentiated, proprietary and cost-effective technology like the VX™ Cycle for “Mobile LNG™” production
Other Markets the VX™ Cycle “Mobile LNG™” Technology Can Serve

» Stranded gas fields/wells
  • Liquefaction via VX™ Cycle “Mobile LNG™” production plants allows natural gas from isolated gas fields to be extracted and cost-effectively brought to market (without the need for a pipeline near the wells)

» Recovery & monetization of associated gas at oil wells
  • An alternative to wasteful flaring of “associated gas” from oil wells
  • Liquefaction via VX™ Cycle “Mobile LNG™” production plants allows associated gas to be captured, converted to LNG, and then trucked to market or used as LNG fuel for vehicles and drilling rigs operating nearby
    • ~ $40 Billion of associated gas is flared globally each year! (Source: World Bank)

» Inland LNG storage terminals
  • For peak-shaving, supply security, etc.
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