LPG Markets in the Indian Sub-Continent

WLPGA Indian Sub-Continent Regional Summit

Walter M. Hart, Ph.D., P.E.
February 15, 2012
Taj Mahal Hotel, New Delhi, India
Agenda

• Population
• Sub-Continent LPG Demand, Supply and Trade
• Prospects for LPG Demand Growth
## Purvin & Gertz NGL Publications, Seminars and Workshops

<table>
<thead>
<tr>
<th>Short-Term Reports</th>
<th>Long-Term Reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global LPG</td>
<td>LPG Market Outlook</td>
</tr>
<tr>
<td>North America NGL</td>
<td>LPG Market Outlook</td>
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<tr>
<td>Latin America LPG</td>
<td>LPG Market Outlook</td>
</tr>
<tr>
<td>Asia Light Naphtha</td>
<td>Asian Petrochemical Feedstocks Market Outlook</td>
</tr>
</tbody>
</table>

### Annual LPG Seminars

**Woodlands, TX**  
March 5-7

**Singapore**  
June 18-20

**Lima, Peru**  
November 12-14

### NGL Workshops Offered at Each Seminar

- Fundamentals of LPG Markets
- Understanding NGL Feedstock Economics
Indian Sub-Continent Region
## Population Comparison to World

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Population (Millions)</th>
<th>% of World</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>World</td>
<td>6,871</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>India</td>
<td>1,210</td>
<td>17.6%</td>
</tr>
<tr>
<td>6</td>
<td>Pakistan</td>
<td>179</td>
<td>2.6%</td>
</tr>
<tr>
<td>9</td>
<td>Bangladesh</td>
<td>142</td>
<td>2.1%</td>
</tr>
<tr>
<td>45</td>
<td>Nepal</td>
<td>27</td>
<td>0.4%</td>
</tr>
<tr>
<td>46</td>
<td>Afghanistan</td>
<td>24</td>
<td>0.4%</td>
</tr>
<tr>
<td>56</td>
<td>Sri Lanka</td>
<td>21</td>
<td>0.3%</td>
</tr>
<tr>
<td>165</td>
<td>Bhutan</td>
<td>1</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

The Sub-Continent Has a Relatively Rural Population

But Sub-Continent Population Density Is Among the Highest in the World

Number of people per square kilometer
The Sub-Continent Uses Less LPG Than Much of the Rest of the World

<table>
<thead>
<tr>
<th>Population Millions</th>
<th>% of World</th>
<th>2011 LPG Demand MM Tonnes</th>
<th>% of World</th>
<th>kg/capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>6,871</td>
<td>237.5</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Sub-Continent</td>
<td>1,604</td>
<td>15.5</td>
<td>6.5%</td>
<td>10</td>
</tr>
<tr>
<td>India</td>
<td>1,210</td>
<td>17.6%</td>
<td>14.7</td>
<td>12</td>
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<tr>
<td>Pakistan</td>
<td>179</td>
<td>2.6%</td>
<td>0.7</td>
<td>4</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>142</td>
<td>2.1%</td>
<td>0.0</td>
<td>0</td>
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<tr>
<td>Nepal</td>
<td>27</td>
<td>0.4%</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Afghanistan</td>
<td>24</td>
<td>0.4%</td>
<td>0.0</td>
<td>0</td>
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<tr>
<td>Sri Lanka</td>
<td>21</td>
<td>0.3%</td>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td>Bhutan</td>
<td>1</td>
<td>0.0%</td>
<td>0.0</td>
<td>0</td>
</tr>
</tbody>
</table>

• India dominates the Sub-Continent LPG demand

LPG Demand in the Sub-Continent is Growing Very Rapidly

Residential / Commercial LPG is subsidized in India
The Residential / Commercial Market Dominates the Sub-Continent LPG Demand

Residential / Commercial market uses about 70% butane
The Autogas Market Is Relatively Small But Growing Rapidly

- Mostly in India
- 3-wheelers and passenger cars
- Has OEM support
- <3.5% of all Indian vehicles run on LPG
- More than 900 filling stations and growing

Photo Credit: Indian Autogas Coalition
Indigenous Supply from the Sub-Continent Is Far Short of Demand

- Sub-Continent demand growth is much higher than supply growth
- The supply shortage was less than 2 million tonnes per year until about 2003
- The current LPG supply shortage is more than 5 million tonnes per year, and is likely to grow to nearly 8 million tonnes per year by 2015
Sub-Continent Indigenous LPG Supply is Nearly All from India and Pakistan

<table>
<thead>
<tr>
<th>Year</th>
<th>Million Tonnes LPG Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>2</td>
</tr>
<tr>
<td>2000</td>
<td>4</td>
</tr>
<tr>
<td>2005</td>
<td>8</td>
</tr>
<tr>
<td>2010</td>
<td>12</td>
</tr>
<tr>
<td>2015</td>
<td>18</td>
</tr>
</tbody>
</table>

- **India**: 94%
- **Pakistan**: 6%
- **Bhutan**: 0%
- **Afghanistan**: 0%
- **Bangladesh**: 0%
- **Nepal**: 0%
- **Sri Lanka**: 0%

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Most Indigenous LPG Supply in the Sub-Continent Is Produced in Refineries

2011

- Natural Gas: 76%
- Refineries: 24%
Nearly All of the Sub-Continent LPG Shortage Is Supplied Through Waterborne Imports

- Waterborne LPG imports arrive in India, Pakistan and Sri Lanka
- A relatively small amount may be provided via truck from Iran and the CIS
Imported Waterborne LPG is Predominantly Butane Sourced From the Middle East

Source: Waterborne Energy
Residential / Commercial LPG Consumption Is Increasing Rapidly on a Per Capita Basis

2009 Regional KG/Capital Data
- High: North America 46.60
- Low: Indian Subcontinent 8.10
- World Average: 17.47

But is still relatively (very) low…
Rural Households in India Appear to Be Replacing Firewood With LPG

- **Residential/Commercial Fuel Ladder**

- **Rural Households (72%)**
  - Source IOC, 2009
  - 2001 Census showed 63% firewood, 6% LPG

- **Urban Households**
  - 2001 Census showed 48% LPG, 19% kerosene, 22% firewood

- **Low natural gas**
- **Low electricity**

- **Crop Residue**
- **Cowdung Cake**
- **Coal**
- **Kerosene**
- **LPG**
- **Others**

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Sub-Continent GDP per Capita Is Among the Lowest in the World, But Improving

Source: International Monetary Fund, as of April 2008

GDP (Nominal) Per capita
2008
India Is Improving Their LPG Infrastructure

- Attempting to increase rural LPG connections by 10 million customers per year
  - Adding 60 million cylinders/ regulators by 2015
  - Upgrading bottling capacity
- Adding nearly 300,000 tonnes of storage capacity
- 3100 km of LPG Pipelines
- 2 import facilities to add a total of 1.2 million tonnes per year of import capacity
- New refineries

Source: IOC, 2011
Important Challenges Remain for the Sub-Continent

• Execution of infrastructure strategy in India
• Infrastructure outside India
• Subsidies / affordability / habits
• Autogas
  • Safe conversions / OEM support
  • Retail dispensing stations
  • Subsidies
• Market access for international companies
• Peace in the western Sub-Continent

Source: IOC, 2011
Conclusions

- Sub-Continent population is high, but per capita LPG consumption is relatively low
- LPG demand is growing rapidly
  - Dominated by residential / commercial demand
  - Autogas demand is relatively small but growing quickly
  - Industrial demand growing
- Demand growth is faster than supply growth
  - Local supply is mostly refinery based
  - Waterborne imports make up the difference
- Numerous challenges for LPG remain within the Sub-Continent, but there is great opportunity!
Thank you for your attention!
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