LPG in Brazil: At a Crossroads

GLOTEC – LAM
Global Technology Network Latin America

Ernst BRANDSTAETTER – August 2017
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SHV ENERGY IN THE WORLD

SHV ENERGY ASSETS

<table>
<thead>
<tr>
<th>Asset</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminals</td>
<td>20</td>
</tr>
<tr>
<td>Ships</td>
<td>10</td>
</tr>
<tr>
<td>Transloading stations</td>
<td>2</td>
</tr>
<tr>
<td>Rail tank cars</td>
<td>500</td>
</tr>
<tr>
<td>Physical Volume (mn MT)</td>
<td>5.5</td>
</tr>
</tbody>
</table>
GLOBAL LPG DEMAND

CAGR 2017-2025
- Other: +0.1%
- Chemical: +2.2%
- Autogas: +0.3%
- Industrial: +1.1%
- Res/comm: +3.1%

Propane vs naphtha

Million tons per year

Res/comm: +3.1%
Industrial: +1.1%
Chemical: +10%
Other: -2.1%

SHV Energy

SHV Gas Supply & Risk Management
Global market to remain long

Price benchmarks

- CIF ARA L
- Saudi CP
- FEI
- Mont Belvieu

Note: 2017 data is until July
LPG PRICE BENCHMARKS

- FEI
- CIF ARA
- DAF Brest
- Mont Belvieu
- CP
- SP
- Mont Belvieu
BRAZIL – MARKET SNAPSHOT

Population (2016) ~209 million
Area (land) 8.4 million sq km
GDP growth (1Q 2017) 1%

LPG demand (2017E) 7.9 million tons
P13 sales (2016) 5.4 million tons
LPG demand per capita 38 kg
LPG production (2017E) 5.4 million tons
Imports (2017E) 2.5 million tons

Source: CIA World Factbook, Trading Economics, IHS Markit, SRM Research
• Growth potential in the large residential/commercial segment remains, but depends on population growth and further phasing out of firewood as a cooking fuel
• On the supply side, LPG recovery from gas plants will grow as crude oil production (along with associated gas) increases
• Brazil will continue to import LPG, particularly propane, for the foreseeable future
Third party capacity 5,200

Brazil – total capacity 180,760

Suape and Santos terminals together receive over 90% of LPG imports
BRAZIL – LPG PRICES

New reference price formula for P13 segment

- Petrobras now uses the average of CIF ARA Large propane and butane prices (plus a 5% markup) as a reference for wholesale LPG prices for 13 kg (and under) cylinders
- The new structure applies only to LPG in the residential segment and will not seek parity with international prices
BRAZIL – SUMMARY OF FACTS

**Imports to continue in the range of 1 to 3 millions tons**

- Not considering further cancellations/delay of upstream projects
- Not considering extra demand growth because of growing GDP
- Not considering potential of shift of LPG streams towards the petchem industry

**Infrastructure needs to be upgraded to cope with growing imports**

- Only one port capable of receiving VLGCs – Suape, which has limited storage capacity
- Santos has sufficient storage capacity but has limited draft and suffers from frequent loading/unloading delays
- Growing gap between supply and demand in the Northeast
- Cabotage is a challenge due to insufficient storage capacities, high berth utilizations, draft restrictions, particularly in Mucuripe, Paranagua and Tergasul
- No options to transport LPG via rail

**Existing pricing model does not enable individual imports**

**Existing law restricts extraordinary development of the LPG market**

**Role/destiny of Petrobras as producer and Transpetro as logistics provider for the LPG industry is unclear**
### MARKET SNAPSHOT – INDIA AS BENCHMARK

<table>
<thead>
<tr>
<th></th>
<th>Brazil</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (2016)</td>
<td>~209 million</td>
<td>1.26 billion</td>
</tr>
<tr>
<td>Area (land)</td>
<td>8.4 million sq km</td>
<td>2.9 million sq km</td>
</tr>
<tr>
<td>GDP growth (1Q 2017)</td>
<td>1%</td>
<td>6.1%</td>
</tr>
<tr>
<td>LPG demand (2017E)</td>
<td>7.9 million tons</td>
<td>22.3 million tons</td>
</tr>
<tr>
<td>P13 sales</td>
<td>5.4 million tons</td>
<td>16.1 million tons</td>
</tr>
<tr>
<td>LPG demand per capita</td>
<td>38 kg</td>
<td>18 kg</td>
</tr>
<tr>
<td>LPG production (2017E)</td>
<td>5.4 million tons</td>
<td>11.4 million tons</td>
</tr>
<tr>
<td>Imports (2017E)</td>
<td>2.5 million tons</td>
<td>10.9 million tons</td>
</tr>
</tbody>
</table>

Source: CIA World Factbook, Trading Economics, IHS Markit, SRM Research
BRAZIL AND INDIA – MARKET SHARES

**Brazil**

- Liquigas (Petrobras) 23%
- Supergasbras (SHV Energy) 21%
- Other 33%
- Ultragaz 23%

**India**

- IOC 46%
- BPC 25%
- HPC 26%
- Private players 3%

**State-owned Petrobras accounts for 23% of the market**

**State-owned oil companies account for 97% of the market**
INDIA – LPG SUPPLY-DEMAND BALANCE

- Although refinery capacity is poised for expansion, which will boost production, domestic demand will far outstrip production.

- The government has implemented a subsidy reform program wherein separate prices for subsidized cylinders will be eliminated in favor of direct cash payments to low income households to be used in purchasing unsubsidized LPG:
  - Subsidy reform caused LPG demand to decline in 2013, but the growth has since resumed, and is expected to continue going forward.

Source: IHS Markit
INDIA – INFRASTRUCTURE

MAJOR & INTERMEDIATE PORTS OF INDIA

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Capacity (kt)</th>
<th>Imports (kt)</th>
<th>Turn rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haldia</td>
<td>30</td>
<td>1,837</td>
<td>61</td>
</tr>
<tr>
<td>Mangalore</td>
<td>25</td>
<td>1,534</td>
<td>61</td>
</tr>
<tr>
<td>JNPT</td>
<td>16</td>
<td>708</td>
<td>44</td>
</tr>
<tr>
<td>Ennore</td>
<td>30</td>
<td>1,170</td>
<td>39</td>
</tr>
<tr>
<td>Tuticorin</td>
<td>9</td>
<td>223</td>
<td>26</td>
</tr>
<tr>
<td>Mumbai</td>
<td>20</td>
<td>375</td>
<td>19</td>
</tr>
<tr>
<td>Vizag</td>
<td>68</td>
<td>1,141</td>
<td>17</td>
</tr>
<tr>
<td>Dahej</td>
<td>30</td>
<td>443</td>
<td>15</td>
</tr>
<tr>
<td>Sikka</td>
<td>60</td>
<td>856</td>
<td>14</td>
</tr>
<tr>
<td>Porbandar</td>
<td>8</td>
<td>53</td>
<td>6</td>
</tr>
<tr>
<td>Kandla</td>
<td>30</td>
<td>0</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>327</strong></td>
<td><strong>8,340</strong></td>
<td><strong>26</strong></td>
</tr>
</tbody>
</table>
INDIA – TAILOR-MADE SUPPLY SYSTEM

THE GOAL

INDIA – TAILOR-MADE SUPPLY SYSTEM

1. SHIP TO SHIP TRANSFER
2. PORTS:
   - PORBANDAR
   - MUMBAI
   - MANGALORE
   - TUTICORIN

THE CHALLENGES

1. ONE MAJOR SOURCE OF SUPPLY
2. LOADING REQUIREMENTS
3. OPTIMIZE SALES VOLUME TO MINIMIZE SHIPPING COSTS

THE SOLUTION

1. CREATE FLEXIBILITY FOR THE SUPPLY SYSTEM
2. CREATE CRITICAL MASS TO OBTAIN SUPPLY FROM THE MIDDLE EAST
3. OPTIMIZE SHIPPING COSTS AND DEMURRAGE
4. VARIOUS PRODUCT RATIOS
5. CHANGING LOT SIZES

1. CREATE FLEXIBILITY FOR THE SUPPLY SYSTEM
2. OPTIMIZE SALES VOLUME TO MINIMIZE SHIPPING COSTS
3. CONTRACT SELECTED THIRD PARTIES
INDIA – TAILOR-MADE SUPPLY SYSTEM

**SHIP TO SHIP TRANSFER**

- PORBANDAR
- MUMBAI
- MANGALORE
- TUTICORIN

**INDIA SUPPLY SYSTEM**

**CRITICAL MASS ON SUPPLY**
- Competitive Price Advantage for SHV India

**CRITICAL MASS ON SHIPPING**
- Security of supply for SHV India
- Maximize the return on investment on Tuticorin
- Supply flexibility & independence for SHV India

**SUPPLY & ASSET OPTIMIZATION**
INDIAN LEARNINGS APPLICABLE FOR BRAZIL?

**Pricing model**

- Subsidy system changed from product to individual
- Market pricing is related to international prices
- Pricing strategies in place to cope with volatile pricing

**Procurement / Infrastructure**

- Imported cargoes are shared between various receivers
- Access to existing infrastructure is possible based on official pricing structure
- Legal framework for individual imports is existing
- Infrastructure programs (terminal investments) are ongoing
CONSIDERATIONS

Pricing model

- Review existing P13 (subsidized) pricing – consider Indian model
- Move the local market pricing to a pricing policy related to international prices
- Understand how to cope with future volatile pricing

Procurement \ Infrastructure

- Review current volume appointment model
- Provide access at competitive terms to existing infrastructure
- Provide legal framework for individual import hubs and individual imports
- Consider joint imports to increase flexibility and decrease cost

Petrobras \ Transpetro

- Define clear and specific rules for access to assets
- Clarify future positioning of Petrobras as producer\supplier after having left distribution market
Obrigado!