By
Fereidun Fesharaki
President
FACTS Inc.

Presented to
24th Annual North American Conference of the USAEE/IAEE
Washington, D.C.
July 8-10, 2004
Asian Oil Demand

• Asia’s oil product consumption has slowed down considerably. The region as a whole grew at over 3%/year over the second half of last decade, it’s less likely that these growth rates are replicated in future.
  • *We forecast a growth rate of 2% in medium term.*
• China alone, has been the engine of world and Asian oil growth. Perhaps the most notable feature is the slowdown in India’s oil product consumption.
  • *Currently China accounts for almost 70% of the growth in Asia, and some 25-30% of the global oil consumption growth.*
• Following poor performance in 2001 and 2002 the region posted a growth of 664 kb/d in 2003. This however does not mark a broad-base growth revival in the region.
  • *For 2004 we expect Asian oil product consumption to grow by some 550 kb/d of which China’s growth is expected to be 400 kb/d.*
Regional oil market – focus on refining

Asia-Pacific Product Demand 1970-2015

- LPG
- Naphtha
- Gasoline
- Kero/jet
- Gasoil
- HFO/other

Growth:
- 85-95  5.5%
- 95-00  3.2%
- 00-05  2.0%
- 05-10  2.8%
- 10-15  2.5%
## Asia Oil Demand Growth, Selected Nations (kb/d)

<table>
<thead>
<tr>
<th></th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004*</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>117</td>
<td>321</td>
<td>320</td>
<td>111</td>
<td>168</td>
<td>451</td>
<td>386</td>
</tr>
<tr>
<td>India</td>
<td>112</td>
<td>154</td>
<td>28</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>61</td>
</tr>
<tr>
<td>Japan</td>
<td>-206</td>
<td>84</td>
<td>-40</td>
<td>-209</td>
<td>-59</td>
<td>84</td>
<td>-127</td>
</tr>
<tr>
<td>S. Korea</td>
<td>-246</td>
<td>130</td>
<td>55</td>
<td>2</td>
<td>53</td>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>Thailand</td>
<td>-43</td>
<td>44</td>
<td>-5</td>
<td>-11</td>
<td>41</td>
<td>48</td>
<td>53</td>
</tr>
<tr>
<td>Indonesia</td>
<td>-57</td>
<td>55</td>
<td>73</td>
<td>45</td>
<td>26</td>
<td>23</td>
<td>46</td>
</tr>
<tr>
<td>Others</td>
<td>107</td>
<td>158</td>
<td>84</td>
<td>121</td>
<td>3</td>
<td>37</td>
<td>135</td>
</tr>
<tr>
<td>Total</td>
<td>-216</td>
<td>946</td>
<td>516</td>
<td>62</td>
<td>236</td>
<td>664</td>
<td>546</td>
</tr>
</tbody>
</table>

*Projected
## China’s Crude Imports by Source, 2003

<table>
<thead>
<tr>
<th>Source</th>
<th>Volume (kb/d)</th>
<th>Share (%)</th>
<th>Source</th>
<th>Volume (kb/d)</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saudi Arabia</td>
<td>303.3</td>
<td>16.8</td>
<td>Angola</td>
<td>201.6</td>
<td>11.2</td>
</tr>
<tr>
<td>Iran</td>
<td>248.4</td>
<td>13.8</td>
<td>Sudan</td>
<td>125.3</td>
<td>6.9</td>
</tr>
<tr>
<td>Oman</td>
<td>185.9</td>
<td>10.3</td>
<td>Congo</td>
<td>73.8</td>
<td>4.1</td>
</tr>
<tr>
<td>Yemen</td>
<td>139.9</td>
<td>7.7</td>
<td>Equatorial Guinea</td>
<td>30.6</td>
<td>1.7</td>
</tr>
<tr>
<td>Kuwait</td>
<td>18.1</td>
<td>1.0</td>
<td>Nigeria</td>
<td>2.6</td>
<td>0.1</td>
</tr>
<tr>
<td>UAE</td>
<td>17.3</td>
<td>1.0</td>
<td>Libya</td>
<td>2.5</td>
<td>0.1</td>
</tr>
<tr>
<td>Qatar</td>
<td>13.4</td>
<td>0.7</td>
<td>Gabon</td>
<td>2.5</td>
<td>0.1</td>
</tr>
<tr>
<td>Iraq</td>
<td>0.0</td>
<td>0.0</td>
<td>Cameroon</td>
<td>2.2</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>Middle East Total</strong></td>
<td><strong>926.4</strong></td>
<td><strong>51.3</strong></td>
<td><strong>Africa Total</strong></td>
<td><strong>441.2</strong></td>
<td><strong>24.4</strong></td>
</tr>
<tr>
<td>Vietnam</td>
<td>70.0</td>
<td>3.9</td>
<td>Russia</td>
<td>105.0</td>
<td>5.8</td>
</tr>
<tr>
<td>Indonesia</td>
<td>66.5</td>
<td>3.7</td>
<td>Kazakhstan</td>
<td>24.0</td>
<td>1.3</td>
</tr>
<tr>
<td>Malaysia</td>
<td>40.3</td>
<td>2.2</td>
<td>Norway</td>
<td>19.0</td>
<td>1.1</td>
</tr>
<tr>
<td>Australia</td>
<td>35.8</td>
<td>2.0</td>
<td>United Kingdom</td>
<td>4.0</td>
<td>0.2</td>
</tr>
<tr>
<td>Thailand</td>
<td>31.7</td>
<td>1.8</td>
<td>Germany</td>
<td>2.6</td>
<td>0.1</td>
</tr>
<tr>
<td>Brunei</td>
<td>29.9</td>
<td>1.7</td>
<td>Argentina</td>
<td>2.6</td>
<td>0.1</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>1.6</td>
<td>0.1</td>
<td>Venezuela</td>
<td>2.6</td>
<td>0.1</td>
</tr>
<tr>
<td>Mongolia</td>
<td>0.4</td>
<td>0.0</td>
<td>Brazil</td>
<td>2.4</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>Asia-Pacific Total</strong></td>
<td><strong>276.2</strong></td>
<td><strong>15.3</strong></td>
<td><strong>Europe/Other Total</strong></td>
<td><strong>162.1</strong></td>
<td><strong>9.0</strong></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1,805.9</strong></td>
<td><strong>100.0</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Asian Refining & Product Trade

- Several additions in the region’s refining capacity coincided with this slowdown in demand growth. This had serious implications for trade flows and refining business in the region.
  - *Deficits turned into surpluses (refer to the charts on next pages)*
  - *Refining margins plummeted – especially for the refiners of Southeast Asia. It’s worth noting that with the exception of Indonesia, refiners in the Southeast Asian region operate under little or no protection.*
  - *Closures and capacity reductions have come from Philippines, Australia, Japan, and Singapore. There are more to come in next 3 to 5 years.*
  - At the same time, additional refining capacity is projected to come from India and China over the next 5 to 10 years.
The Regional Oil Market – Focus on Refining

Increases in Asian Refining Capacity*, and its impact on...

...The Regional Product Balance: Net-imports/(Net-exports)

*based on CDU capacity
Regional oil market – focus on refining

Range of Difference between Crude & Product Import Duty
Asian Refiners (Arranged according to CDU capacity)

China *Approximated from duty applied on a volume basis
Japan*
S Korea
India
Taiwan
Singapore
Indonesia
Thailand
Australia
Malaysia
Philippines
Pakistan

Difference in Percentage Points

FACTS Inc.
Gross Refining Margins Based on Arab Light Crude Cracking Yield

- US Gulf Coast
- North West Europe
- Singapore
Oil Storage in Asia-Pacific Region

- Oil storage is seen both as a means to improve security of supply and to consolidate/maintain competitive advantage:
  - China and India are considering strategic stocks.
  - Besides ASEAN has also considered oil stock piling as a means of increasing energy security.
- Recently several Southeast Asian countries have been considering some sort of storage: commercial, sovereign, or a combination.
  - Singapore: Jurong island
  - Philippines: Subic bay
  - Thailand: storage related to the trans-peninsula pipeline
  - *There is room for only one!*
Oil Storage in Asia-Pacific Region (continued)

• One option is to elicit the involvement of Middle East oil producers. We believe that under the current scenario there is greater interest on the part of Middle Eastern producers (national oil companies) to participate in a storage project in the region.

• Asia is Middle East’s largest market for crude oil and refined products and at the same time, it is the largest supplier to Asia. (Refer to chart on following page.)

• Currently over 10 mmb/d of crude oil flows from Middle East to the Asia-Pacific region – this is the single largest inter-regional crude flow.

• This relationship is likely to grow further in the future.
**Oil Exports from the Middle East**

- Europe: 18%
- North America: 14%
- S & C America: 2%
- Africa: 4%
- Asia-Pacific: 62%

Total Exports in 2002 = 18 million barrels per day

*Includes crude and refined products*

---

**Crude Imports in the Asia Pacific Region**

- Middle East: 74.4%
- Asia-Pacific: 13.3%
- Atlantic Basin: 6.6%
- Africa: 2.9%
- Americas: 1.2%
- Other: 1.7%

Estimate of 2003 imports, total = approximately 14.2 mmb/d
Asia-Pacific Oil Production and Net Import Requirements, 1999-2010

Note: Oil production = crude output plus nonrefinery LPG.
China Crude Production and Net Oil Import Requirements, 1990-2015

Crude Production

Net Oil Import Requirements


Crude Production

Net Oil Import Requirements

(218) (703) (1,033) (1,493) (1,398) (1,620) (2,083) (2,834) (4,141) (5,203)
Growth Comparison by Fuel, World 2002-2025
(Base 2001=100)

Source: EIA International Energy Outlook 2003
Demand and Supply Outlook

World LNG Trade, 2003

Asia 67% (84.1 million tonnes)

Europe 24% (29.5 million tonnes)

Americas 9% (11.2 million tonnes)
Existing Buyers

• **Japan**
  – In terms of volume, Japan still dominates the Asian LNG market.
  – Uncertainty over demand growth is driving companies’ behavior for new contracts and renewals—the priority is flexibility in terms of volume and destination clauses. Multi-tiered contracts with different terms are the trend.

• **Korea**
  – Korea’s gas requirements are large and continue to grow.
  – Korea is in a powerful position in this buyer’s market.
  – Almost every seller knows Korea Gas (KOGAS) has the potential to be a major buyer and they will work hard to secure a deal.

• **Taiwan**
  – The recent deal between CPC and RasGas helped illustrate that in the current market, low prices can be secured for stable long-term contracts.
New Buyer: China

China's Sectoral Gas Consumption: Base-Case

(mmscf/d)

- Power
- Industry
- Residential and Commercial
- Transport
- Others

Asia-Pacific LNG Outlook
New Buyer: China

Note: the Russia-China-Korea pipeline route is for illustrative purposes only.

China’s West-East Gas Pipelines, Ordos-Beijing Pipelines, and Proposed Russia-China-Korea Pipelines
New Buyer: India

India's Sectoral Gas Consumption: Base-Case

- Power
- Industry
- Residential/Commercial
- Transport
- Others

Asia-Pacific LNG Outlook

FACTS Inc.
New Buyer: India

Supply Sources

- India has 3 import options for gas
  - Imports from Iran via Pakistan: This will be the cheapest source.
  - Imports from Bangladesh: This would be the second cheapest source.
  - Imports by LNG: Probably the more expensive route.

- India’s geopolitical concerns have dictated that the cheapest source may be imported last.

- A new option is emerging with the discovery of gas in Burma partially owned by GAIL/ONGC.
Oil Price Relationship in LNG Contracts

% Linkage with Oil Prices

- Pre-1985
- Post-1985
- S-Curve Low/High Prices
- Guangdong
- NWS/Kogas Medium Term
- RasGas-Taiwan
- RasGas-India

Asia-Pacific LNG Outlook

FACTS Inc.
Thank You!