East Asian Gas Markets in Transition: A Japanese View

Tri Plenary Session 5

40th IAEE International Conference

June 20th, 2017

Dr. Ken Koyama

Chief economist and managing director
Institute of Energy Economics, Japan
Natural Gas Consumption by Region

- The world natural gas demand is projected to increase from 3.5 trillion cubic meters (tcm) in 2014 to 5.7 tcm in 2040, a 1.6-fold increase.
- Asia accounts for 44% of projected global increase in natural gas demand between 2014-2040.

Source: IEEJ, “Asia/World Energy Outlook 2016”
World LNG demand expands from 245 mtpa in 2015 to 545 mtpa in 2040 (2.2 folds increase).

Asia’s LNG demand increases by 222 mtpa, accounting for about 70% of the world’s LNG demand growth.

Source: IEEJ, “Asia/World Energy Outlook 2016”
Factors to affect Gas/ LNG Demand in Asia

- Economic growth
- Need to protect environment
- Lower price
- Competition against coal
- Future of nuclear power
- Competition against renewable energy
- Competition with LPG
- Impact of power/ gas market reform
- Pipeline vs. LNG
“SWOT” of Natural Gas in Asia

- **Strength**
- **Weakness**
- **Opportunity**
- **Threat**
Strength of Natural Gas in Asia

- Environmental advantages
- Supply (potential) abundance
- Source of energy diversification
- Supply reliability

Source: Japan Gas Association
Weakness of Natural Gas in Asia

- Weaker economic competitiveness
- Infrastructure requirement
- Large scale initial investment
- Lower flexibility of supply and market

Levelized power generation cost in Japan

Opportunity for Natural Gas in Asia

- Growing energy/power demand
- Growing energy security concerns
- Climate change and air pollution

### NDC under Paris Agreement

<table>
<thead>
<tr>
<th>Party</th>
<th>Date of submission</th>
<th>Target type</th>
<th>Reduction target</th>
<th>Base year</th>
<th>Target year</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU</td>
<td>Mar 6 2015</td>
<td>Absolute emissions</td>
<td>40%</td>
<td>1990</td>
<td>2030</td>
<td>GHG</td>
</tr>
<tr>
<td>United States</td>
<td>Mar 31 2015</td>
<td>Absolute emissions</td>
<td>26～28%</td>
<td>2005</td>
<td>2025</td>
<td>GHG including LULUCF</td>
</tr>
<tr>
<td>Russia</td>
<td>Apr 1 2015</td>
<td>Absolute emissions</td>
<td>25～30%</td>
<td>1990</td>
<td>2030</td>
<td>GHG</td>
</tr>
<tr>
<td>China</td>
<td>Jun 30 2015</td>
<td>GDP intensity</td>
<td>60～65%</td>
<td>2005</td>
<td>2030</td>
<td>CO₂</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total emission peak out before 2030</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td>Jul 17 2015</td>
<td>Absolute emissions</td>
<td>26%</td>
<td>2013</td>
<td>2030</td>
<td>GHG</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Sep 24 2015</td>
<td>Reduction from BAU</td>
<td>29%</td>
<td>BAU</td>
<td>2030</td>
<td>GHG</td>
</tr>
<tr>
<td>Brazil</td>
<td>Sep 30 2015</td>
<td>Absolute emissions</td>
<td>37% (43% for 2030)</td>
<td>2005</td>
<td>2025</td>
<td>GHG</td>
</tr>
<tr>
<td>India</td>
<td>Oct 1 2015</td>
<td>GDP intensity</td>
<td>33～35%</td>
<td>2005</td>
<td>2030</td>
<td>GHG</td>
</tr>
</tbody>
</table>

### Air pollution in China

8
Threat to Natural Gas in Asia

- **Competition with other energy source**
  - Abundant and lower priced coal, with no effective CO2 pricing
  - Lowering costs of renewable energy with policy back-up
  - Nuclear restart in Japan and new builds in China, India, others

- **Electricity market reform**

  Japan’s Power and Gas Market Reform

- Basic Problem Committee
- Strategic Policy Committee
- Full retail deregulation
- Legal unbundling of T&D sector
- Full retail deregulation
- Legal unbundling of 3 big companies
- Electricity Systems Reform Subcommittee
- Legal revision
- Legal Revision
- Gas System Reform Subcommittee
- Legal revision
- Legal Revision
Global LNG Balance up to 2017

Ample supply continues to exist in the short term and LNG supply-demand will be softened further in 2017 and beyond.

Source: Yoshikazu Kobayashi (IEEJ) December 2016
Issues for LNG Pricing in Asia

- Given the dominance of the existing contracts, JCC pricing likely to remain dominant mechanism in Asia at least up to early 2020s
- But tide is changing:
  - Prevailing over-suppled market
  - Inflow of US LNG with HH pricing will increase in Asia
  - Spot/short-term trading continue to grow
  - Initiatives to create hubs and new price discovery in Asia
  - Power and gas market reforms in Japan and Asia
- Major Asian buyers such as JERA have a strategy to diversify pricing
- Buyers continue to search for possible alternatives to JCC and the share of JCC pricing will be reduced
- So far there is no clear answer as to what is the best alternative
- What will happen if divergence emerges between LT contract and spot price?
Asia’s Challenges for “3E+S”

- Rising import dependence and energy security
  - High oil import dependence. Gas import dependence rising
  - High Middle East dependence, Sea-lane dependence

- High coal dependence and environment loads
  - Challenges for both climate change and pollution problems

- Need for energy market reform
  - Japan leads the way. Reform for both energy market and NOCs

- Challenges for nuclear power program
  - Impacts of Fukushima. Ambitious nuclear power program in China, India, etc, with challenges for safety and public acceptance