Global Perspective and Key Challenges for Natural Gas Development

Takato OJIMI
President
Asia Pacific Energy Research Centre

Co-Organized by:

ASEAN Centre for Energy
Leverage International (Consultants) Inc.
• Background
• Natural Gas Demand Outlook
• Security Challenges
• Market Challenges
• Clean Energy Challenges
• Way Forward
• Conclusion
The Asia-Pacific Economic Cooperation (APEC) was established in 1989 as a regional economic forum in the Asia-Pacific, with 21 member economies.

The Asia-Pacific Energy Research Centre (APERC) was established in 1996 following the directives of APEC Leaders, to serve EMM & EWG.
Over the last 2 decades, the natural gas consumption has increased by nearly 75%.

Source: BP Statistical Review of World Energy 2015
China, India and Southeast Asia will drive the natural gas demand growth in “Non-OECD Asia”

- 40% of total growth in “Other Non-OECD” is expected to take place in Middle East
- “OECD” is expected to have slower and stable growth rate at 0.7% annually

*excluding Middle East
Gas demand in China will grow by more than 3 fold while the demand in South East Asia will increase by more than 2 fold from 2013 to 2040.

Russia demand peaks around 2025.

The US and other Americas will have slow to moderate growth.

Source: APEC Energy Demand and Supply Outlook 6th Edition and Draft Results or Preliminary Results.
Continued rise in cross-border gas flows creates greater energy security challenges
APEC LNG imports face geopolitical challenges due to high dependency on maritime routes through extremely busy straits and politically unstable regions.
Shale Gas Development In APEC

- APEC region is endowed with rich unconventional gas. (US, Canada, Mexico, China, Australia)
- Increasing regional supply and decreasing reliance on external sources of gas. <Lesser chokepoints, Shorter routes>
- More intra APEC gas trade, diversification of sources lead to secured supply of energy.

<table>
<thead>
<tr>
<th>Tcm</th>
<th>Shale gas resources*</th>
<th>Proven Reserves</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>39.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Canada</td>
<td>20.2</td>
<td>2.4</td>
</tr>
<tr>
<td>US</td>
<td>20.0</td>
<td>11.2</td>
</tr>
<tr>
<td>Mexico</td>
<td>19.3</td>
<td>0.6</td>
</tr>
<tr>
<td>Australia</td>
<td>15.4</td>
<td>1.5</td>
</tr>
<tr>
<td>Russia</td>
<td>10.1</td>
<td>59.6</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1.6</td>
<td>3.8</td>
</tr>
<tr>
<td>Thailand</td>
<td>0.2</td>
<td>0.4</td>
</tr>
<tr>
<td>APEC</td>
<td>126.3</td>
<td>84.0</td>
</tr>
</tbody>
</table>

*unproved wet shale gas technically recoverable resources (TRR)
Source: U.S. Energy Information Administration (EIA), 2013

Further reading: Pathways For Shale Gas Development In Asia-Pacific was recently published by APERC
Measures in response to Security Challenges

<Short Term Measures>
- Emergency response

<Mid. and Long Term Measures>
- Diversification of import gas sources
- Combination of pipe gas and LNG
- Diversification of energy mix
- Electricity grid interconnections
- Energy efficiency and conservation
- Other economic and structural policies

Global/Regional & Bilateral/Multilateral Cooperation

- APEC Oil & Gas Security Initiative (OGSI)
- ASEAN Petroleum Security Agreement / Coordinated Emergency Response Measures (APSA/CERM)
- IEA’s Oil and Gas Emergency Response such as oil stockpiling etc.
- Bilateral and multilateral cooperation framework may also resolve regional disputes
- G7 and other fora will pursue measures to face future gas security challenges
Market Challenges

**PRICE**
Volatile world gas price may hamper investment

**TECHNOLOGY**
Tech. & cost barriers for unconventional & deep water

**INVESTMENT**
Exploration and infrastructure

**INSTITUTIONAL/REGULATORY**
Government support on developing Natural Gas

**ACCEPTANCE**
Not in my back yard (NIMBY)

**MARKET ACCESS**
Framework that facilitates infrastructure & market development
Market Challenges

Demand

Natural Gas Hub

Price Discovery
- Upstream/Downstream Investment
- Future Price
- LNG Price

Supply

Market Access
- Long/Mid Term
- Third Party Access
- Spot Market
Asia Pacific Region has been importing more than 70% of world’s LNG demand.

**Market Challenges**

**LNG**

**GLOBAL LNG IMPORTS IN 2014**

- North America
- Other Americas
- Europe and Eurasia
- Middle East
- Asia Pacific

**CHALLENGES**

- Large scale investment
- Asia Premium
- Oil-indexation
- Traditional terms of contract
- Destination clause

Source: BP Statistical Review Of World Energy

Asia Pacific Energy Research Centre
Clean Energy Development Challenges

SUSTAINABLE DEVELOPMENT

What will be the future CO₂ emissions scenario?

CHALLENGES

• Cheaper competing fuel such as coal
• Lack of policies that support the market to switch fuels
• Regulatory framework
• Geopolitical issues

Source: BP Statistical Review Of World Energy

• Over the past 4 decades, the global CO₂ emissions increased at annual rate of 1.9%.
• Gas, clearly a cleaner fuel option among fossil fuels, can help to mitigate emissions.
The CO₂ emissions will be reduced by 500 million tons by substituting future coal power plant with gas, but it comes with a price.
Clean Energy Development Challenges

LNG AS TRANSPORTATION FUEL

CLEANER FUEL
Exploration and extraction of gas

AVAILABILITY
LNG availability and reliable supply chain

TECHNOLOGY
Commercialization of proven and reliable engine technology

CHALLENGES

INFRASTRUCTURE
Increasing in infrastructure development parallel with demand

ENGINE & FUEL SYSTEM COST
Developing new technology

REGULATORY
Requires framework that facilitates infrastructure and market development

Source: Shell Eastern Petroleum Pte Ltd.
Transparency and Data Sharing

- Transparency is essential for efficient, liquid and competitive gas markets.
- Data transparency will help in developing gas market integration
- Businesses require robust and transparent data to make informed investment decisions
Way Forward

Cooperation among All Stakeholders

Regional/global cooperation will foster better understanding between gas producers, importers, consumers, businesses and governments.
Conclusion

- Strengthening regional and global cooperation will be the key in overcoming gas security challenges

- Robust and transparent gas market will facilitate gas demand growth in the future

- Natural gas can be fuel of choice due to its abundant reserves and cleanest fossil fuel. With the right policy framework and regulatory support, natural gas can help to promote clean energy and reduce CO₂ emissions

- Natural gas can make a major contribution to improving energy security, facilitating economic growth and providing a cleaner and more efficient energy system for future generations
THANK YOU