Role of LNG in Growing Asian Gas Market

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Asian Natural Gas Market: Diversification of Supply and Conditions

- Pricing -
  Oil indexed gentle slope, S-curve
  Henry-hub, NBP

ASIAN HUB

- Flexibility -
  Term, Spot,
  Free destination
LNG Demand and Supply Perspective in Asia

Source: IEEJ

- Supply (Branded LNG)
- Supply (Pre-FID)
- Supply (existing, SPA/HOA concluded)
- Demand (High Case)
- Demand (Low Case)
Perspective in Japan
~Key factors in the Discussions on the New Energy Policy

- Diversification of Supply Sources
  New potential sources: Shale gas, CBM, Methane hydrate
- Safety of Nuclear Power Plant, Management of Nuclear Waste
- Utilization of High-efficient Gas Power Generation
- Wider use of Renewable Energies
- Development of Infrastructures (i.e. Pipeline network)
- Liberalization of Energy Market
  Power Market Reform; Full liberalization 2016
  Unbundling of power utilities ~2020
- Wider use of Distributed Energy System utilizing CHP
- Promotion of Demand Side Management
  Demand response, Energy conservation
- Promotion of Smart Community
Perspective in Japan
~LNG Demand Profile through 2030

- Increased use of Natural Gas in Power Generation
- Conversion from Oil to Natural Gas in Industrial Sector
- Decrease of Nuclear Power and Increase of Renewables

90-100 MTPA; with enhanced competitiveness and development of pipeline network

60-70 MTPA; under the current conditions increase of coal in power generation limited conversion to natural gas
Potential of U.S. LNG to Asia

- **Freeport**
  - Export Capacity: 12 MTPA
  - Osaka Gas (2.2 MTPA)
  - Chubu Electric (2.2 MTPA)

- **Sabine Pass**
  - Export Capacity: 15 MTPA
  - KOGAS (3.5 MTPA)
  - GAIL (3.5 MTPA)
  - BG (5.5 MTPA portfolio to Asia)

- **Cameron**
  - Export Capacity: 8 MTPA
  - Mitsubishi (4 MTPA)
  - Mitsui (4 MTPA)

- **Cove Point**
  - Export Capacity: 4.6 MTPA
  - HOA for Sale and Purchase with Cove Point LNG
  - Tokyo Gas, Kansai Electric and Sumitomo (2.3 MTPA)

- **TOKYO GAS Activities**
  - Mitsubishi (4 MTPA)
  - Mitsui (4 MTPA)

- **Cordova Shale Basin**

- **Barnett Shale Basin**

- **More than 25 MTPA to Asia**
Three key Factors for the Golden Age of Asian Natural Gas Market

I. High Supply Potential with Diversification

New Sources:
U.S Shale, Canada, Alaska (North Slope), Mozambique, Russia (LNG & Pipeline: Siberia to China and Korea, Sakhalin to Japan)

Regional Sources:
Unconventional gas in China, Pipeline from Central Asia

II. Enhanced Competitiveness among fuel mix

Global pricing: Henry-hub, NBP, Combination of Indexes
Stable pricing: Oil-indexed gentle slope, S-curve
Flexibility: Term, Spot, Free destination, LNG trading hub
Three key Factors for the Golden Age of Asian Natural Gas Market

Ⅲ. Smart Use

*Highly efficient power generations;*
MACCGT (Most Advanced Combined Cycle Gas Turbine), CHP (Combined Heat and Power), Fuel Cell

*Highly efficient industrial use;*
High efficient and compact burners

*Smart Energy Network in Smart Community;*
Smart use of heat & power in distributed energy system with CHPs and renewables
Three key Factors for the Golden Age of Asian Natural Gas Market

Factors altering the market context

- Volume and timing of LNG export from US and East Africa
- Emergence of pipeline supplies from Russia
- Emergence of unconventional gas production in China
- Geopolitics in Middle East and Northeast Asia
- Economy
- Market liberalization
- Global warming