

Shale gas in North America and Asian LNG market

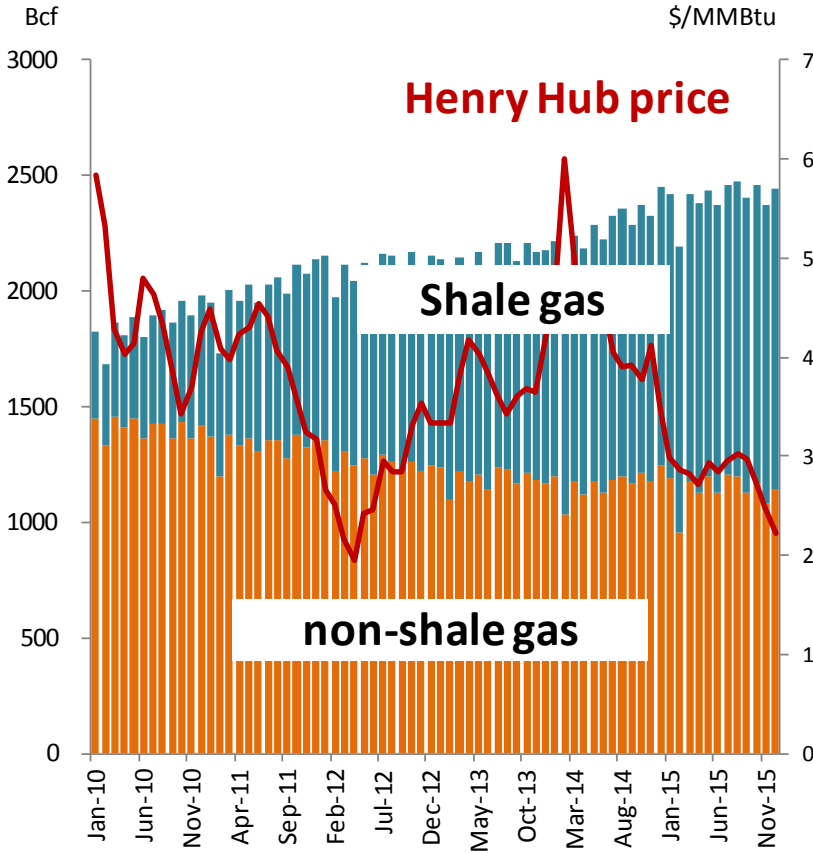
IEEJ-CGEP Seminar:
Pacific Rim energy trade and economic competitiveness
in the age of shale oil and gas

April 7th, 2016

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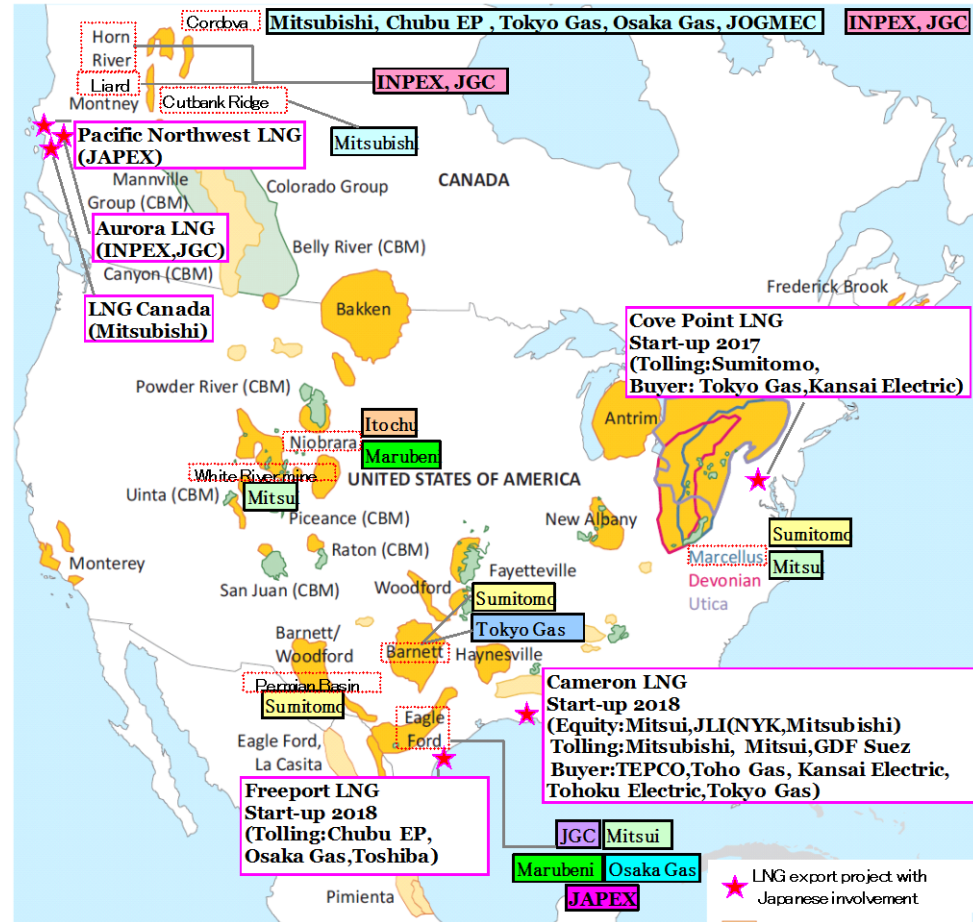
U.S. shale gas and LNG export projects

Production



Source: EIA, company websites

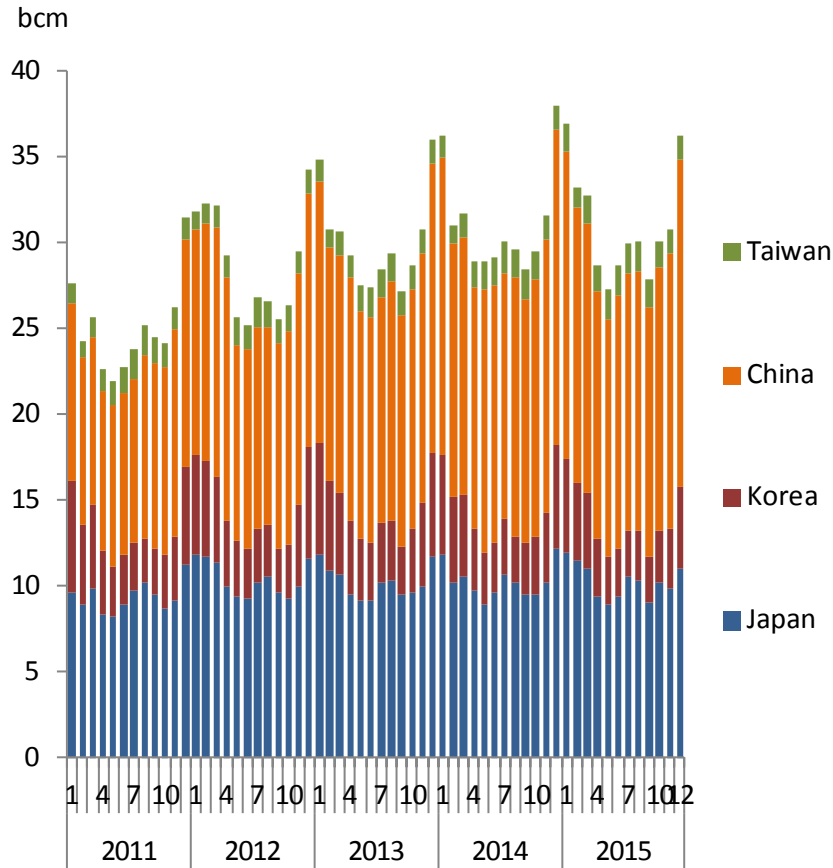
LNG export projects with Japanese interests



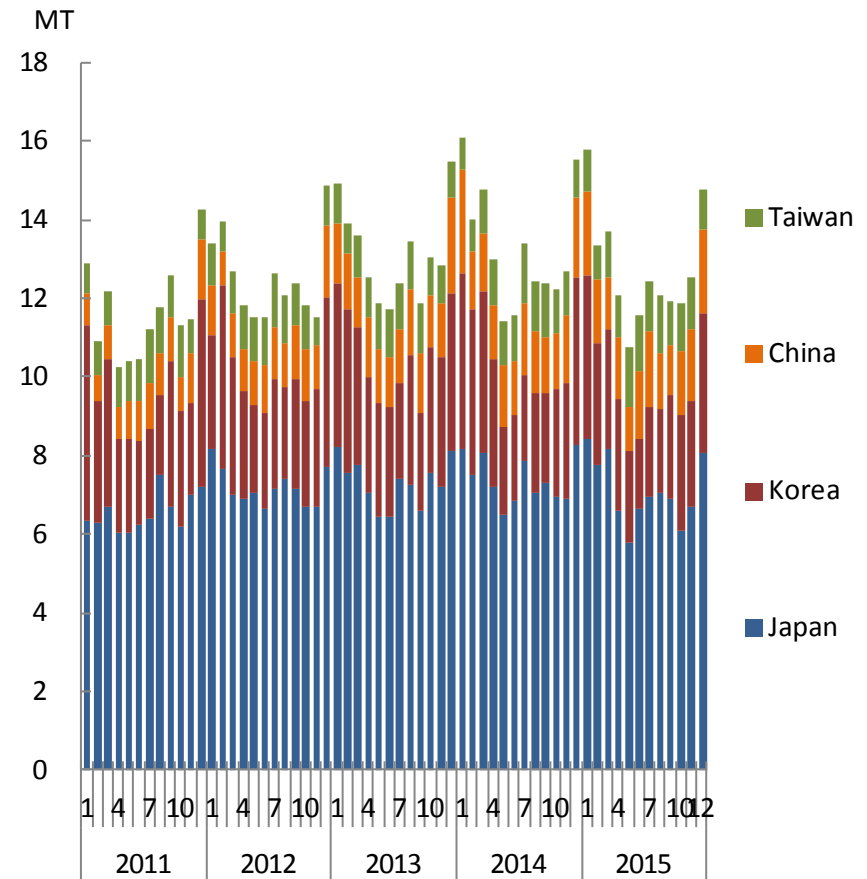
- Shale gas production still growing despite low price
- First LNG exported in February, and the U.S. will be the third largest LNG exporter by 2020

Natural gas demand in Northeast Asia

Natural gas



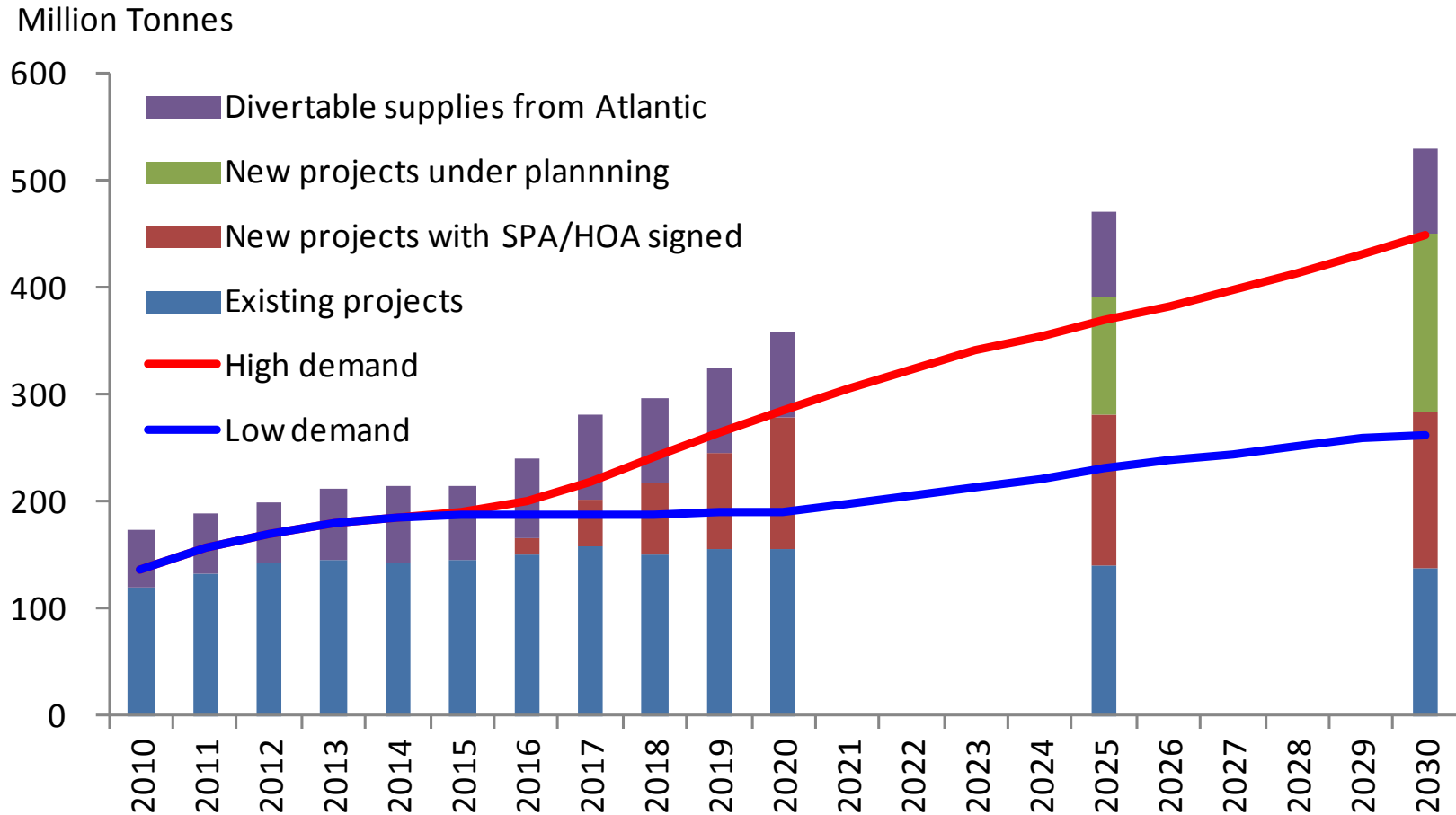
LNG imports



Source: Trade statistics

- Natural gas: 372bcm in 2015 (no growth since 2014)
- LNG: 153MT in 2015 (-6.6MT y/y)

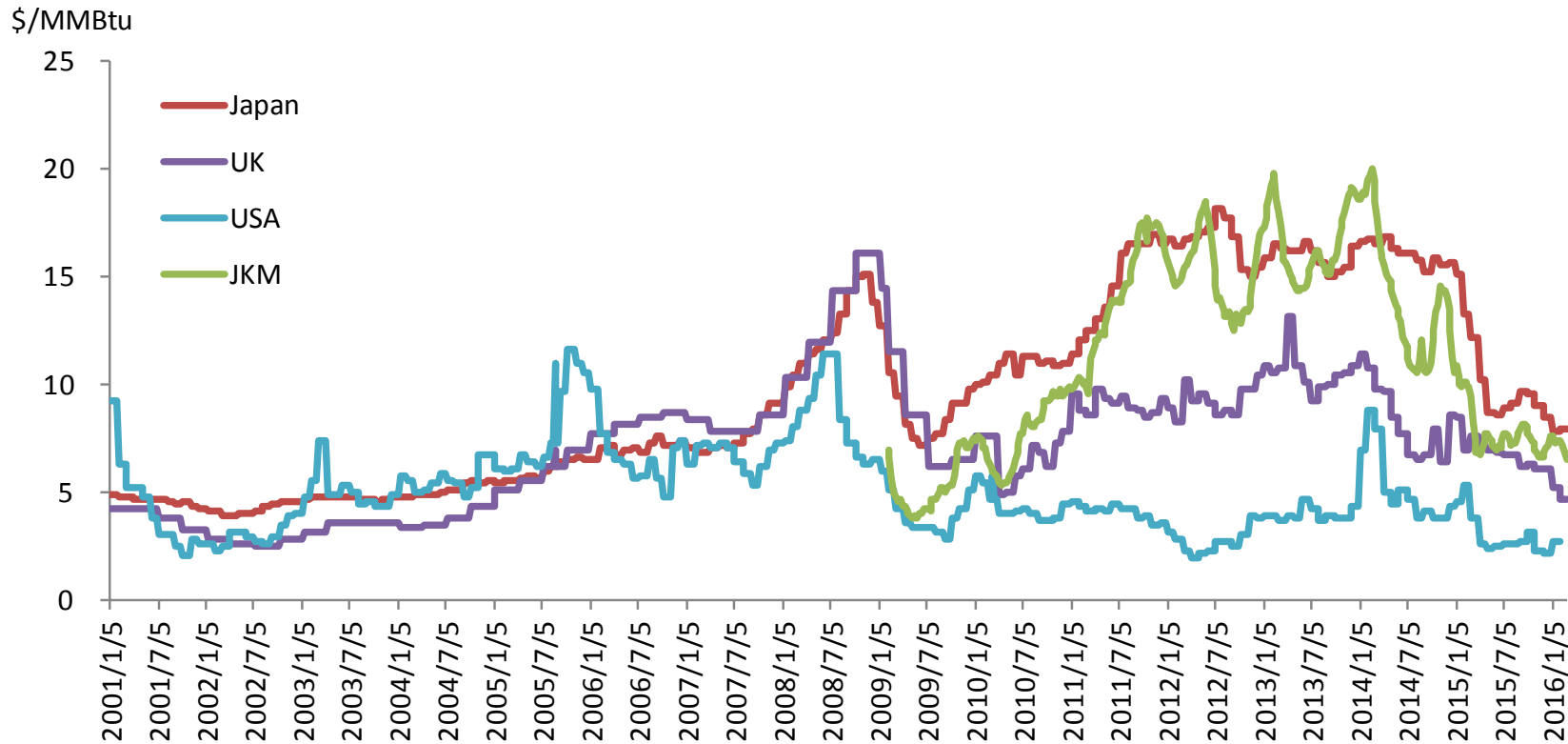
LNG balance outlook for Asia



Source: IEEJ

- LNG will be oversupplied at least till 2020
- Timely upstream investment is the key to meet the demand growth towards 2030

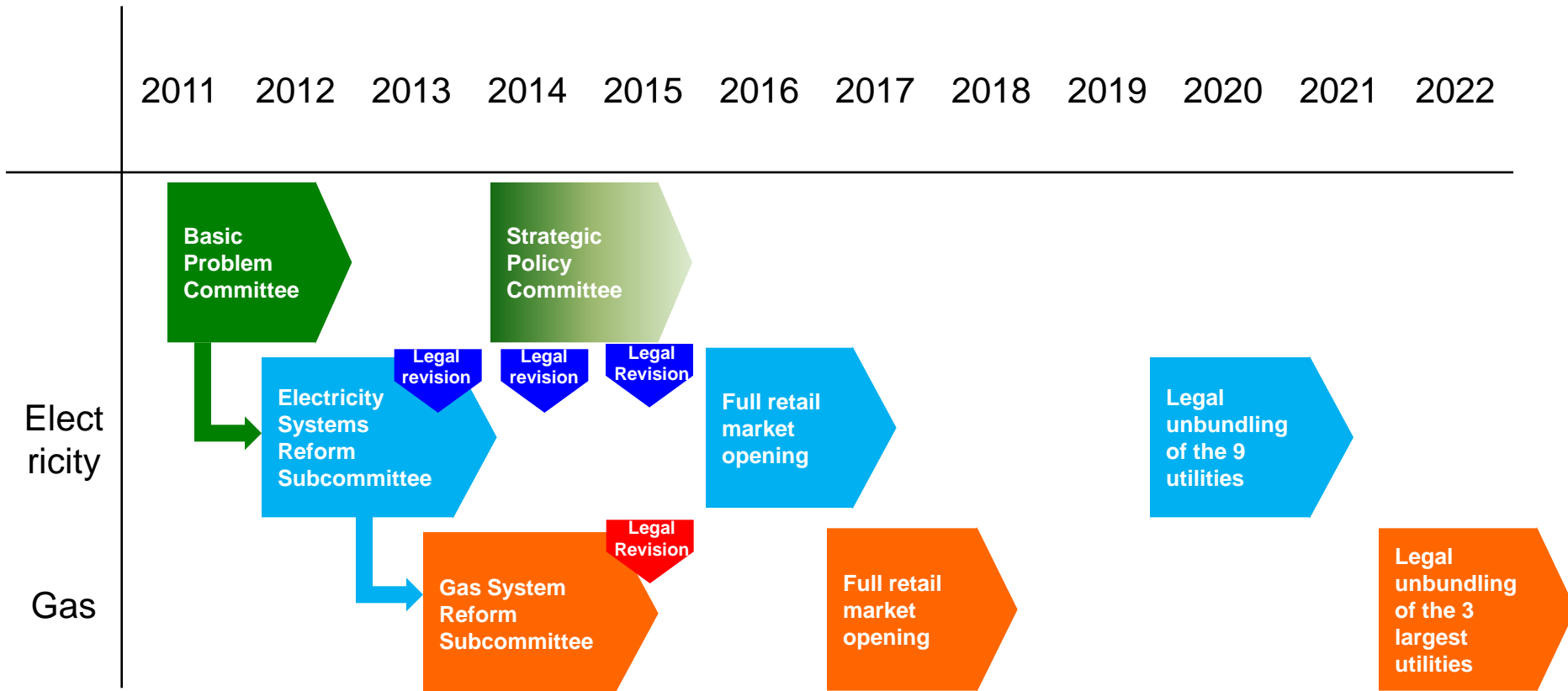
Natural gas import prices



Source: Trade Statistics, EIA, Energy Intelligence

- Asian Premium of LNG has diminished significantly, but can widen again if oil prices rise
- Asia needs more rationale LNG pricing to reflect market fundamentals accurately

Electricity and gas market liberalization in Japan



- Electricity and gas market will be fully open in 2016 and 2017, respectively
- 9 power utilities and 3 largest gas utilities will be legally unbundled in 2020 and 2022
- Flexible LNG supply is increasingly important for LNG importers in Japan

How do we develop Asian benchmark price(s)?

Domestic approach

Gas market liberalization

Domestic wholesale price (hub) development

Divergence of hub and oil-indexation prices

De-oil-indexation of import prices

International approach

Relaxation/Elimination of destination clause / Over supply

Spot market development

Divergence of spot LNG and oil-indexation prices

Spot LNG price(s) development

Asian benchmark price(s)

- International approach quicker to develop Asian benchmark price(s) of natural gas
- Drastic demand/supply changes will accelerate the process

LNG trading hub initiatives in Japan



Contract specifications

Commodity	LNG DES Japan
Price quotations	U.S. dollars and cents per MMBtu
Heating value	9,000-12,000kcal/m ³
Contract unit	250,000MMBtu (abt. 5,000t) or 50,000MMBtu (abt. 1,000t)
Contracting month	Monthly forward contracts up to 12 months ahead
Price increment	\$0.01/MMBtu
Settlement price	RIM DES Japan

- JOE started non-deliverable forward in December 2013
- First trade in July 2015
- Lack of physical market liquidity is a challenge