

Gas Markets in 2015: Outlook and Challenges

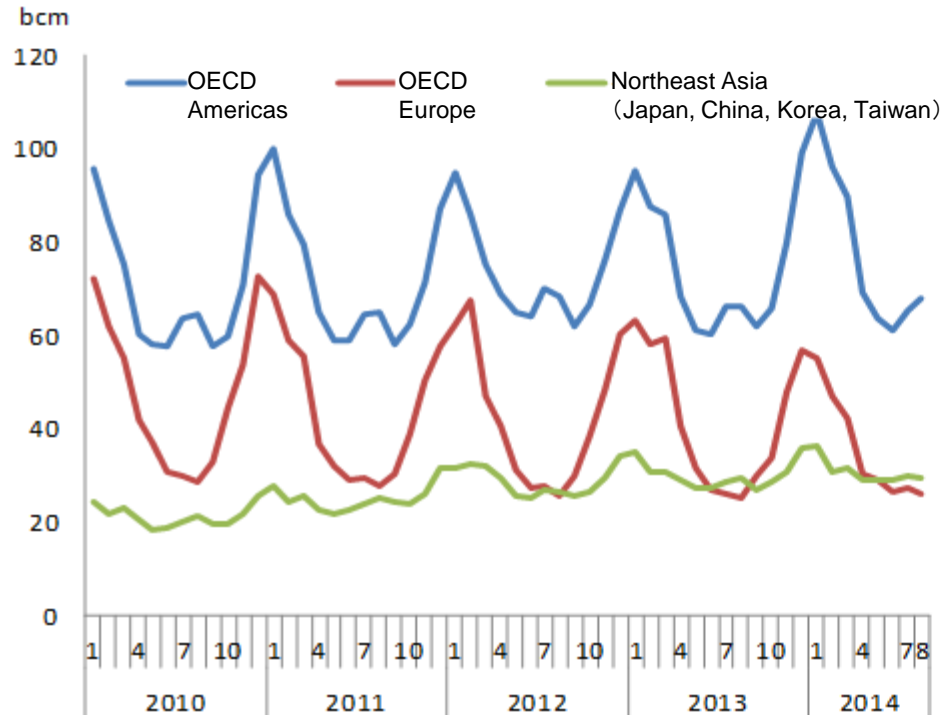
December 19, 2014

Tetsuo Morikawa

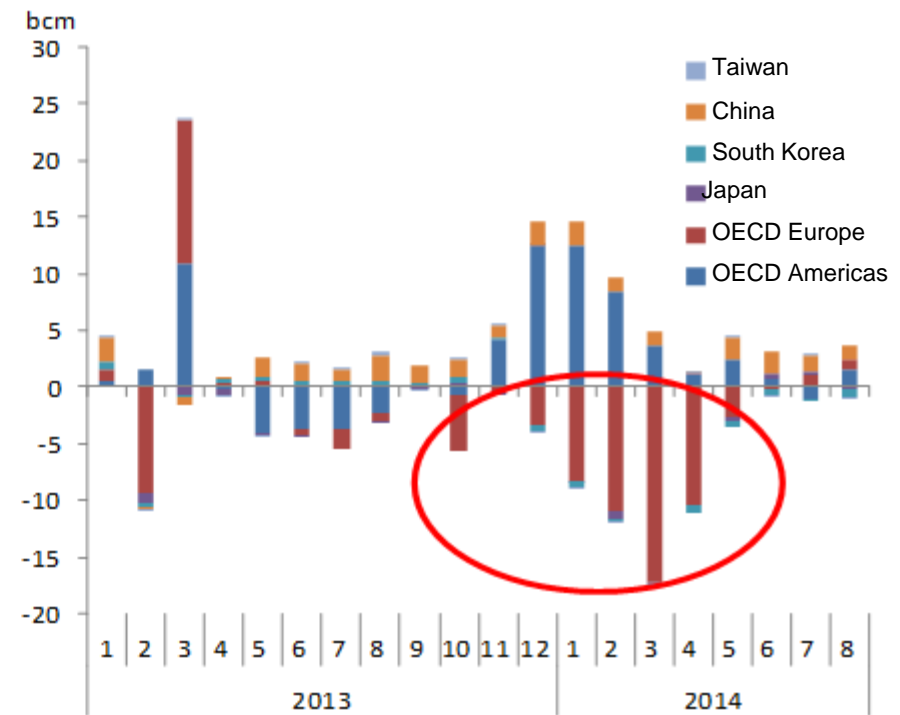
The Institute of Energy Economics, Japan

Natural Gas Demand in Major Regions

Natural Gas Demand in Major Regions



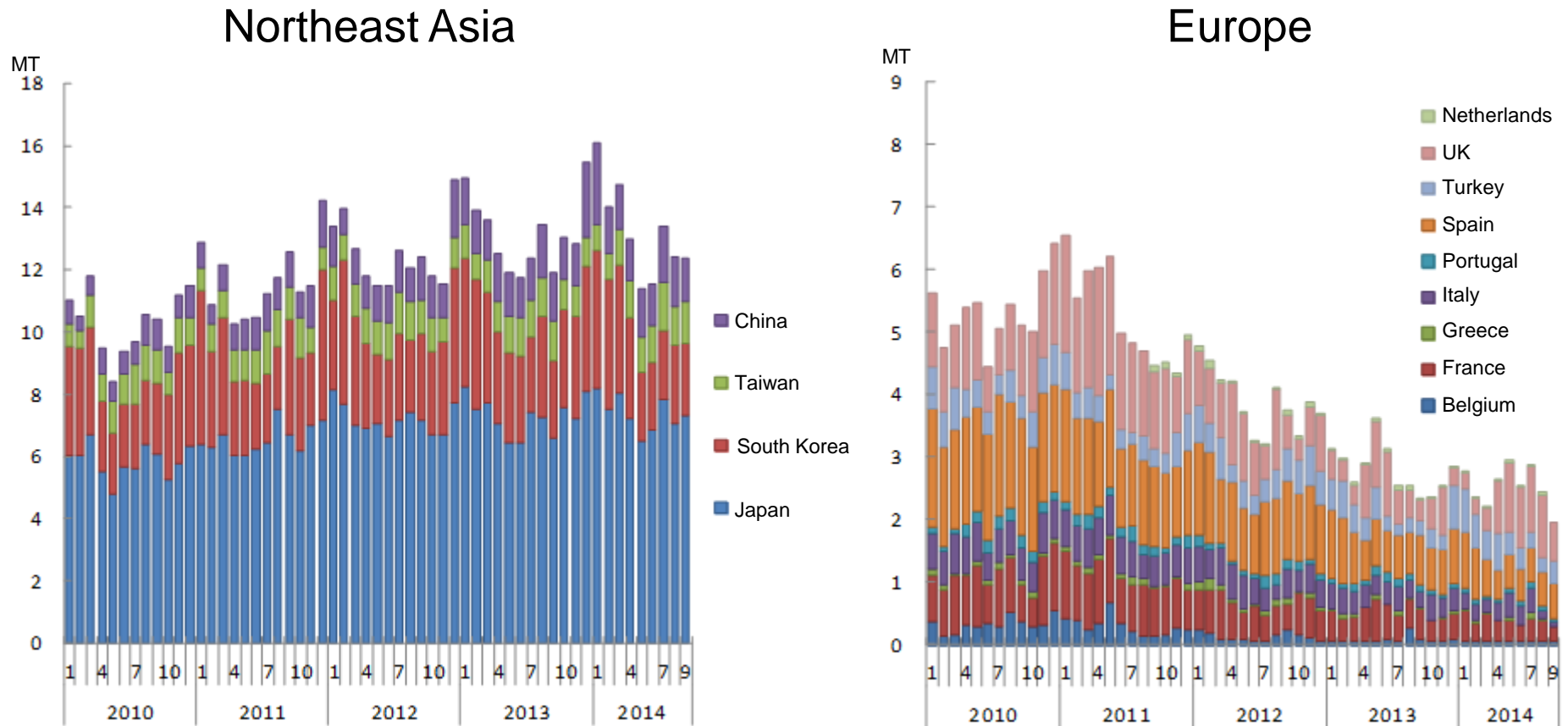
Year-on-year Changes



(Sources) IEA; China OGP; Bureau of Energy, Ministry of Economic Affairs, Taiwan

- Natural gas demand in January-August 2014:
 OECD Americas 620 Bcm (up 29 Bcm or 3% year on year)
 OECD Europe 283 Bcm (down 48 Bcm or 9%)
 Northeast Asia 360 Bcm (up 15 Bcm or 2%)
- Demand collapse continued in Europe.

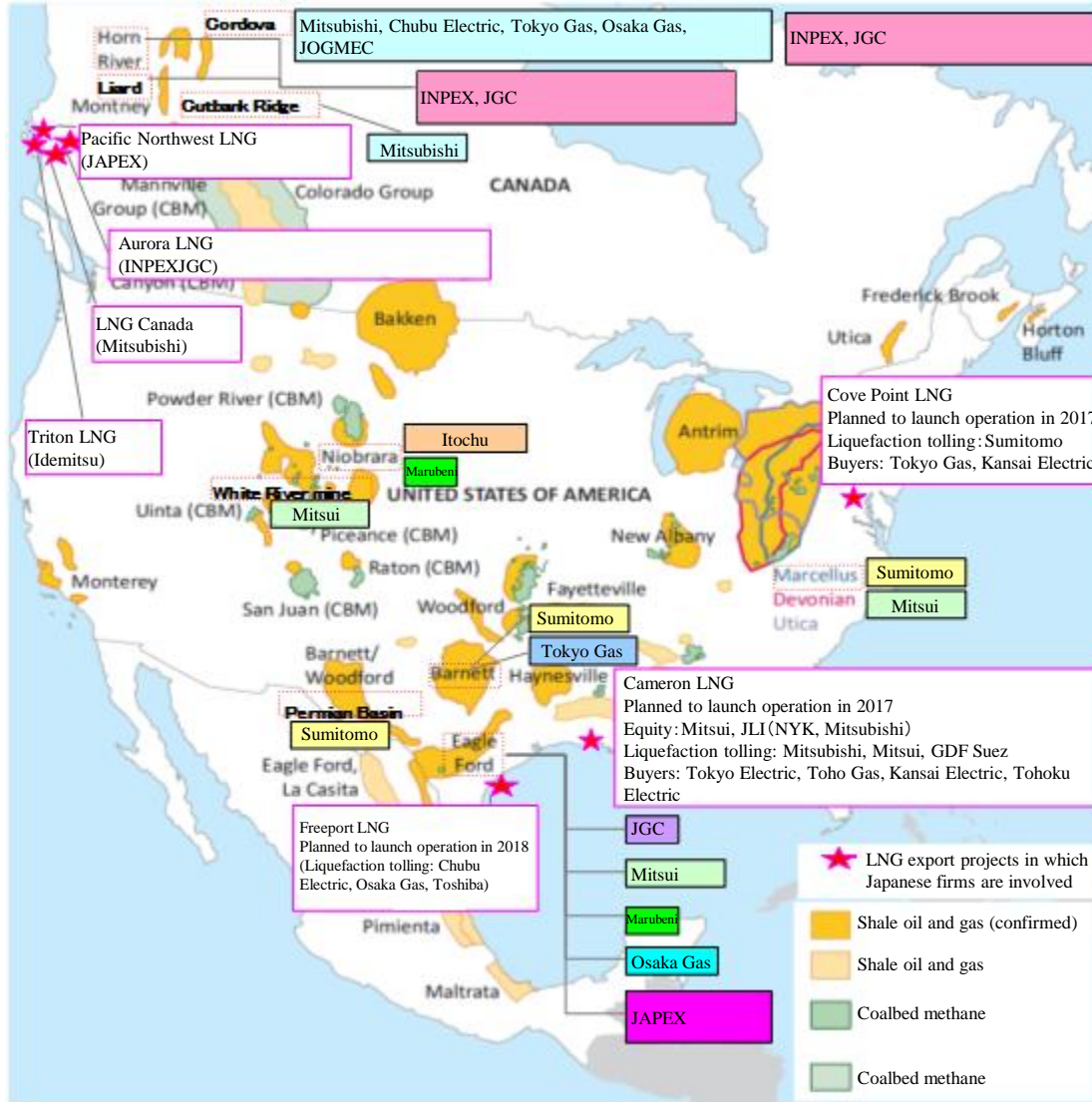
Monthly LNG Imports in Northeast and Europe



(Sources) Customs statistics in each country, IEA

- LNG imports in January-September 2014: 118.92 million tonnes in Northeast Asia (up 2.74 MT year on year), 22.83 MT in Europe (down 3.07 MT)
- LNG imports in Europe remained slack as LNG's price competitiveness declined.

LNG Export Projects in North America



- DOE has approved nine projects (about 800 million tons per year) for exports to non-FTA countries
- FERC has approved four (about 53 million tonnes per year) of them for LNG plant construction.
- DOE and FERC streamlined the authorization process of LNG export and plant construction applications.
- North American LNG export projects are important for diversifying supply sources and pricing formulas.

Europe and Russia

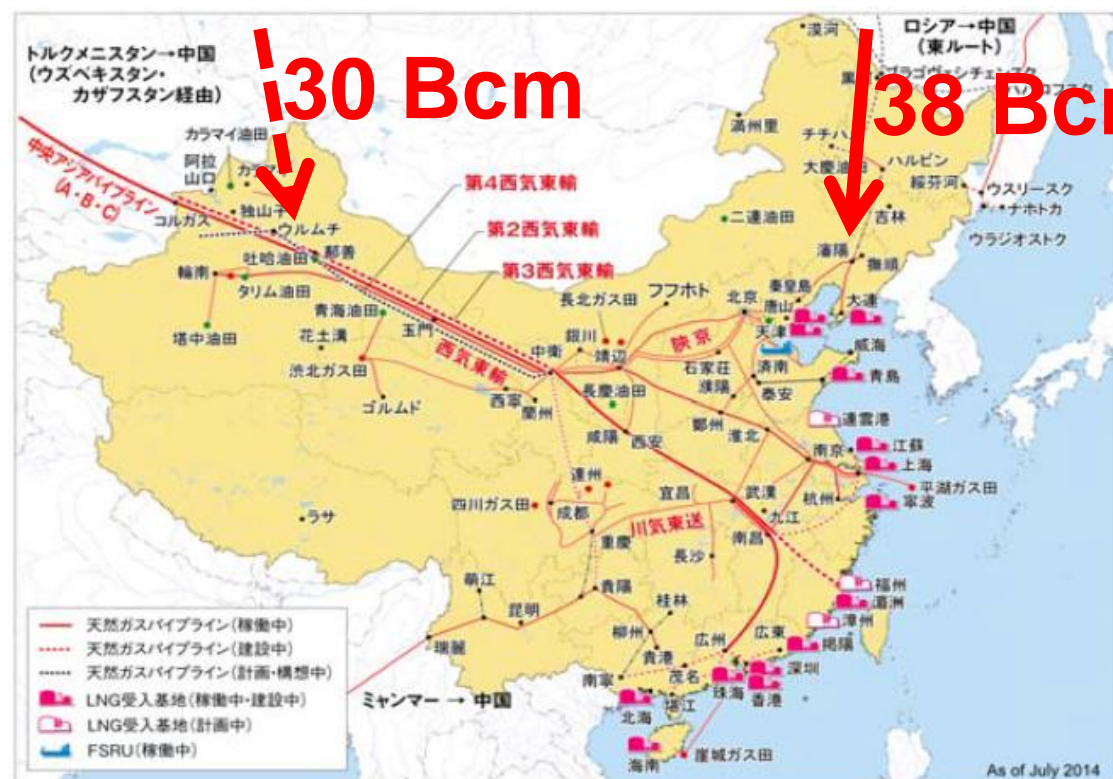


(Source) JOGMEC

- The EU and Russia had confronted each other over the third energy package and a revision to a pricing formula for Europe.
- Diplomatic relations deteriorated through the Ukraine turmoil.
- Russia resumed gas supply to Ukraine for the first time in a half year.
- Withdrawing South Stream project
 - ⇒ Supporting Russia's shift to Asia
 - ⇒ The EU is holding down gas demand and diversifying gas supply sources.

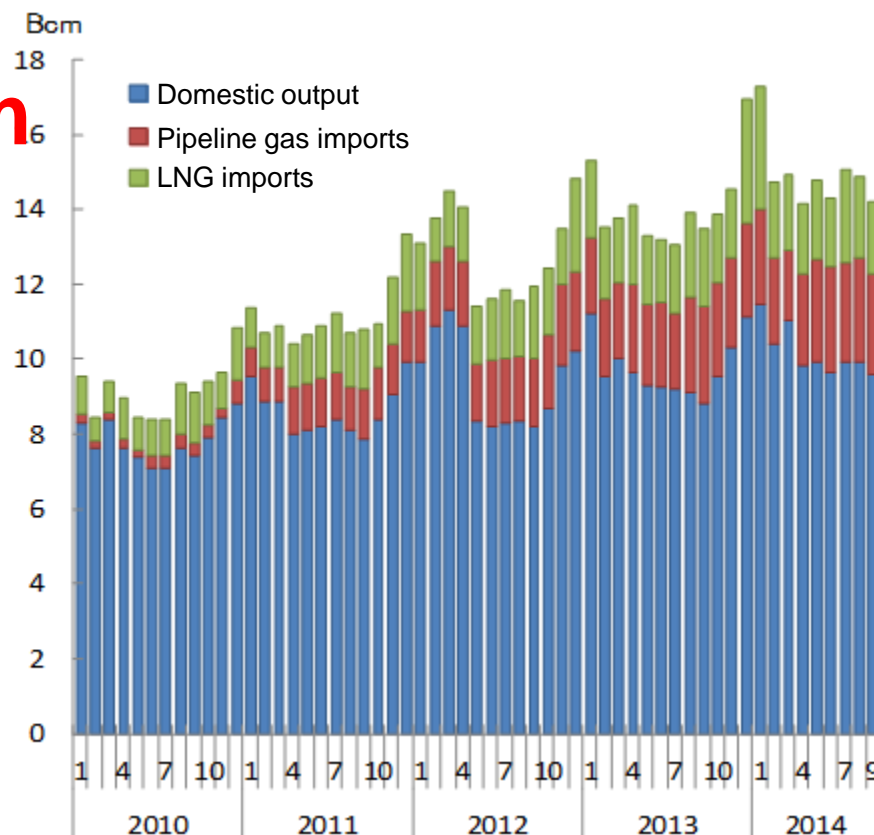
Natural Gas Supply and Demand in China

Gas infrastructure development



(Source) JOGMEC

Domestic production and imports

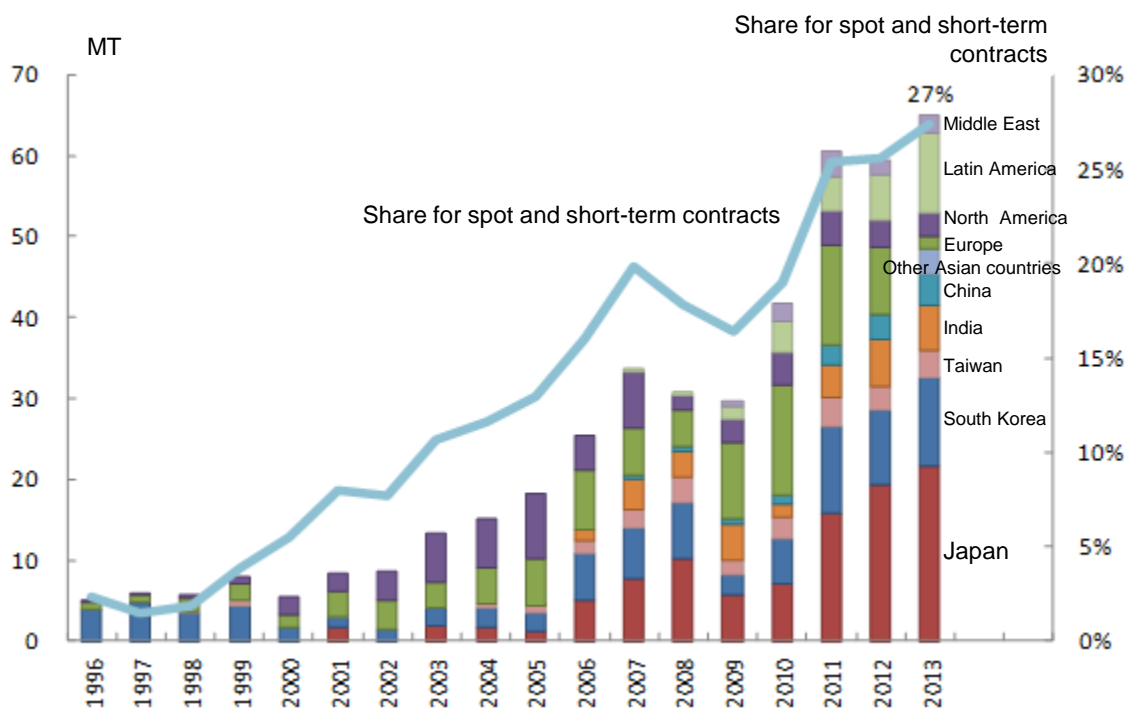


(Source) China OGP

- Demand has steadily increased, though with growth decelerating.
- China's conclusion of a pipeline gas import contract with Russia contributes to holding down demand for LNG imports.

Spot and Short-term LNG Trade

Spot and short-term LNG trade volume

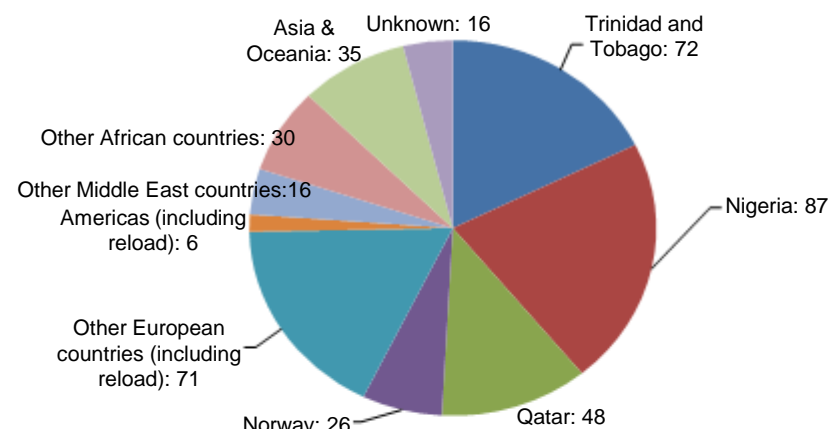


(Source) GIIGNL

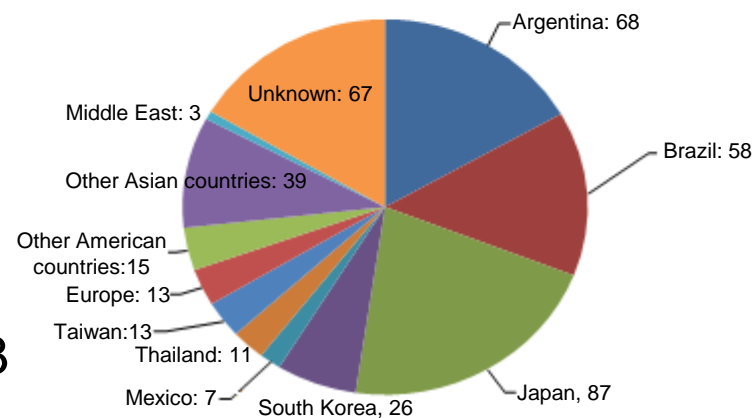
- 64.98 MT (of which Japan accounted for 33%) traded via spot and short-term contracts in 2013
- Japan's spot procurement in 2014 estimated at 87 cargoes (about 5.2 MT)

Spot LNG exports/imports (2014)

Exported cargoes

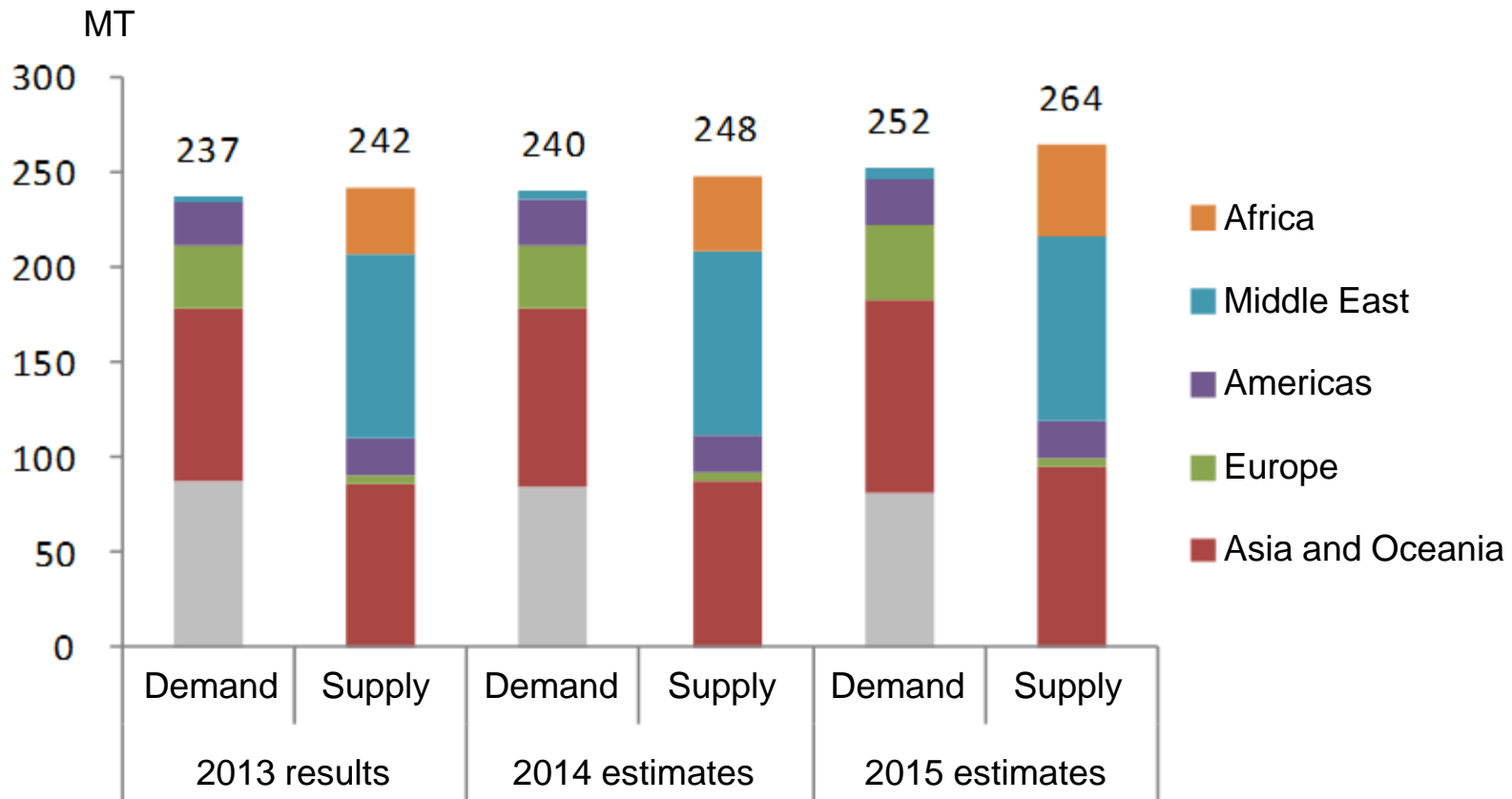


Imported cargoes



(Source) ICIS Heren

LNG Supply and Demand Outlook

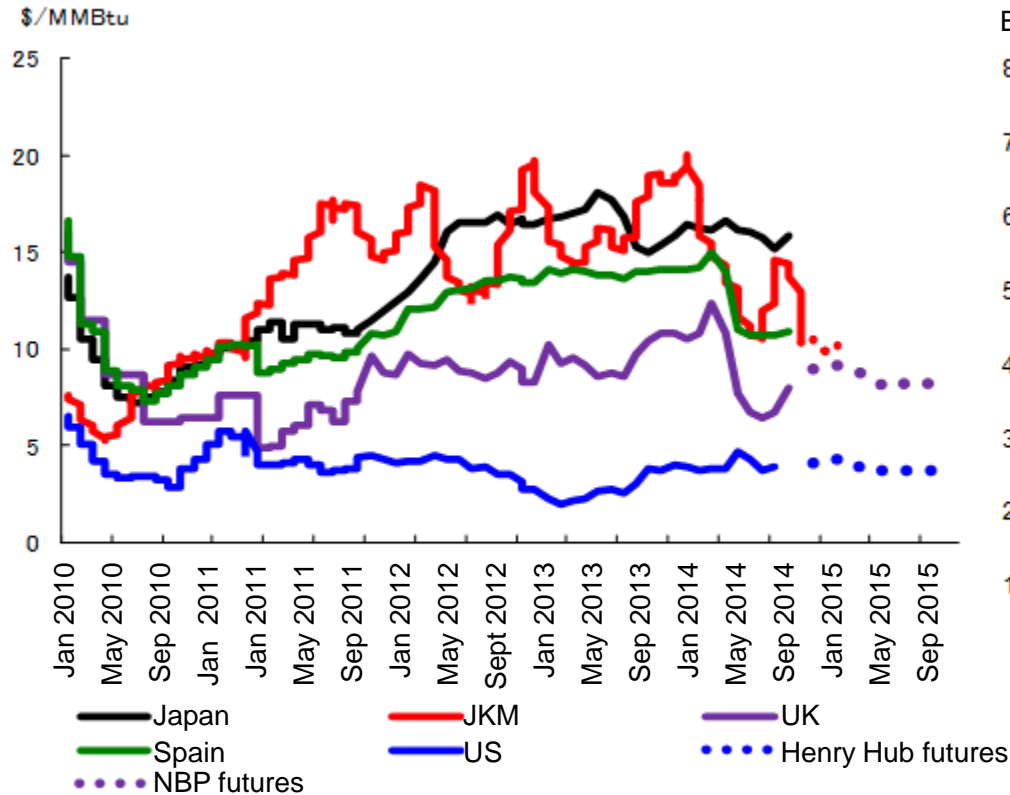


(Source) IEEJ

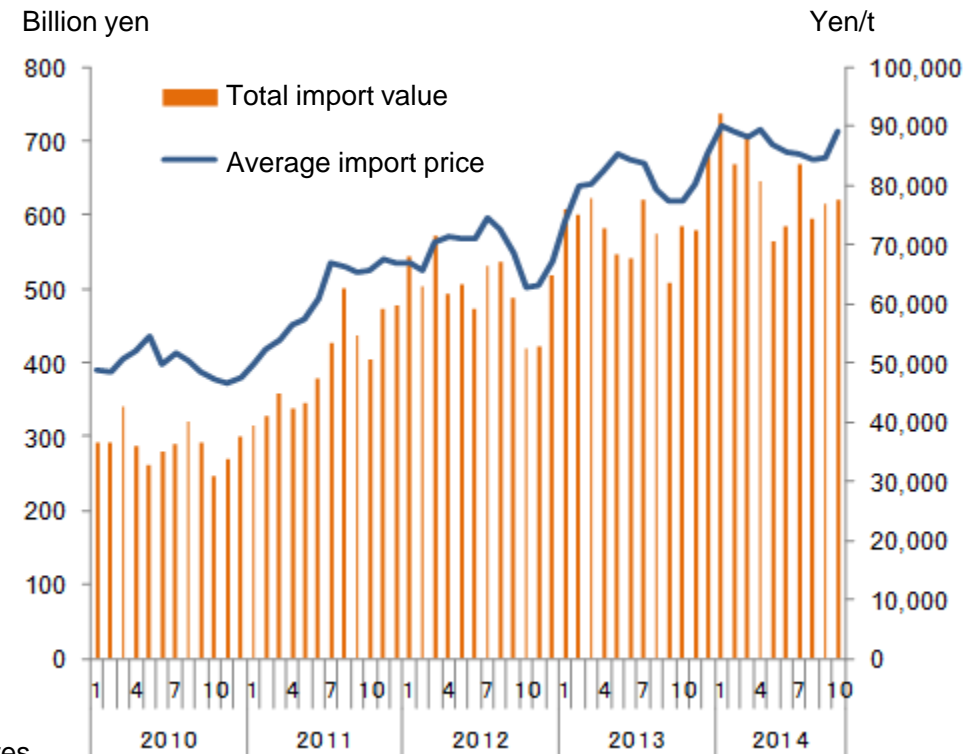
- Firm Asian demand and stably low Atlantic demand
- Despite Egypt's and Angola's suspension of exports, new project launches help expand capacity substantially.

Natural Gas Prices

Natural gas prices



Japan's LNG import volume and value



(Source) Energy Intelligence, EIA, Platts

(Source) Trade Statistics

- The import price for Japan remained in a \$15-16/MMBtu range in 2014, though with spot prices declining.
- LNG import value increased further due to the weakening yen.
- The import price in 2016 is forecast to fall to around \$10/MMBtu due to crude oil and spot price drops.

Pricing Formula Options

	Gas vs. gas competition Hybrid			Linked to other fuel prices	
	Asian domestic wholesale hubs	European and American domestic wholesale hubs (Henry Hub, NBP)	LNG hub (Spot LNG)	Oil	Electricity, coal
Advantages	<ul style="list-style-type: none"> • Reflecting domestic supply/demand conditions 	<ul style="list-style-type: none"> • Available • Low prices (at present) 	<ul style="list-style-type: none"> • Available 	<ul style="list-style-type: none"> • Easiest solution 	<ul style="list-style-type: none"> • Rationale for power generation
Disadvantages	<ul style="list-style-type: none"> • No hub exists • High volatility 	<ul style="list-style-type: none"> • High volatility • Asian supply and demand fail to be reflected 	<ul style="list-style-type: none"> • High volatility • Low liquidity (at present) 	<ul style="list-style-type: none"> • Declining rationality of oil indexation • Asian supply and demand fail to be reflected 	<ul style="list-style-type: none"> • Low liquidity of electricity market

- Price levels vs. pricing formulas
- Asian benchmark natural gas prices, based on wholesale prices in Asian LNG importing countries or on an Asian LNG hub, most desirable

Asian Benchmark Price Formation

Domestic approach (wholesale hub)

Gas market deregulation

Domestic wholesale hub price formation

Deviation between domestic wholesale hub and import prices

Ending link to oil prices

International approach (spot LNG)

Relaxation of destination clauses

Spot LNG market development

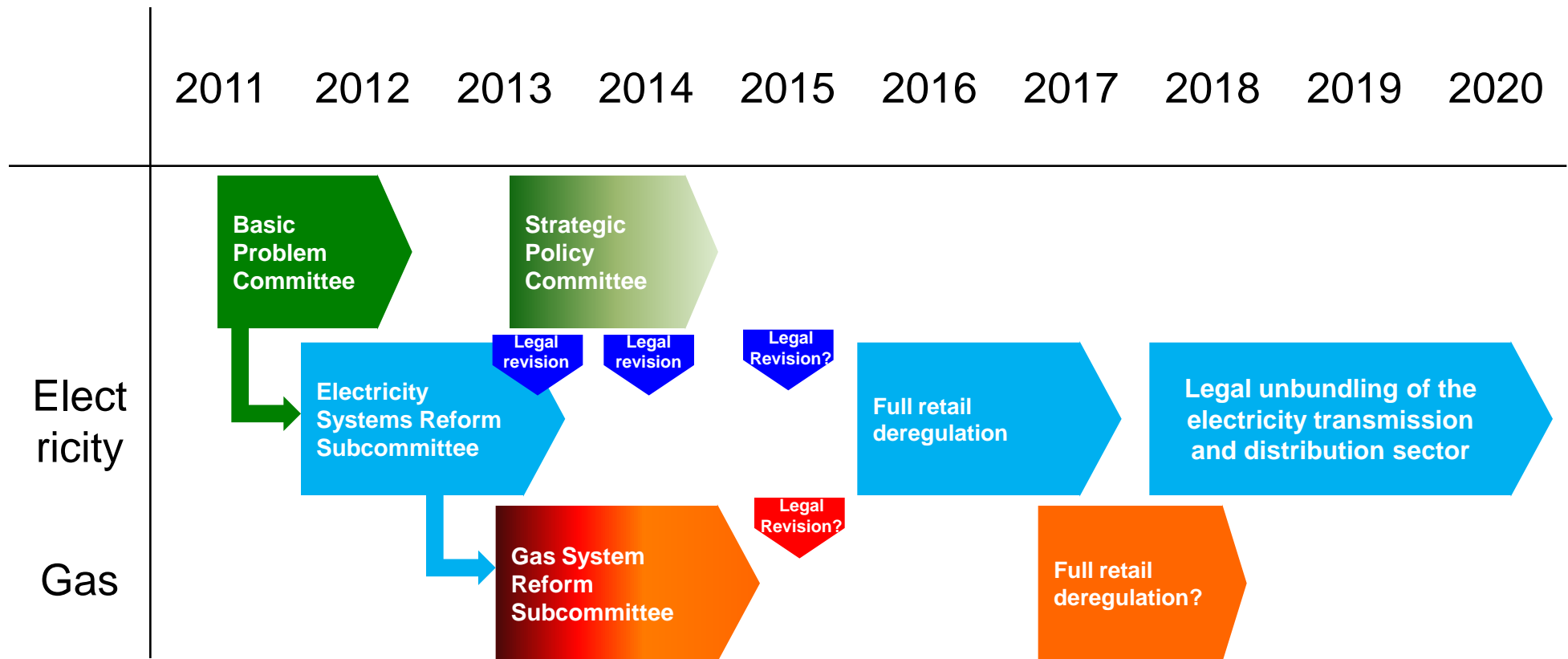
Deviation between spot and oil-linked prices

Increasing influences of spot LNG prices

Asian benchmark price formation

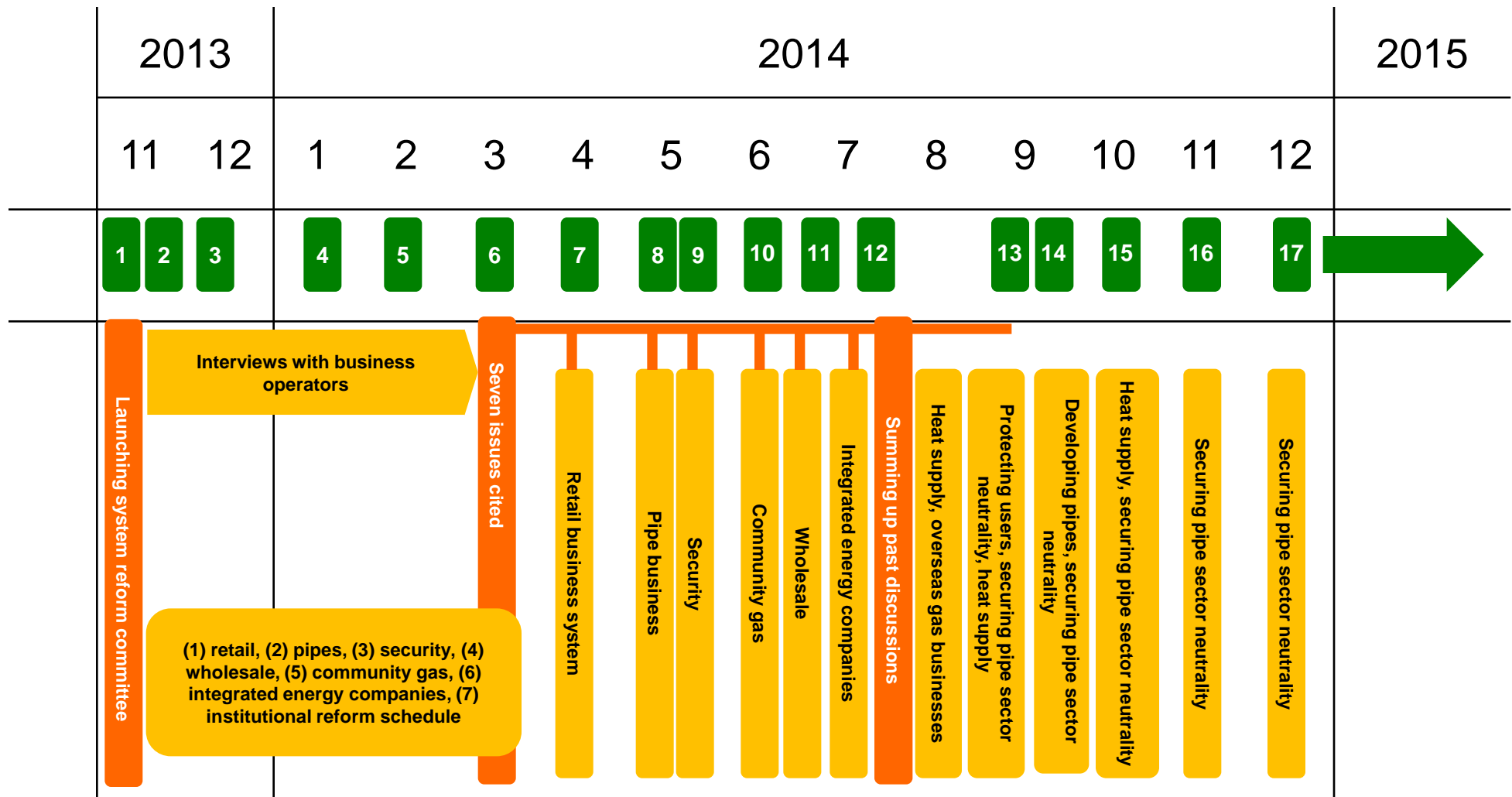
- The international approach is easier for forming an Asian benchmark price.
- The benchmark price formation will accelerate in the event of substantial, rapid supply/demand changes.

Electricity and Gas Systems Reform



- Electricity system reform has triggered gas system reform.
- Differences between electricity and gas systems: (1) underdevelopment of gas infrastructure, (2) abundant gas companies, (3) competition with other energy sources
- Objectives of gas system reform: (1) creating new services and businesses, (2) invigorating competition to hold down gas prices, (3) developing gas supply infrastructure, (4) protecting consumers' interests and securing safety

Gas System Reform



- Discussions have been underway on seven issues. Present discussions cover how to secure the neutrality of the pipe sector through the unbundling of business operators and the relaxation of requirements for third parties' access to gas facilities.

Gas System Reform

Issues		Reform measures
Retail market participation		Implementing full deregulation
Business operator categories		Integrating categories into two – transporters and retailers
Retail prices		Abolishing price regulations after a transitional measure (coexistence of regulated and deregulated prices)
Transportation	Unbundling	Legal unbundling or accounting-based unbundling plus behavior regulation. Only the three largest companies will be subjected to stricter unbundling.
	TPA	Easing TPA conditions. Regulated TPA to LNG terminals.
Safety		Incumbents (new pipe business operators) and new entrants (new retailers) will share roles.
Infrastructure development		Sharing demand forecasts, preferential tariff, power generation demand uptake, deregulating pipeline construction requirements
Heat supply		Deregulating prices and new market participation

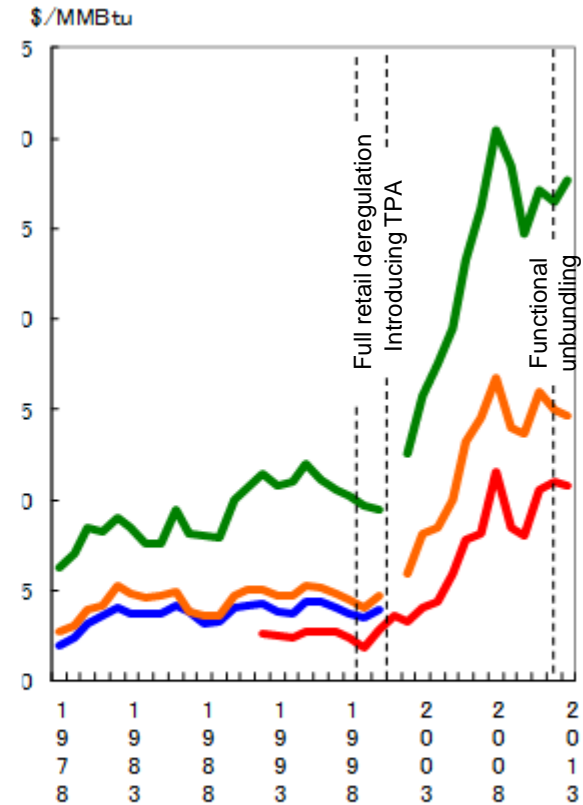
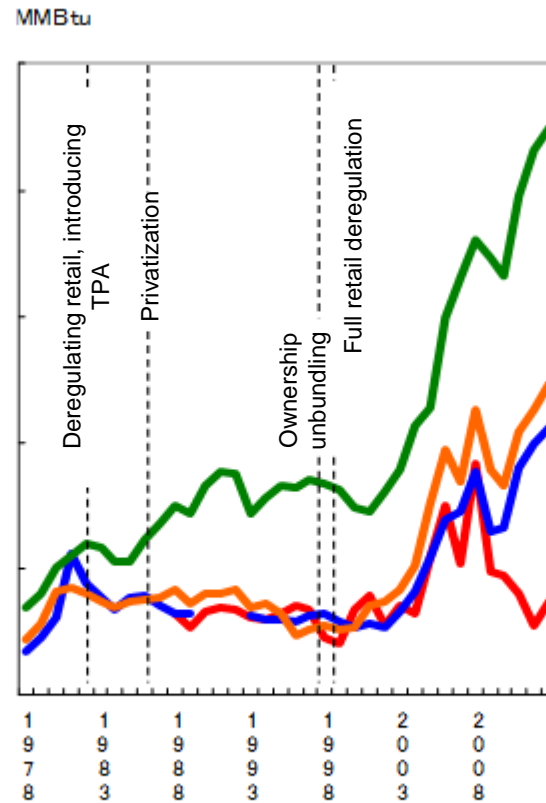
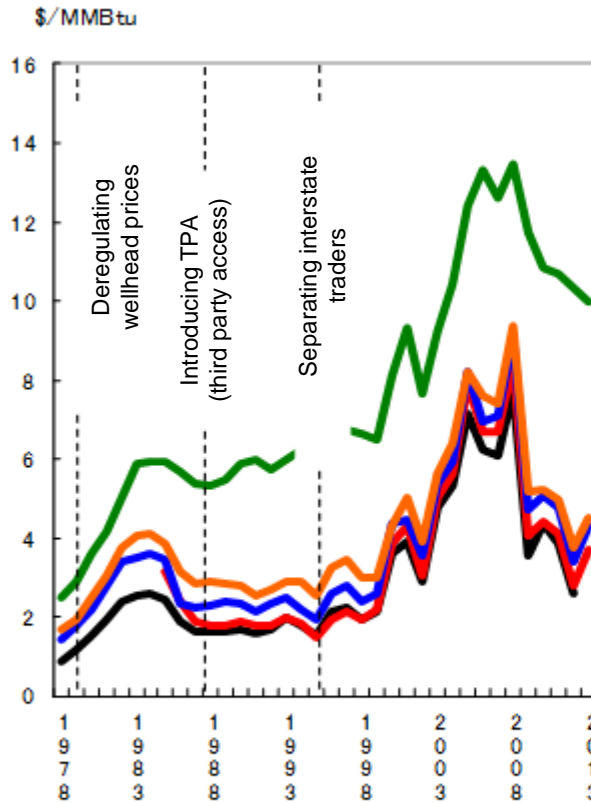
- Can these measures achieve the system reform objectives?

Gas System Reform

US

UK

Germany



— Wellhead price — Import price — Power generation gas price
— Industrial gas price — Residential gas price

— Pipeline gas import price — Power generation gas price
— Industrial gas price — Residential gas price

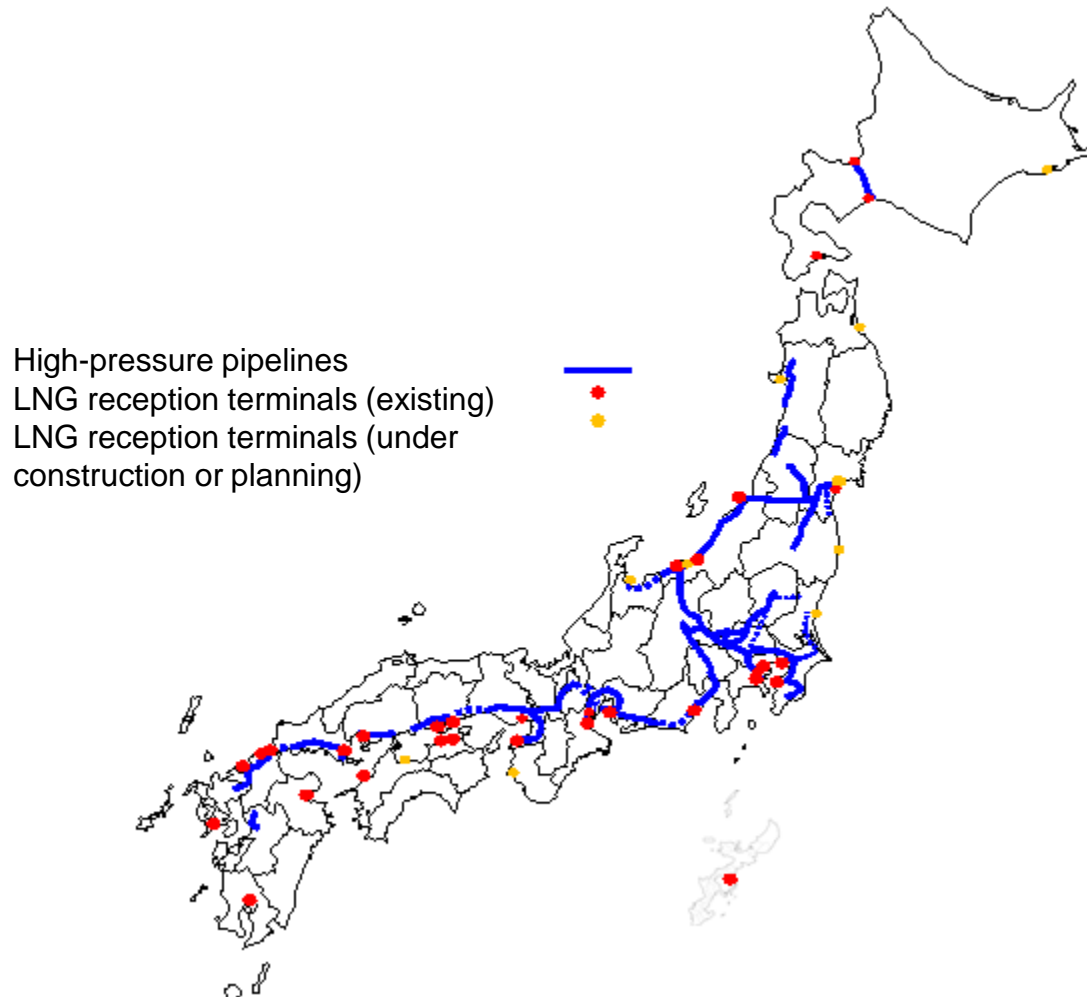
— Pipeline gas import price — Power generation gas price
— Industrial gas price — Residential gas price

(Sources) IEA, EIA

- Retail prices are linked closely to wellhead or import prices.
- No unified views have been given on whether deregulation can help cut retail prices.

Gas System Reform

Japan's gas infrastructure



- LNG terminals can undertake most of transportation pipelines' functions
- Many pipeline construction lacking profitability
- Pipeline gas imports will be effective for competitive procurement and domestic infrastructure development.

(Source) IEEJ

Conclusion

- Natural gas supply and demand
 - Global natural gas demand is expected to moderately expand. But European demand is projected to remain weak.
 - Sufficient supply capacity exists to meet LNG demand growth.
- Natural gas prices
 - Downward pressure on LNG import prices for Japan due to crude oil and spot LNG price drops.
 - The international approach is an easier way for the formation of an Asian benchmark price.
- Gas market liberalization
 - Correlations between liberalization and lower retail prices cannot be ascertained.
 - Can the gas system reform hold down retail prices or promote infrastructure development?