
Prospect and Challenges in the World and Asian LNG Market

LNG Producer Consumer Conference

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The Institute of Energy Economics Japan

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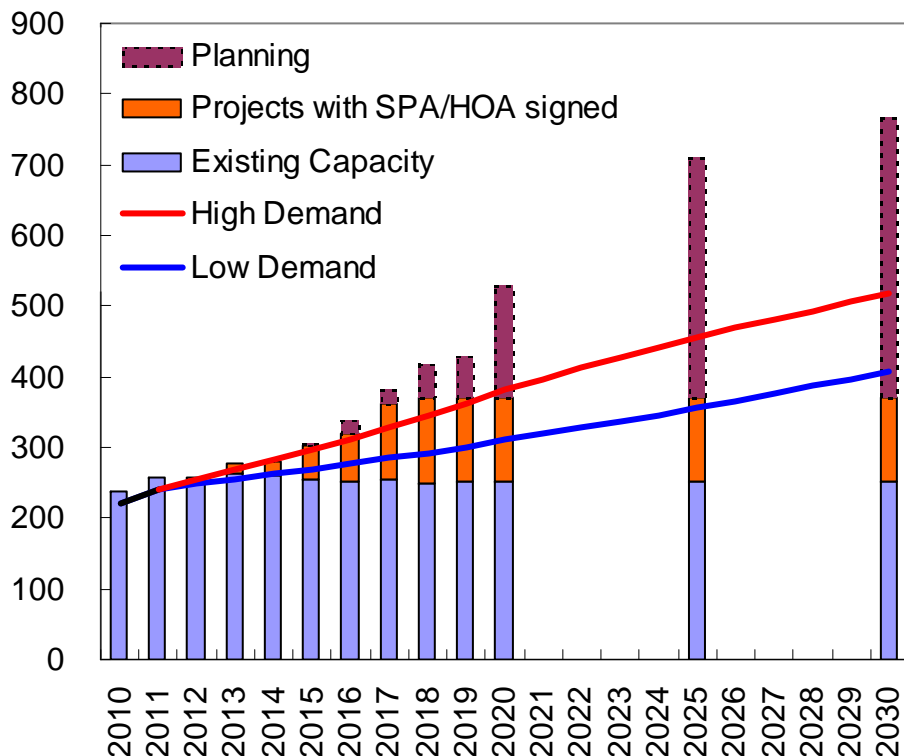
Summary

- LNG, an increasingly important energy option in Asia and the rest of the world
- But challenges remain for LNG to play an expected bigger role
 - Security of supply, security of demand, etc.
 - Especially in terms of competitiveness
- LNG in Japan after “March 11th”
 - Large increase in LNG use to replace lost nuclear energy
 - Higher LNG import prices due to crude oil price run-up
 - Leading to increasing import payments, outflow of Japan’s national wealth, rising costs for power generation
- For LNG consumers in Asia, security of supply both in terms of volume and price is important
 - Gas pricing issues, increasingly important for market players in Asia
- It is also very important to pursue sound development of LNG market for mutual benefit of LNG importers and exporters

LNG Outlook

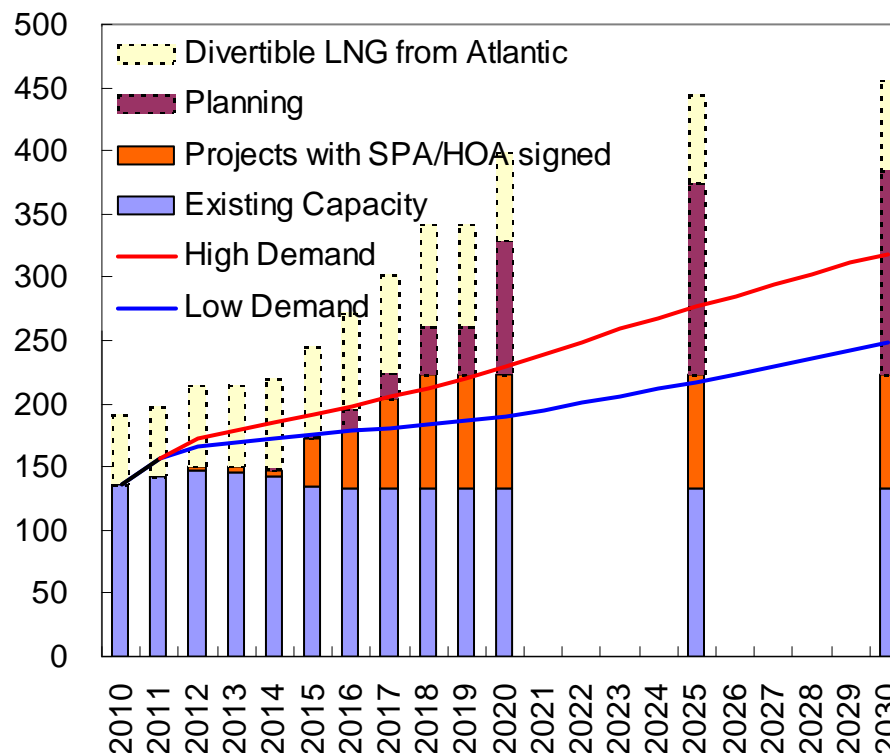
World

Million Tonnes



Asia and Middle East

Million Tonnes

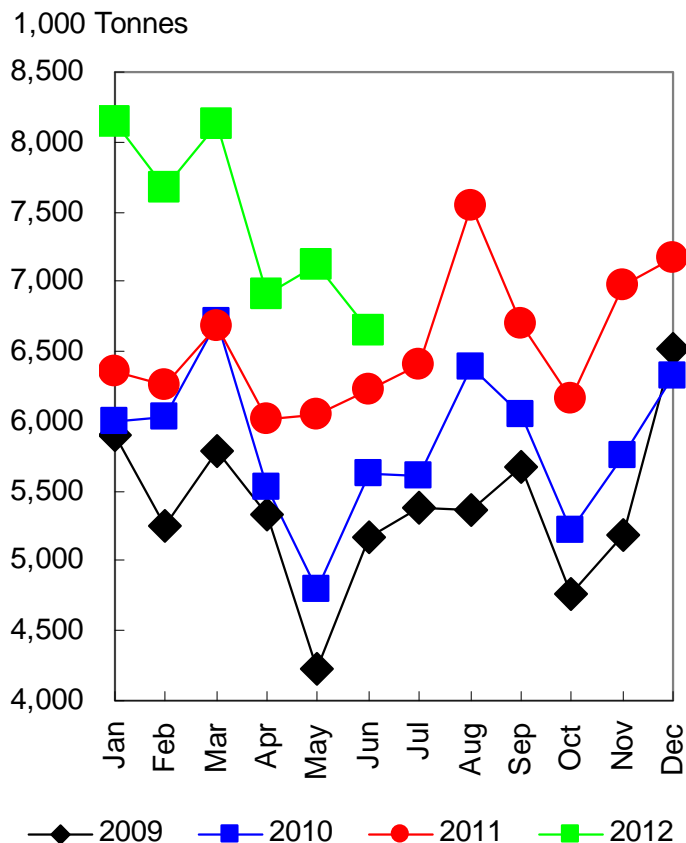


Source: IEEJ

- Ample supply potential, but timely investment is the key
- Divertible LNG from Atlantic to balance the Asian demand for short-term

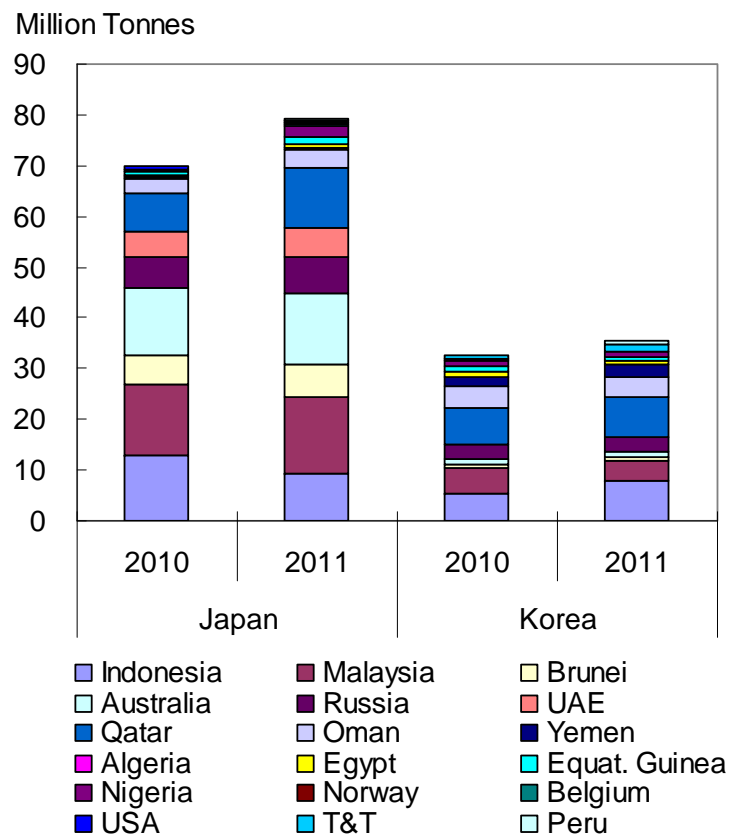
LNG imports by Japan and Korea

Japan's Monthly LNG Imports



Source: Ministry of Finance

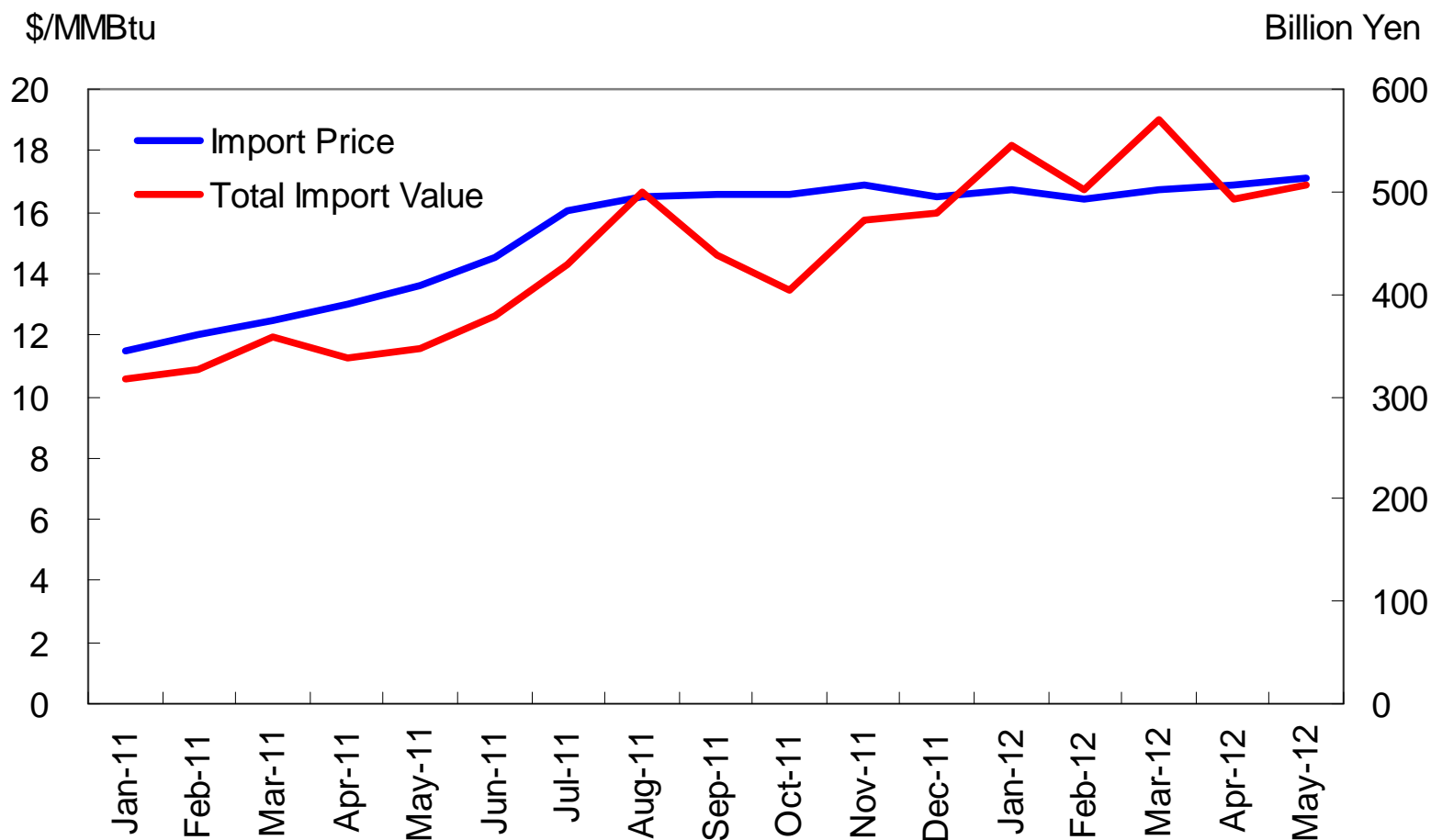
LNG Imports in 2010 and 2011 by Japan and Korea



Source: GIIGNL

- Japan and Korea imports surging, driven mainly by power generation in Japan and city gas use in Korea

Price surging and outflow of national wealth



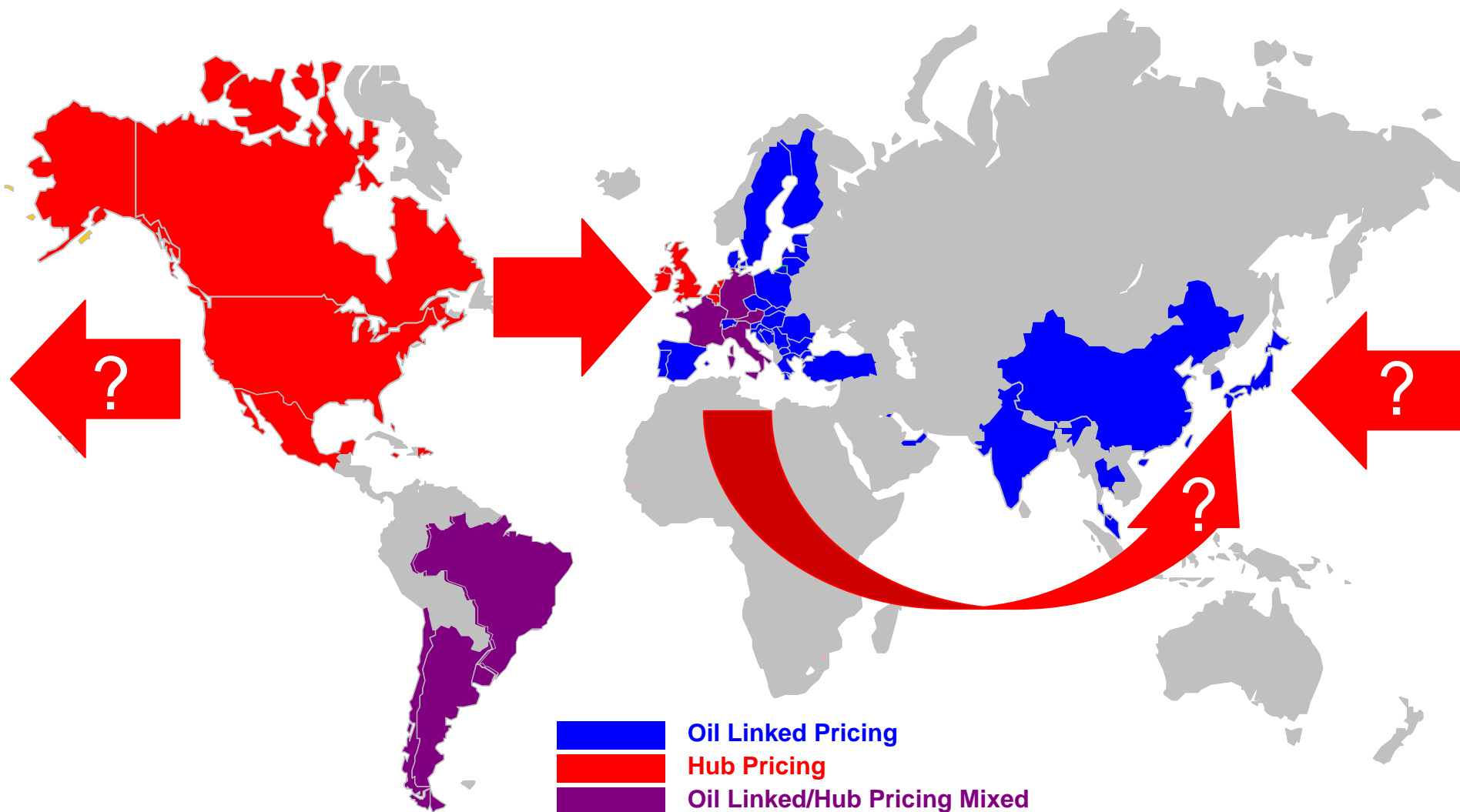
Source: Ministry of Finance

- Outflow of national wealth problematic as import quantity and price surge
- In FY 2011, Japan's LNG import bill increased by 1.8 trillion Yen (52%) from previous year, contributing to historic trade deficits of that year.

Measures for LNG supply security

- Diversification of supply
 - North America
 - Russia
 - Africa
- Diversification of transportation
 - Introducing pipeline gas
- Diversification of fuels for power generation
 - Coal
 - Nuclear, etc.
- Efficient use of LNG for power generation
 - MACC
 - Co-generation
- Emergency Response
- LNG Pricing

International Natural Gas Pricing



- Hub-based pricing penetrating into continental Europe, possibly into Asia

Rationale of oil-linked pricing questioned

- The rationale for oil-linked pricing existed at the time of its introduction (gas, competing with oil in power sector)
- However, the past market development made the rationale diminishing, as oil is already replaced by alternative energy in power sector and thus not competing with oil
- Periodical price reviews in oil-linked long-term contracts not quick enough to reflect demand/supply of gas
- Oil-linked pricing determines the level and volatility of gas price, not in relation to gas supply-demand situation
 - The pricing of oil itself is affected by various complicated factors (not only oil supply-demand fundamentals but also arguably financial factors)
- Thus, buyers of gas need to explore new ideas for gas pricing that can better reflect gas market fundamentals in pursuit of sound gas market development as well as gas security of supply

LNG Pricing Options for Asia

	Hub pricing		Spot pricing	Link with other fuels (Electricity, Coal)	Adjustment within oil-linked pricing
	Henry Hub, NBP	Hubs in Asia			
Advantages	<ul style="list-style-type: none"> • Already available • Lower prices (for now) 	<ul style="list-style-type: none"> • Possible to reflect regional market balance 	<ul style="list-style-type: none"> • Already available 	<ul style="list-style-type: none"> • Rational for power utilities 	<ul style="list-style-type: none"> • Possibly quickest solution
Disadvantages	<ul style="list-style-type: none"> • Higher volatility • Asia market balance not reflected 	<ul style="list-style-type: none"> • Not yet available • Higher volatility 	<ul style="list-style-type: none"> • Higher volatility • Limited liquidity (so far) 	<ul style="list-style-type: none"> • Irrational for gas utilities • Lack of power market liquidity 	<ul style="list-style-type: none"> • Rationality of oil-linked pricing • Gas market balance not reflected

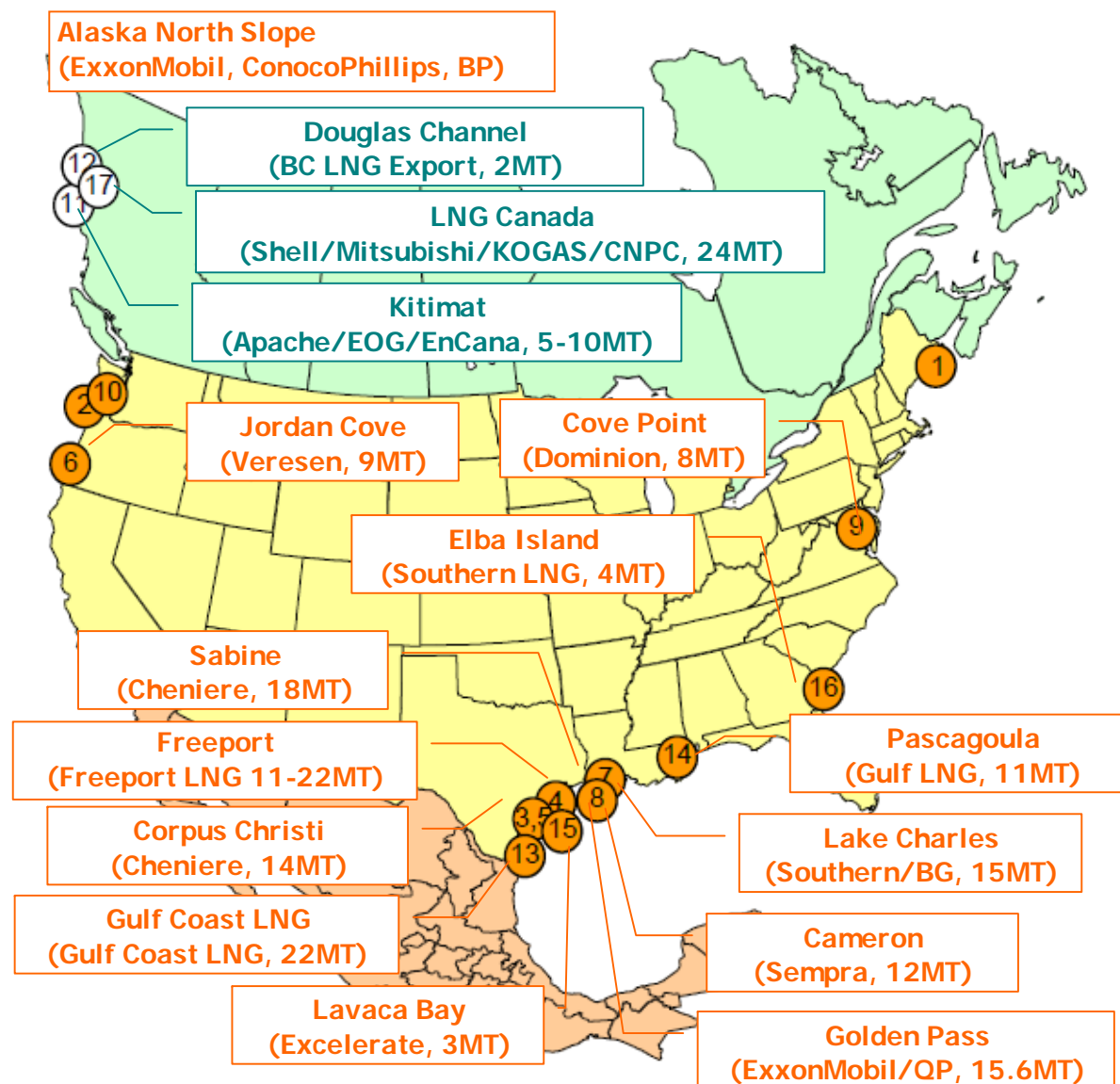
- Each pricing option has its advantages and disadvantages, thus there is no easy and perfect solution
- Based on market fundamentals, new pricing will be explored. And new pricings contribute to diversification of supply and risk
- Sustainable and rational pricing needs to emerge for mutual benefit between sellers and buyers

To find a better solution...

- In the long term, pricing mechanisms including hub-pricing based in Asia that reflect gas market fundamentals in Asia needs to be devised.
- In the medium term, Asian buyers will explore to increase LNG imports based on Henry Hub (HH) pricing, in order to diversify pricing mechanism as well as to alleviate the problems associated with oil-linked pricing
 - In case of Japan, LNG import volume linked with HH pricing may reach about 15 million tonnes at around 2020, accounting for about 20% of total LNG import
 - Japanese buyers will also be required to explore more rational pricing mechanism for the existing LNG contracts, taking full account of new market development including expected growth in LNG imports based on HH pricing
 - Possible suggestions include: introducing HH pricing element into oil-linked pricing in a form of weighted average of Japan Crude Cocktail (JCC) and HH pricing
 - $Y_{\text{LNG price}} = \alpha \cdot \text{JCC pricing} + \beta \cdot \text{HH pricing} \quad (\alpha + \beta = 1)$
- In any case, demand/supply fundamentals as the key
 - More supply sources: diversification of supply, including pipeline gas imports

Reference

LNG exports from North America



Source: FERC, Company Websites

- Export potential of over 100MT
- Asian market targeted due to price difference
- Export authorisation as an uncertainty

Gas exports from Central Asia and Russia



Source: IEA

- China's pipeline gas imports could exceed 100Bcm/y in the long-term
- Korea planning pipeline gas imports from Russia