

# BC Gas Exports and LNG Shipping: Unlocking the Export Potential



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# LNG Shipping Market Outlook

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FSO



SHUTTLE TANKER



FPSO



PRODUCT TANKER



CRUDE TANKER



LNG CARRIER

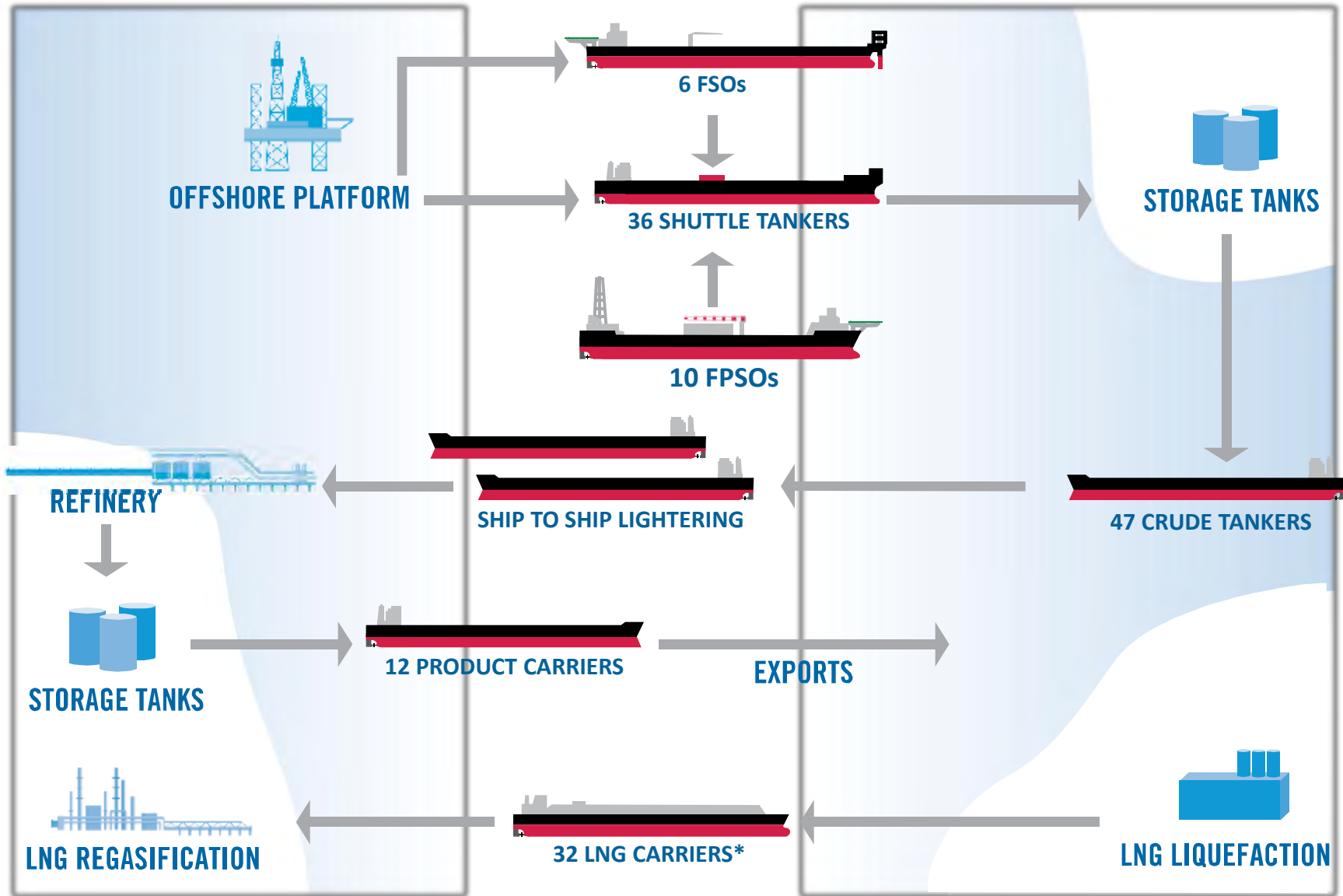
# SERVING OUR CUSTOMERS' MARINE ENERGY NEEDS



## Teekay Shipping

- A world leader in marine logistical solutions to the global oil and gas industry
- Founded 1973 by the late Torben Karlshoej
- Listed on the NYSE since 1995 (TK) and controls three NYSE-listed daughter subsidiaries (TOO, TGP and TNK)
- Transnational company with 6,600 employees
- 200 employees in the Vancouver, BC office
- \$11 billion of consolidated assets, approximately 175 vessels

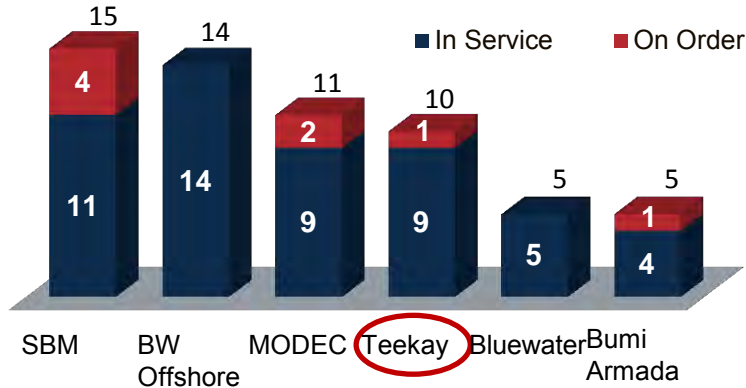
# Teekay Is In Every Part of its Customer's Value Chain



# Teekay is a Leader in Each of its Business Segments

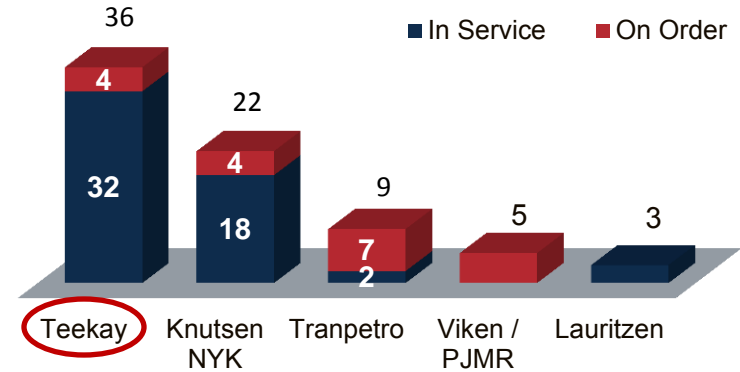
## Leading Position in Leased FPSOs

Leader in Harsh Weather Operations in the North Sea



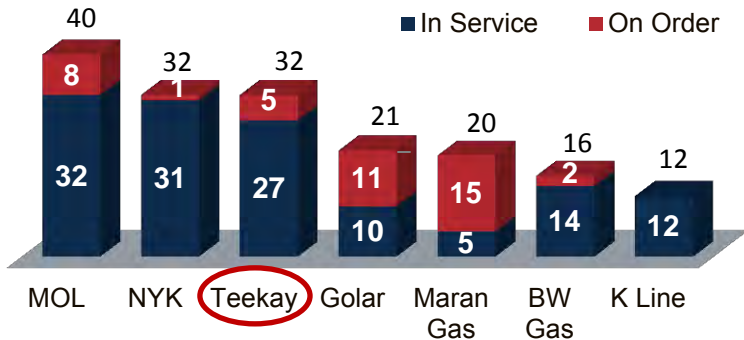
## Largest Operator of Shuttle Tankers

Controls More Than 50% of the World's Fleet



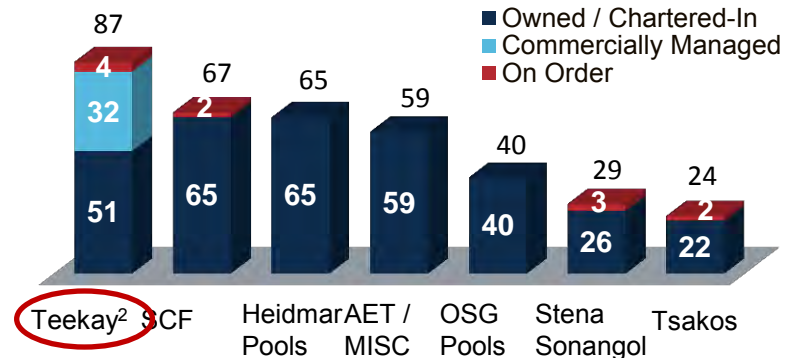
## Leading Position in LNG Carriers

Operates Third Largest Independent Fleet in the World



## Largest Operator of Mid-Size<sup>1</sup> Conventional Tankers

Transports Approximately 10% of the World's Seaborne Oil<sup>3</sup>



Note: Excludes state & oil company fleets.

Source: Clarkson Research Services, Platou, Company Websites, Industry Sources.

<sup>1</sup> Aframax and Suezmax tankers. Includes vessels under commercial management.

<sup>2</sup> Excludes one VLCC and six MR product tankers.

<sup>3</sup> Includes shuttle tankers.

# LNG Market



TEEKAY CORPORATION

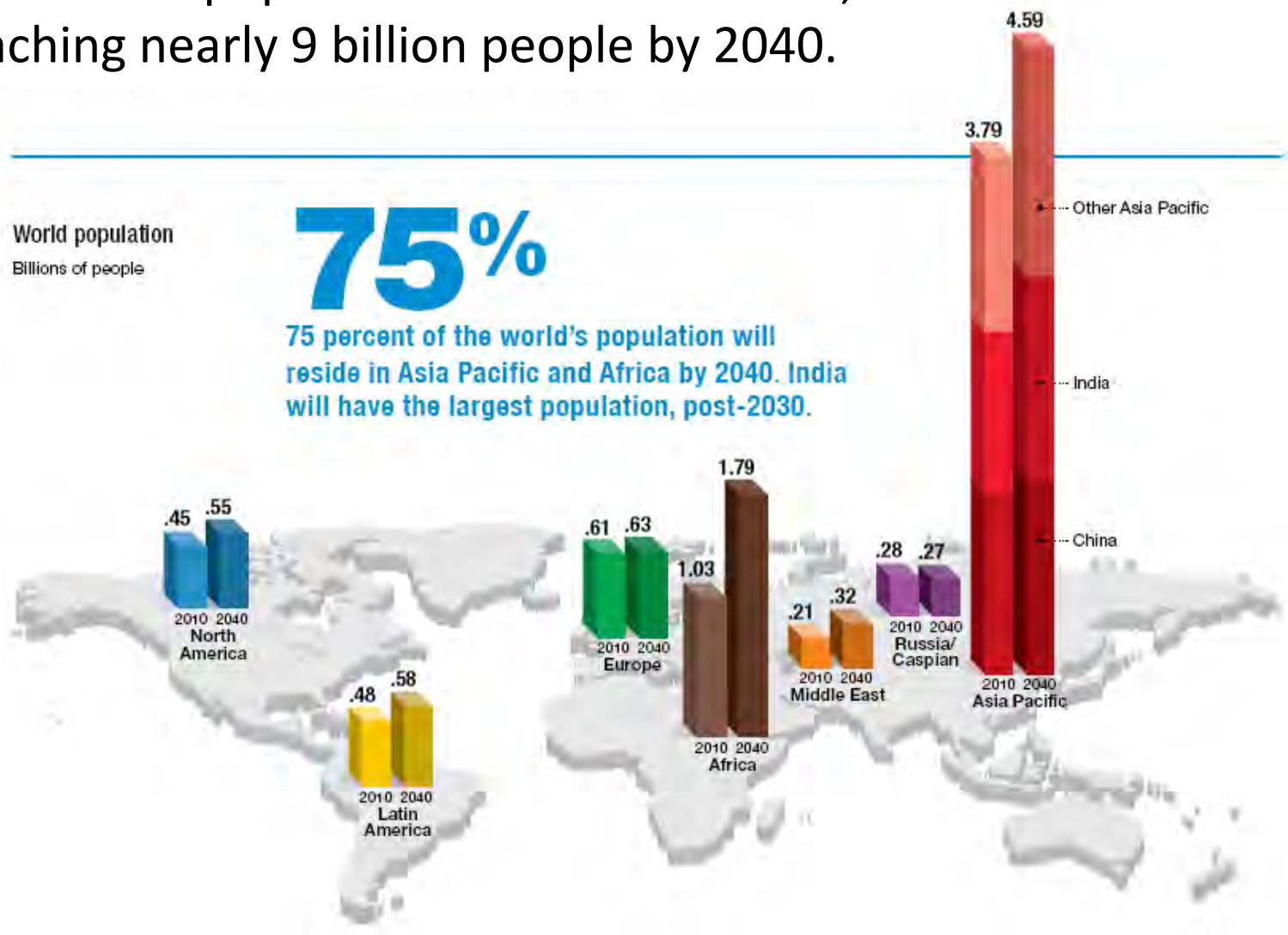
# The World is Growing

The world's population will increase 25%, reaching nearly 9 billion people by 2040.

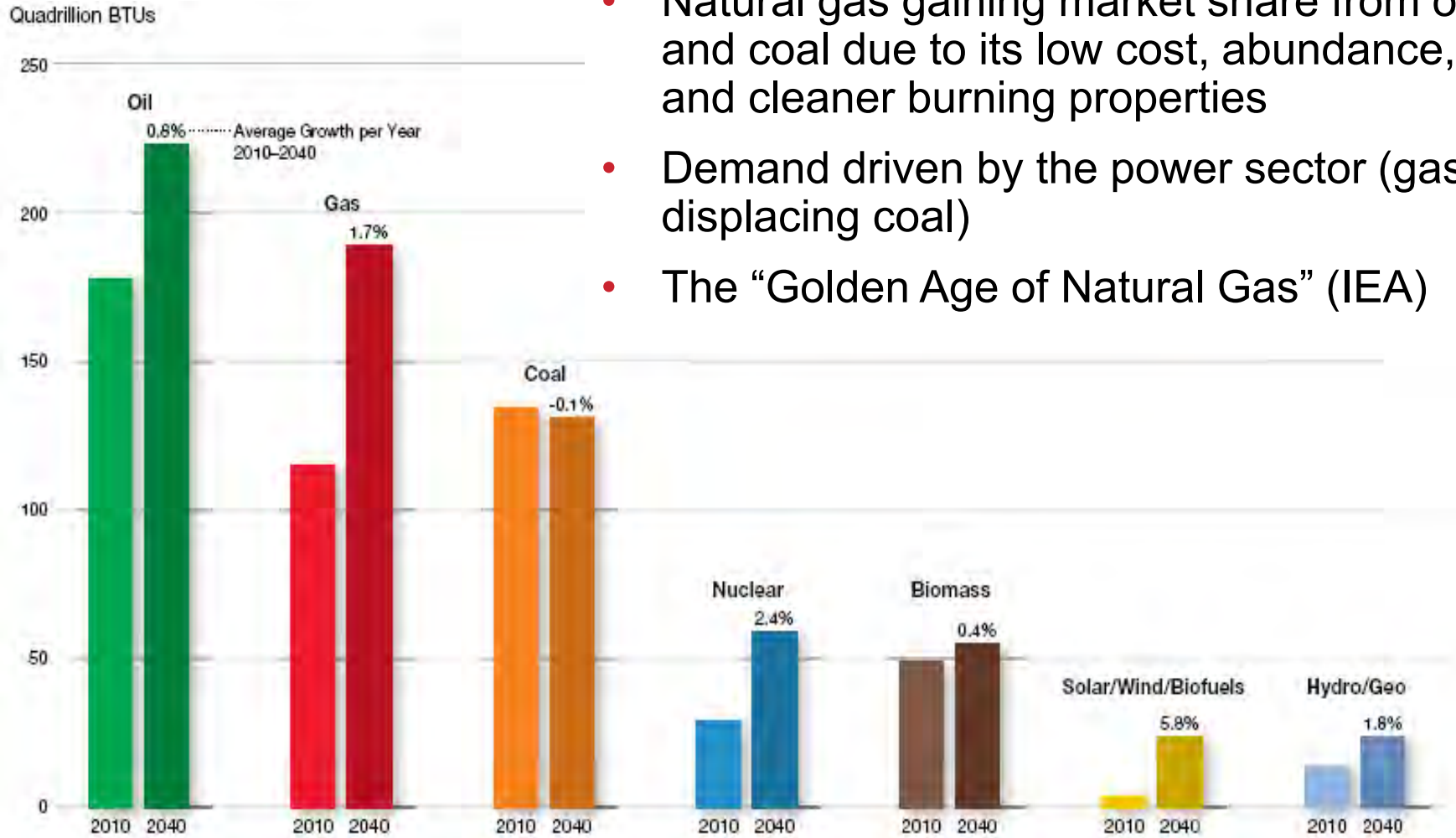
World population  
Billions of people

# 75%

75 percent of the world's population will reside in Asia Pacific and Africa by 2040. India will have the largest population, post-2030.



# And Needs More Energy

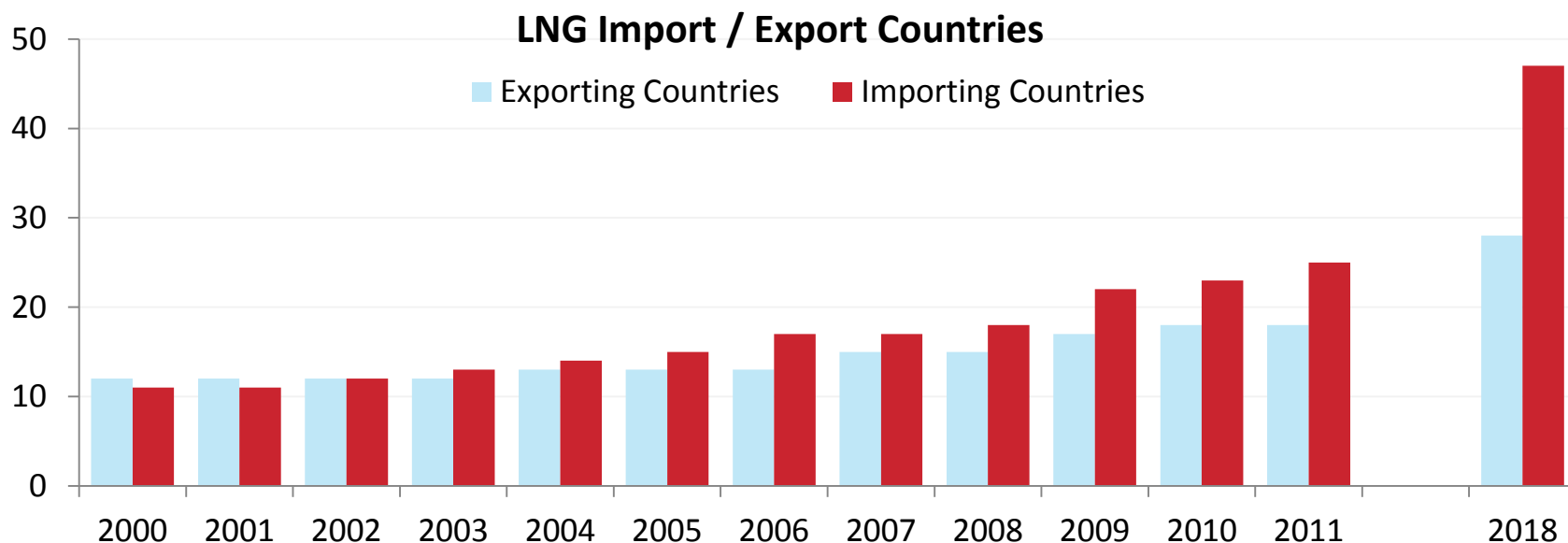


- Natural gas gaining market share from oil and coal due to its low cost, abundance, and cleaner burning properties
- Demand driven by the power sector (gas displacing coal)
- The “Golden Age of Natural Gas” (IEA)



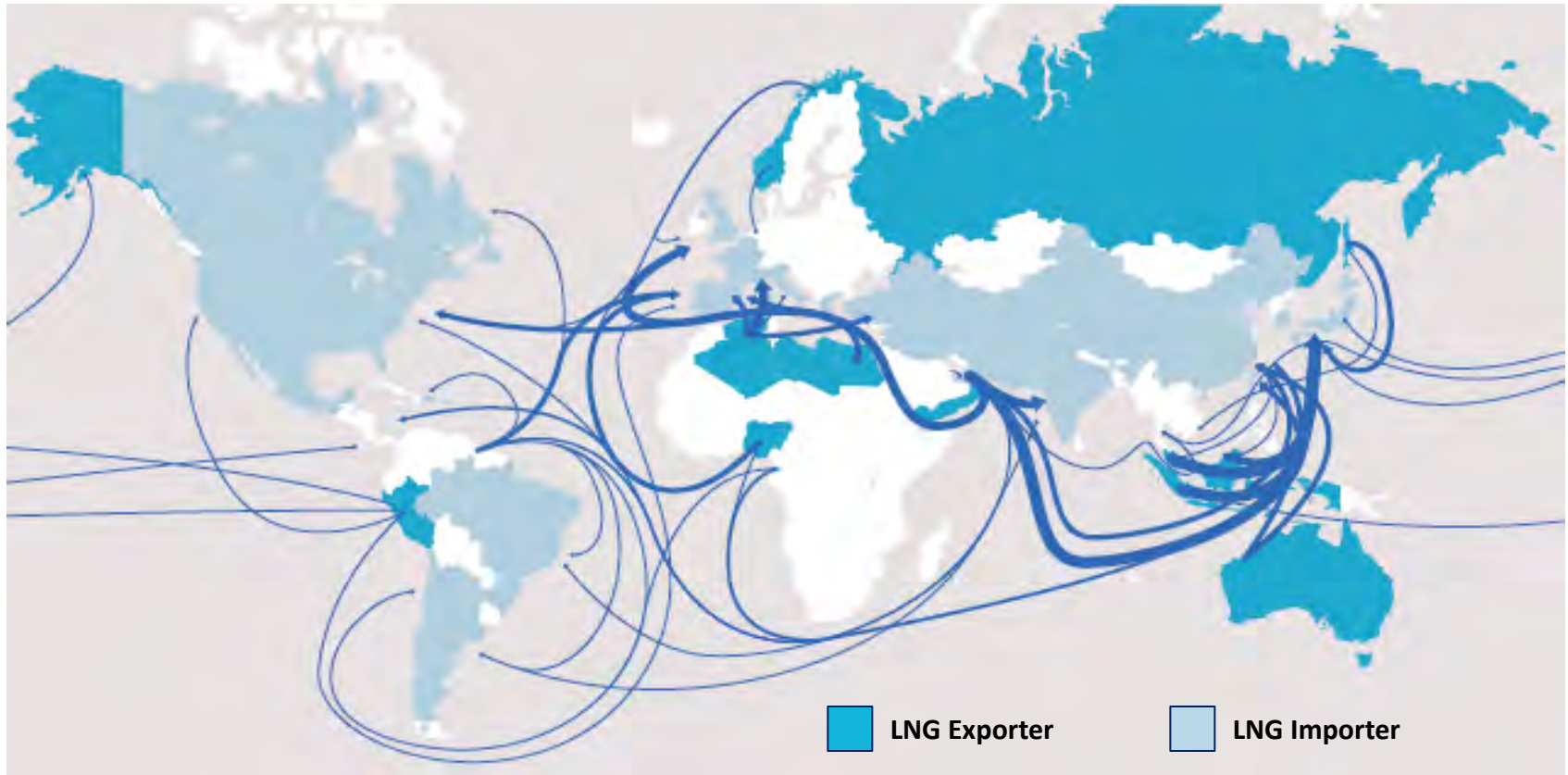
# Build-Out of Global LNG Infrastructure In Progress

- LNG supply expected to grow by 4.4% p.a. to 2030, more than twice as fast as underlying global gas production (2.1% p.a.)
- Worldwide build-out of a global LNG market requires significant investment in infrastructure and logistics chain
- LNG is playing an increasing role in many countries' energy mix



Source: Clarksons / GIIGNL / JP Morgan

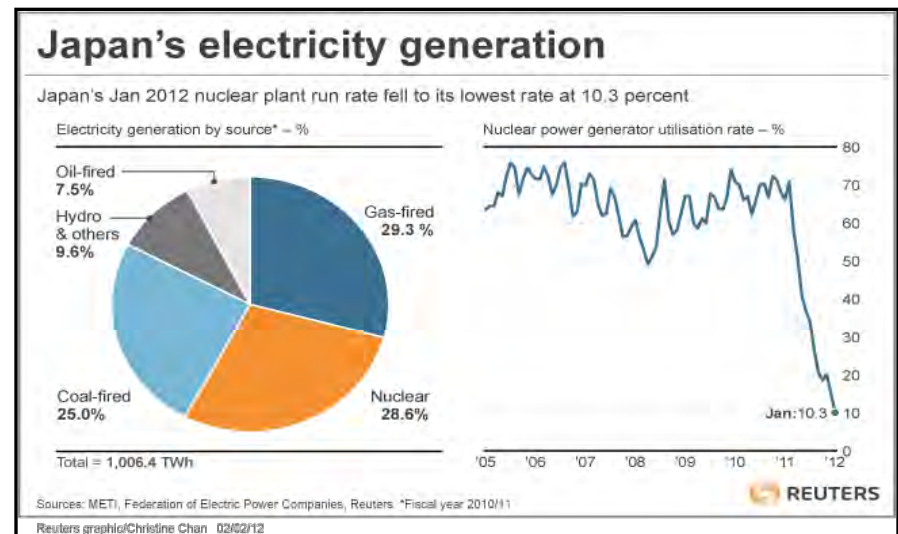
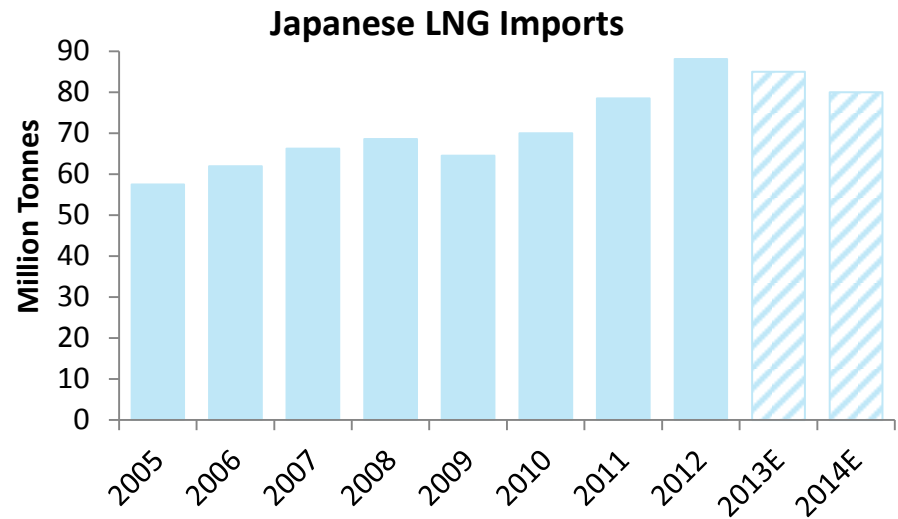
# Current LNG Trade Map



- 236 million tonnes of LNG imported worldwide in 2012
- 40% of global LNG imports were supplied by the Middle East
- 71% of global LNG demand is from Asia
- 26 countries currently import LNG; 18 countries export LNG

# Japan Currently the Top LNG Importer...

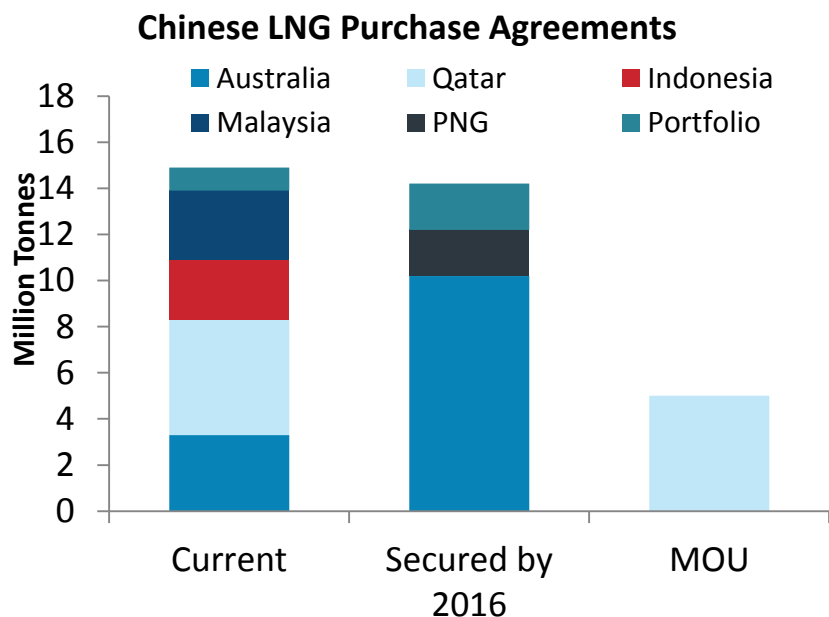
- Japan imported 88 MT of LNG in 2012 accounting for 37% of global imports
- Nuclear accounted for ~30% of Japan's electricity generation pre-Fukushima
- None of Japan's 50 nuclear reactors are currently online – no clear timeline for activation of the reactors
- Without nuclear Japan depends on fossil fuel imports (vulnerable to price shocks)



Source: Thomson Reuters

## ...Though Future Demand Driven By China & India

- LNG is a cornerstone of China's energy mix
- Chinese LNG imports expected to double to ~25-30 MT by 2015
- Domestic gas shortfall prompting India to turn to LNG
- India planning to double regasification capacity by end-2015



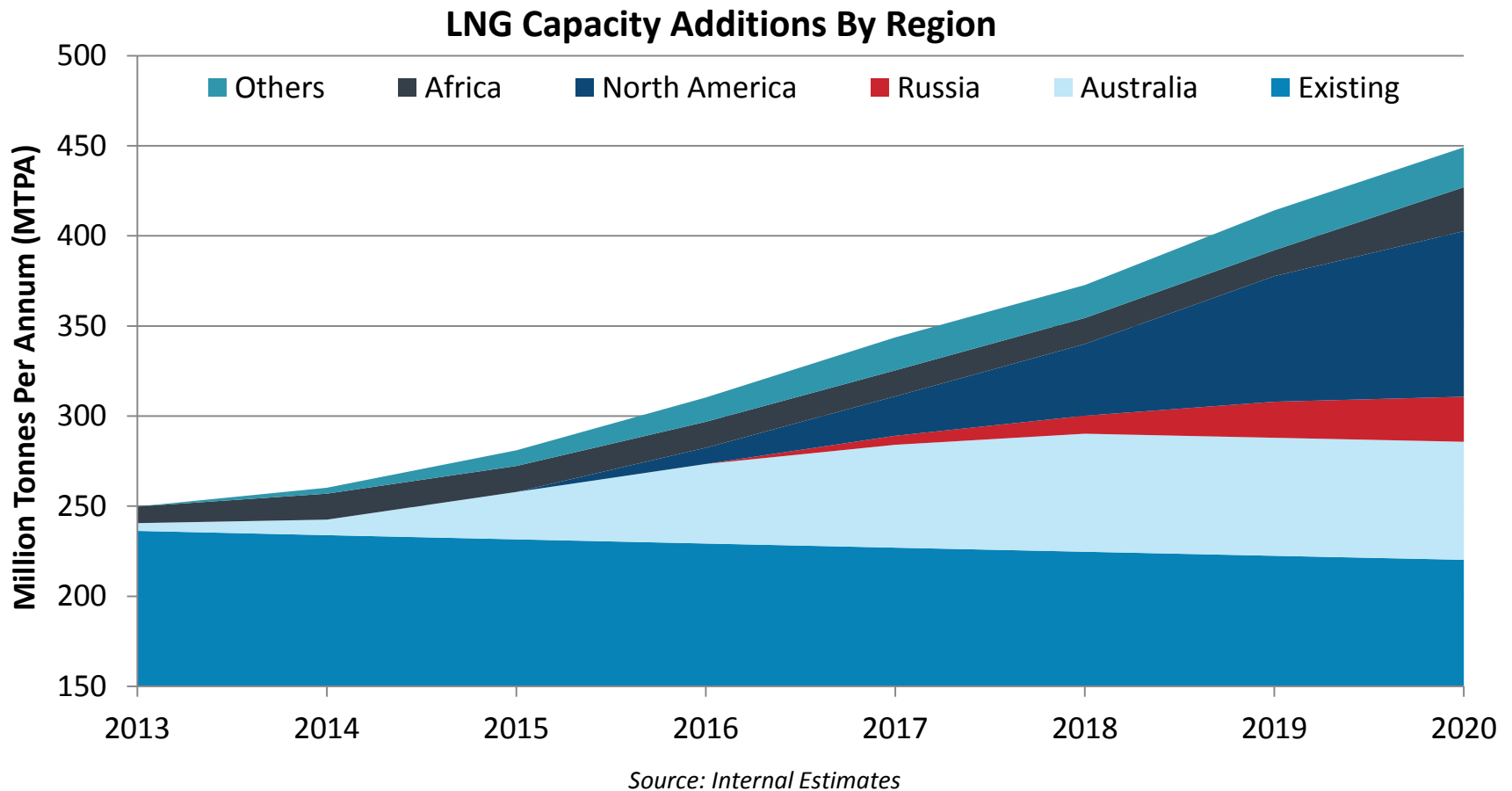
Source: Thomson Reuters



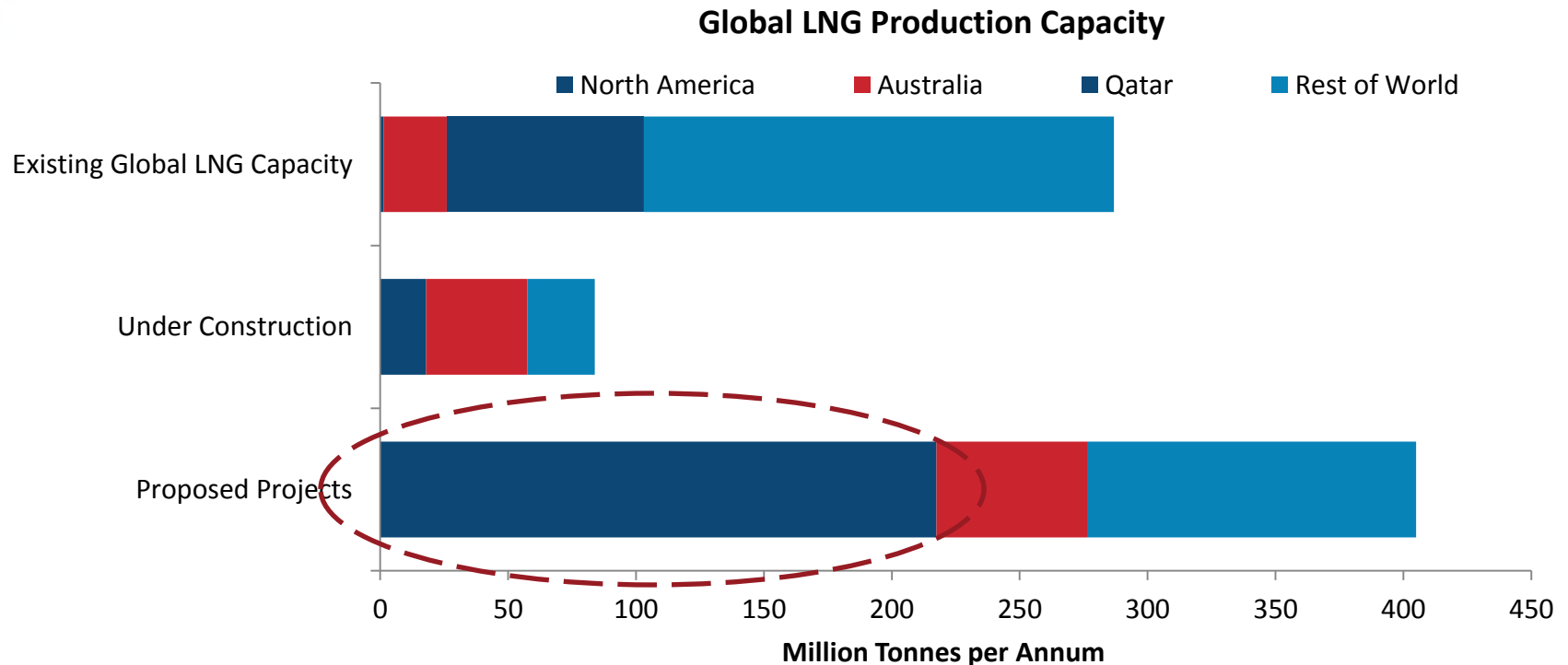
Source: Ambit Capital

# Strong LNG Supply Growth Post-2015

- Australia expected to add ~65 MTPA of LNG supply by 2020
- North America may add a further ~95 MTPA of LNG supply



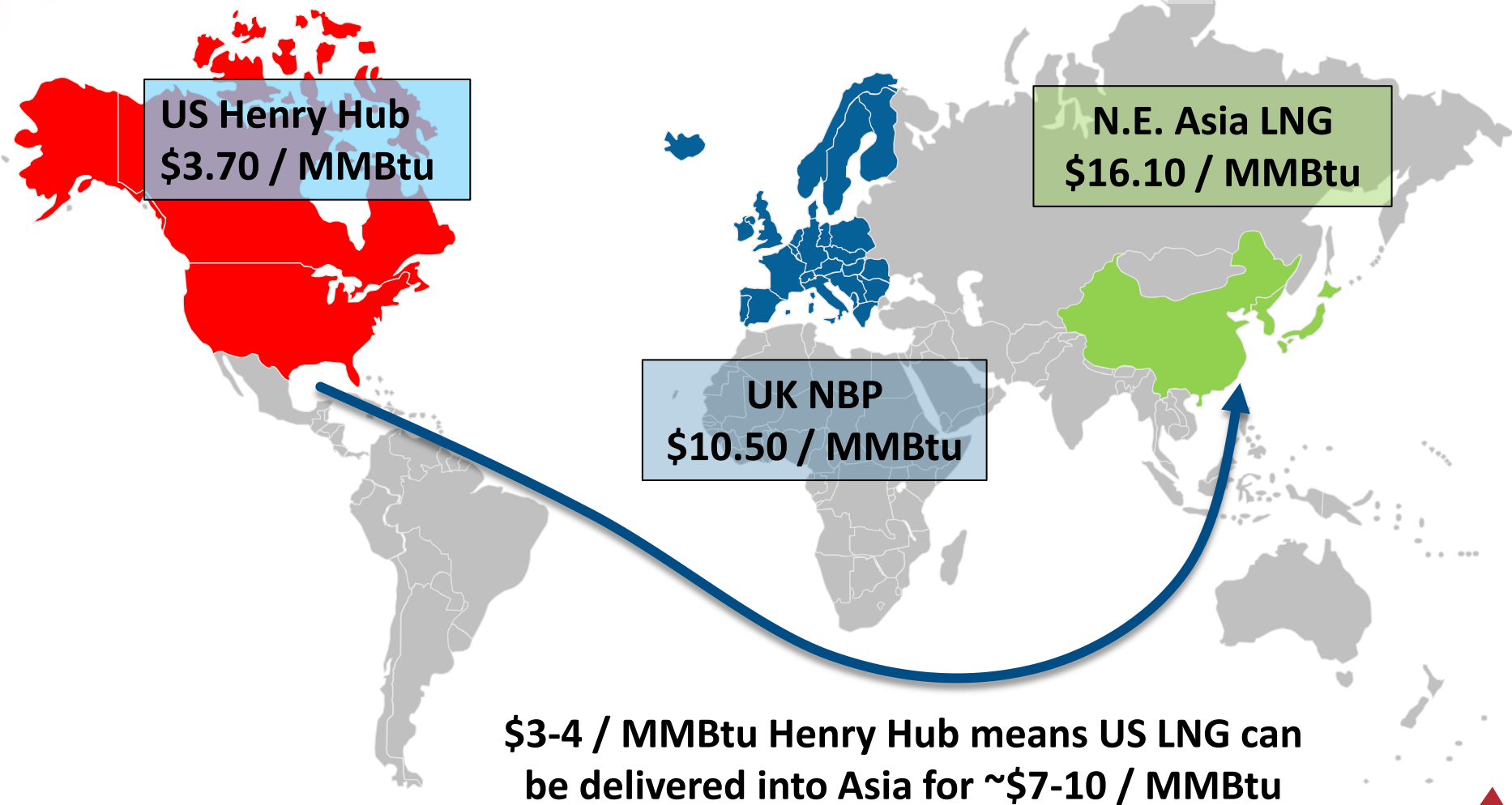
# North American Exports Provide Upside



- 200+ MTPA of North American LNG export projects in the planning stage
  - Cheniere’s 18 MTPA Sabine Pass terminal the only project under construction
- Every 10 MTPA moving USG to Asia creates demand for **~18-20 LNGCs**
  - Versus ~7-8 LNGCs to move 10 MTPA from Australia to Asia

# Looking to Take Advantage of Regional Pricing

Average Spot Natural Gas Prices 2013

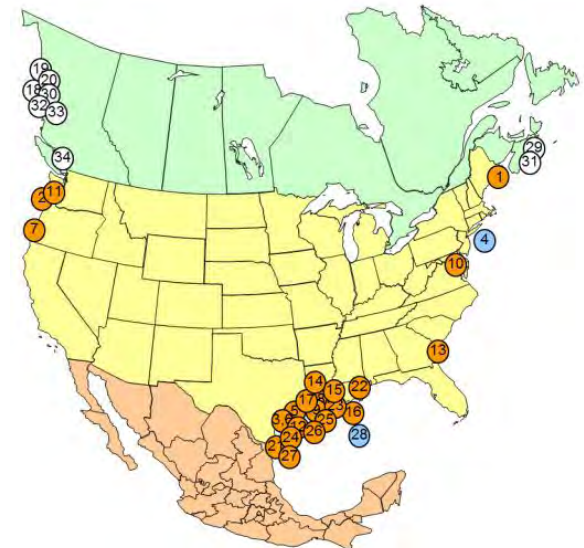


# North American Project Overview

- 10+ planned export projects in Canada, 20+ in the US
- 3 Canadian projects have NEB export approval (BC LNG, Kitimat, LNG Canada)
- US projects have to gain both FERC and DoE approval
  - FERC approves construction of liquefaction facilities
  - DoE approves export of LNG to FTA / non-FTA countries
  - Four projects have secured non-FTA export approval

## Potential LNG Export Projects

- US sales agreements are indexed to gas, not oil:
  - **BC LNG:** Golar - *gas indexed*
  - **Sabine:** BG, EDF, Gail - *HenryHub + \$2-3/mmbtu*
  - **Cameron:** GDF Suez, TEPCO - *HH indexed*
  - **Dominion Cove:** Sumitomo, Tokyo Gas - *HH indexed*
  - **Freeport:** Osaka, Chubu – *tolling agreement*

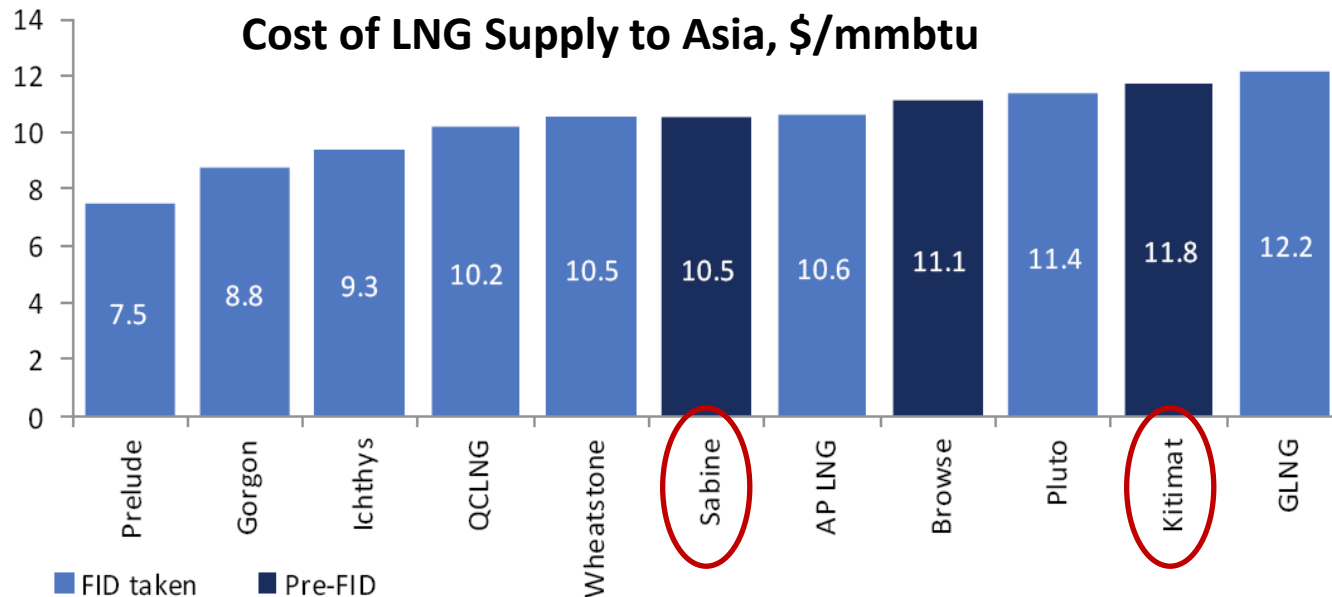


Source: FERC



# North American Exports in Competition

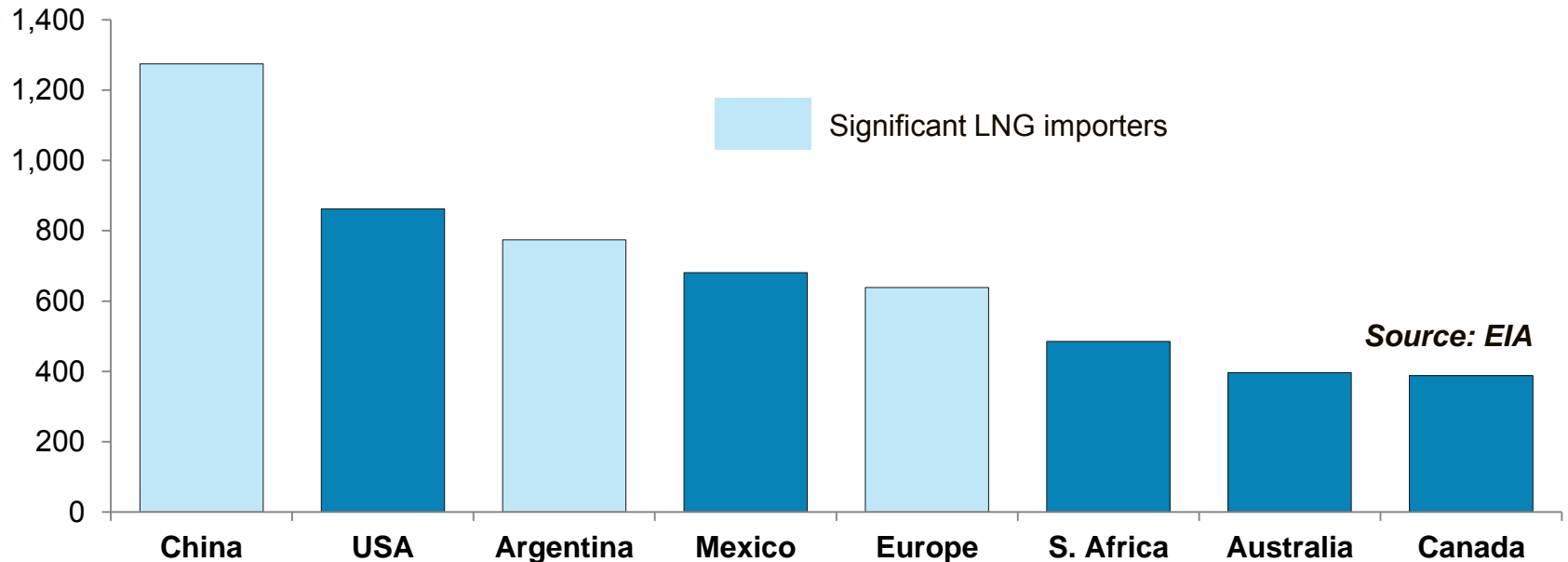
- North America is generally competitive with Australia despite longer distances
- Several issues will affect the degree of Canadian competitiveness:
  - Time to market; lots of competing projects chasing the same resources
  - Some US projects can utilize existing import terminal infrastructure
  - Cost vs. Price – will sales contracts be indexed to oil or gas?
  - Canadian project costs are higher; Canada could become the marginal producer



Source: Pareto

# Global Shale Deposits Pose Long-Term Threat

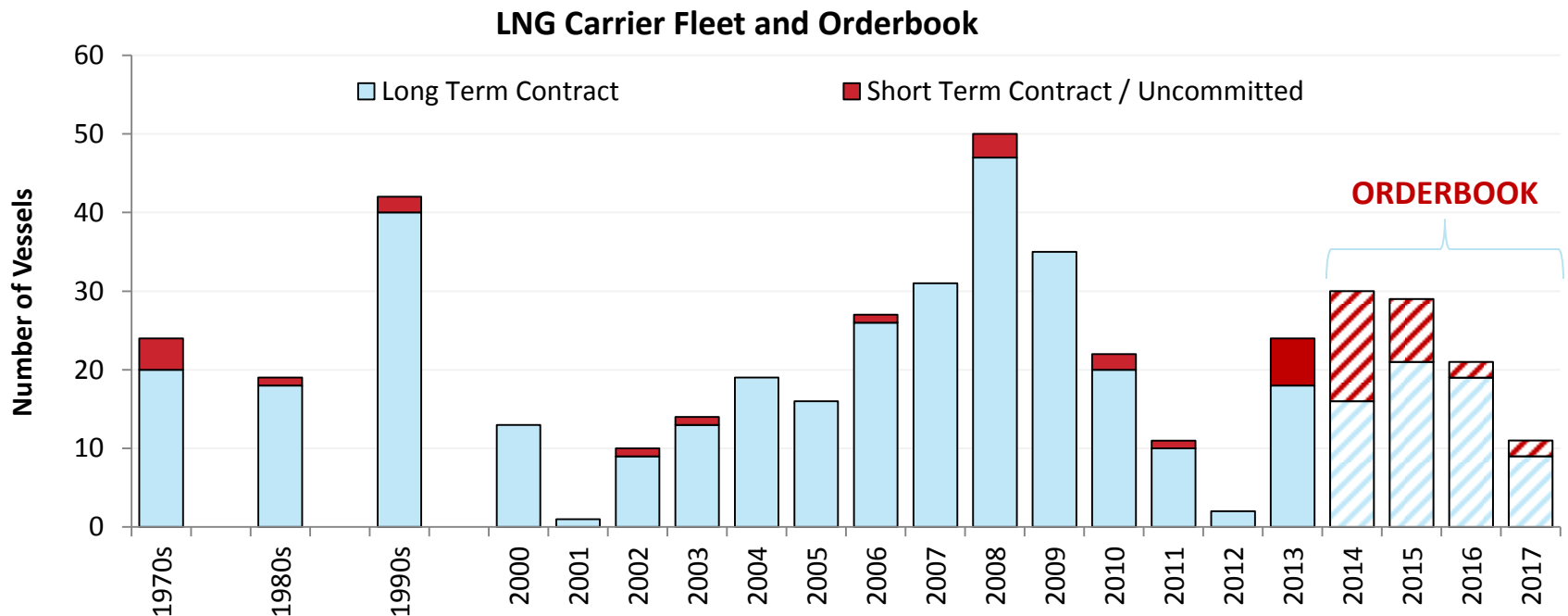
## Technically Recoverable Shale Gas Reserves (Trillion Cubic Feet)



- China has the largest shale gas reserves in the world (1,275 tcf)
- Shale development in other countries not expected before 2020; the US has unique advantages which are not easily replicated elsewhere:
  - Abundance of fresh water for fracking
  - Existing oil & gas infrastructure and technical expertise
  - Small, risk-taking entrepreneurial companies

# LNG Fleet Overview

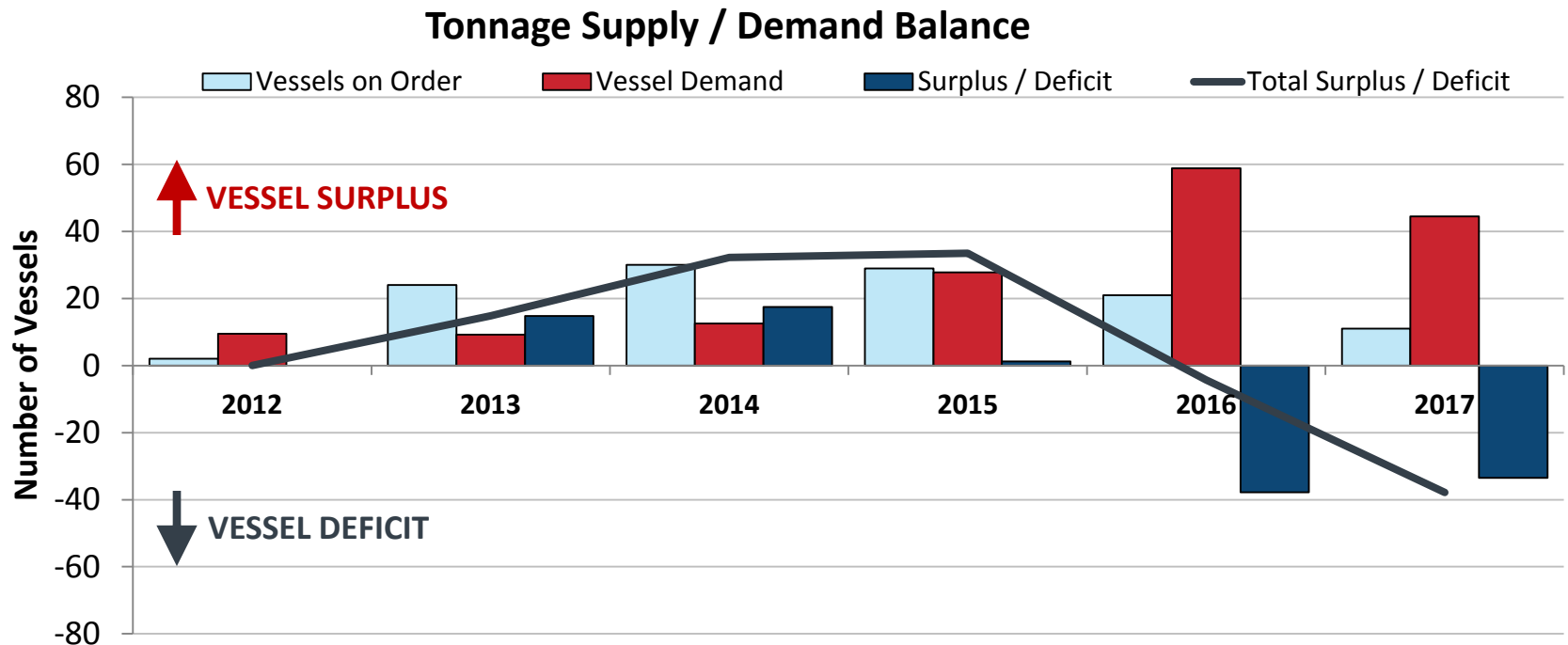
- 347 LNG Carriers on the fleet and 105 more on order
  - 30 LNGCs on order are currently uncommitted to long-term charters
- Move towards standardized size of 160-170 kcbm
  - New technologies (MEGI engine, new containment systems)



Source: Clarksons

# LNG Fleet Utilization Improves From 2015

- 72 LNG carriers due to deliver by end-2015
  - Little new LNG supply growth during this time; fleet utilization expected to fall
- New LNG supply post-2015 expected to create significant demand for new vessels over and above the current orderbook



Source: Clarksons / Internal Estimates

# Conclusion

## Supply / Demand Fundamentals

- Global demand for LNG remains strong with future growth to be led by the non-OECD and China / India in particular
- Global liquefaction capacity is set to increase significantly in the next decade led by Australia, North America, Russia and East Africa
- Canadian LNG projects face several challenges:
  - Time to market / competition from other global projects
  - Pricing vs. competing projects

## Shipping Fundamentals

- Oversupply of vessels 2013-15 as ships deliver early
- Strong market post-2015 with significant new shipping demand

# BC Gas Exports & LNG Shipping

Unlocking the Export Potential



TEEKAY LNG PARTNERS L.P.

# Properties of LNG

- Whilst primarily composed of Methane LNG does not have a standard composition.
- In order to transport LNG efficiently the Natural gas is cooled to -160°C. The liquid form is about 1/600th of the Natural gas at ambient temperatures.
- Normal steel becomes brittle at -160 and even a small amount of LNG coming into contact with normal steel can cause it to crack.
- LNG vapours are lighter than air at ambient temperatures (> -110°C), other hydrocarbons such as gasoline, propane etc are heavier than air.
- LNG has a narrow flammability range, between 5 and 15% concentration in air
- LNG produces the least amount of CO<sub>2</sub> of any hydrocarbon fuel