Oxford Institute for Energy Studies
Natural Gas Programme
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LNG Costs, Russian Exports and Global Interactions
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OIES Natural Gas Research Programme

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• A gas research programme at a Recognised Independent Research Centre of Oxford University, specialising in fossil fuel research
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WE ARE FUNDED BY: sponsorship by 20 companies and governments in gas producing and consuming countries

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• consultants, sellers of exclusive, high price business reports

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http://repository.upenn.edu/cgi/viewcontent.cgi?article=1008&context=think_tanks, P. 95
Themes


LNG Cost Trends

Research Question:

‘Given that the general E&P cost base doubled between 2004 and 2014, why did the LNG cost base treble or even quadruple?’

Recent High Cost Locations Squew Trend (Australia, PNG, Norway)

Australia suffered from:
- Too many projects proceeding in parallel.
- Laws restricting use of imported labour.
- Currency appreciation.
- Project Schedule Slippage.
Challenges in Reducing LNG Project Costs

- Using barge-mounted liquefaction plant built in a shipyard/module yard in China or Korea to take advantage of the lower cost base and higher productivity.

- Use of alternative liquefaction processes and new EPC contractors. An example could be using the Black & Veatch PRICO process and using Chinese construction.

- Bringing in a competitor to GE/Nuovo Pignone who currently have the exclusive position of supplying the refrigeration compressors and drivers. Other major vendors include Siemens and Dresser for the compressors and Rolls Royce for the gas turbine drivers.

- Cooperation between the owners of different projects in the same area to take advantage of synergies and shared use of facilities.

- Reconsider the use of expensive design competitions (multiple FEEDs) which require high cost multiple client teams and payment of multiple contractors with very little perceived value.
Europe – keen to reduce dependence on Russia but tied into long-term contracts

Russia’s share of the European gas market has been above 25% for most years since 2000, and is currently over 30%.

Gazprom’s stated ambition is to maintain its share at 30%, although there is a suspicion that it expects sales to be higher than this.

Long-term contracts offer security to 2020 before going into decline.

New average 70% take-or-pay level implies that exports could fall to 100bcm by early in the 2020s if Europe is serious about diversification.

Russia has a 100 bcma (10 bcf/d) gas bubble in West Siberia!!!!!
Where does Russia fit into the Chinese gas market?

- Questions over Chinese demand and production remain
- How reliant will Chinese authorities want to be on imported gas?
- Can Russian gas compete commercially?
- Will China want to limit its political exposure to Russian sources of energy?
Current status of Russia’s Asian plans

- Energy strategy to 2035 sees rapid growth in hydrocarbon exports to Asia

- Power of Siberia pipeline appears to be firm – construction has started on both sides of border
  - Flexibility remains in 2019-2021 start date
  - Potential for renegotiation remains

- Russia would prefer Altai pipeline, but discussions appear to have stalled given Chinese uncertainties

- LNG plans are going backwards – Vladivostok LNG postponed indefinitely, no Sakhalin 2 expansion before 2021, Far East LNG no longer a priority

- A level of desperation appears to have emerged on the Russian side, with the proposal of a third pipeline from the Far East a clear example

- Realistically only one Russian pipeline is needed before 2025 unless Chinese gas demand growth accelerates rapidly
LNG Demand 2008 - 2015

- Fukushima was a ‘one off’ 20 bcma LNG demand boost.
- China and East Asian manufacturing pace slowed ‘new normal’.
- High LNG prices did not help.

Source: Platts Monthly LNG Service
Regional Gas Prices 2013 – 2016 (including futures)

Sources: Platts, EIA, Argus, CME

SOURCES:
Global LNG System

North America Exports LNG, Russia Becomes ‘system shock absorber’

Niche Markets
(South America, Middle East etc.)

Asian Markets
(Japan, Korea, Taiwan, China, India)

Hub-Indexed Pipeline Contracts / direct hub sales

US Exports LNG provided price difference between HH and Asia is > circa $6.50/mmbtu. Flow reduces as Storage level falls. Incremental supply ends up in Europe.
Beyond 2015 – The ‘Big Six’ Uncertainties

- Demand for Natural Gas and LNG in Asia, particularly (short term) speed of Japanese Nuclear re-start and longer term – Chinese LNG demand.
- New LNG Markets, including Bunkers
- European Demand Recovery.
- Scale and pace of US LNG export approvals and construction (production response to price).
- Scale of LNG supply ramp-up from non-US suppliers, especially Australia, East Africa, Canada, Russia (and potentially Qatar post moratorium).
- Response by Russia to ‘overspill’ of excess LNG into European market in 2018 – 2023 period.
Key Issues:
- Russia’s Response in terms of Price – Volume in Europe,
- Timing of New LNG FID’s

Russia
Long and Short Run Marginal Costs – Russia & LNG to European Market

Gazprom has 100 bcma ‘spare’ productive capacity which could cover SRMC at $3.80. European hub prices need to stay below $9/mmbtu to deter new LNG investment. Once LNG FID has been achieved, US LNG will flow at European hubs above $6/mmbtu, Non-US LNG at European hub prices above $3/mmbtu

Source: J. Henderson & D Ledesma, OIES
Future Demand Trends

- Europe absorbs the balance.
- Some needed to offset UK, Dutch and Norway production decline.
- Competition with Russian pipeline gas.

Source: GIIGNL, Author’s Calculations
Scenario 3, (Low Asian Demand, Low European Demand) Russia Maintains Price not Volume, LNG FID’s Slip 3 Years

Global LNG Supply 2008 - 2030
- Assumed 3 year delay to previously targeted FID’s
- Risked profile
- Unrisked profile
- Firm Projects only

LNG Imports 2008 - 2030
- North America
- Europe
- Bunkers
- New markets
- India
- China
- Taiwan
- Korea
- Japan

European Supply 2008 - 2030
- Base Case Demand
- Pipeline
- LNG
- Domestic Production (incl. Norway)

Russia Pipeline Exports to Europe
- Actual/Modelled European Imports
- Production potential
- Take-or-Pay / Supply Floor
Scenario 3 (Low Asian Demand, Low European Demand)
Russia Keeps Hubs Low to early 2020s
No New US FID’s, No Qatari FIDs, Other FID’s Delayed 3 Years

Non – US LNG Supply 2008 - 2030
Assumed 3 year delay to previously targeted FID’s, No New US FID’s

Russia Pipeline Exports to Europe 2005 - 2030
Conclusions

- 19 bcfdf of new LNG plant (FID’d/Under construction) starting up between 2015 and 2021. (8.5 USA, 8.5 Australia, Remainder Russia, Malaysia, Indonesia).

- With Asian LNG demand lanquishing, Europe becomes the ‘sink market’. Hub gas prices (and Asian LNG spot prices) could fall to $4/mmbtu coal switching support level.

- Glut should clear in early 2020s (Asian demand and European domestic production decline).

- Competition for next tranche of new supply: Russia (gas bubble but at what price ?) or LNG (can cost of supply be reduced from $9 – 10/mmbtu) ?
Gas Programme Books Published since 2003

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Thank You
for your attention.

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