

The Impact of a Globalising Market on Future European Gas Supply and Pricing

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ofgem GB Gas Security of Supply Seminar

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Themes

- **Major Future Global Gas Uncertainties**
- **Scenario Modelling Outcomes**
 - **Implications for Russian Pipeline Exports to Europe**
 - **Implications for Prices**
- **Conclusions**

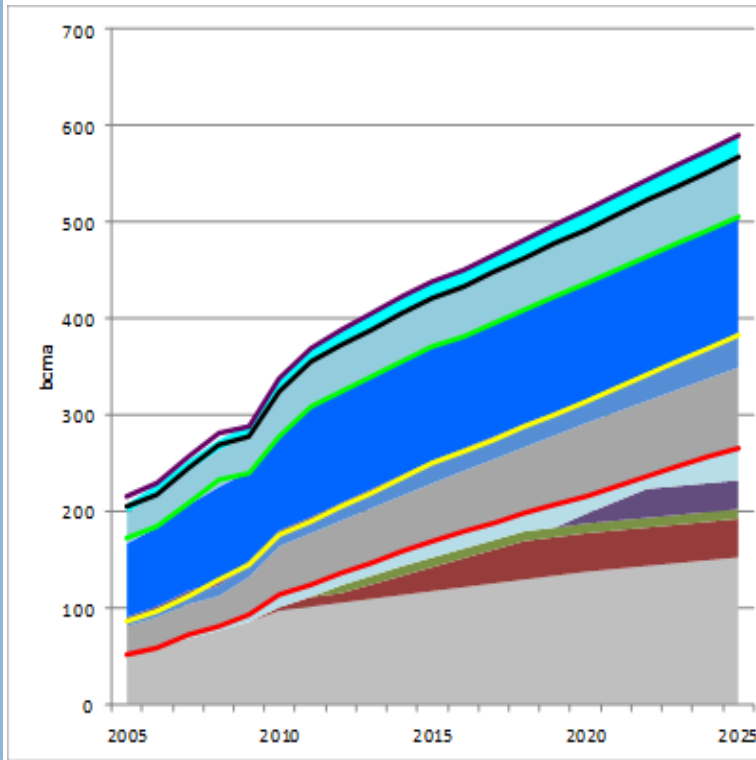
Based on the Following Published Research:

'LNG trade-flows in the Atlantic Basin, trends and discontinuities', Howard Rogers, March 2010,
<http://www.oxfordenergy.org/pdfs/NG41.pdf>

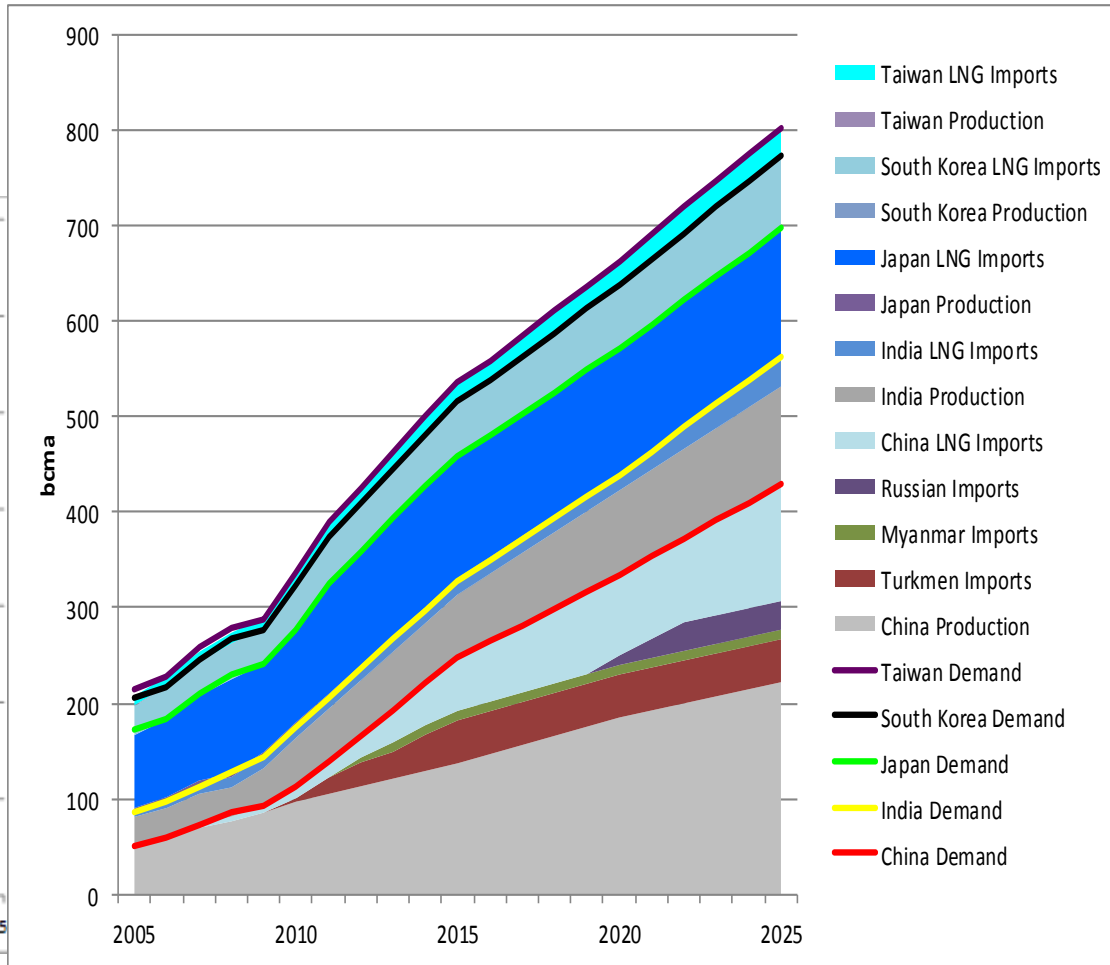
'The Impact of a Globalising Market on Future European Gas Supply and Pricing: the Importance of Asian Demand and North American Supply', Howard Rogers, January 2012,
http://www.oxfordenergy.org/wpcms/wp-content/uploads/2012/01/NG_59.pdf



Asian Demand Growth



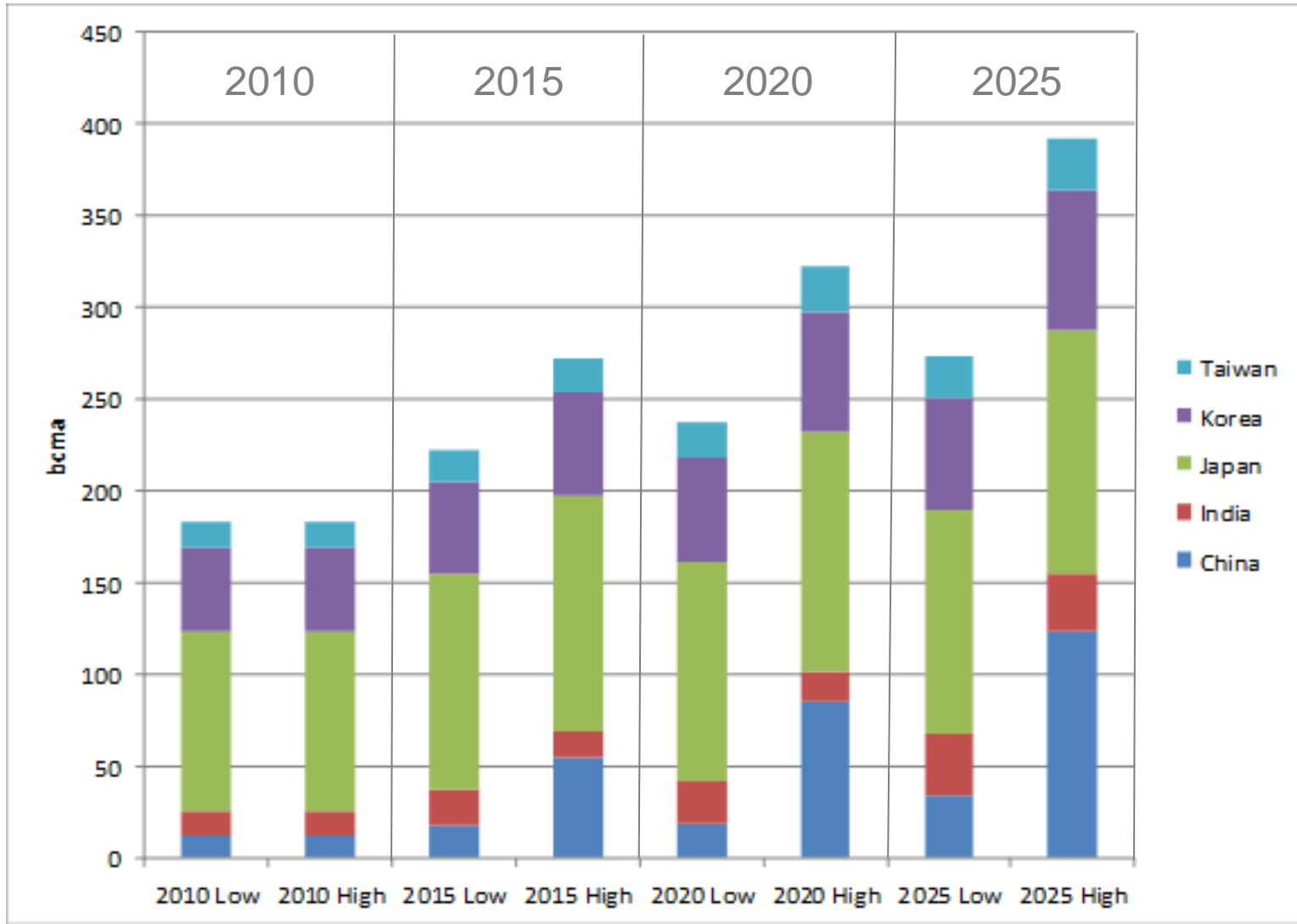
Low Demand Growth
(IEA WEO 2010 New Policies Scenario Demand)



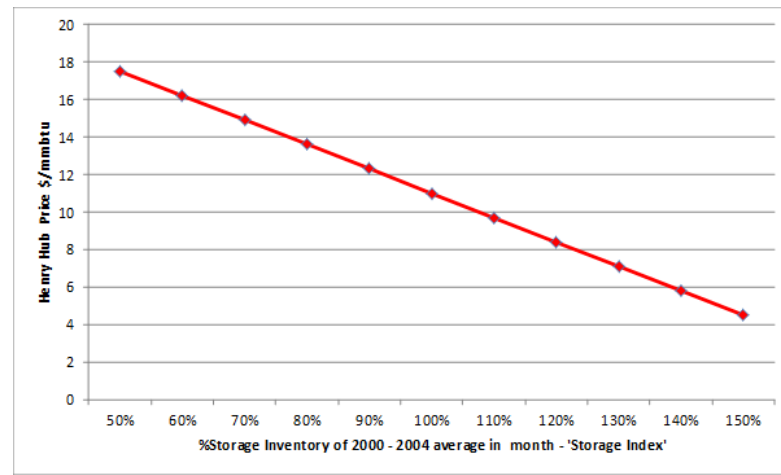
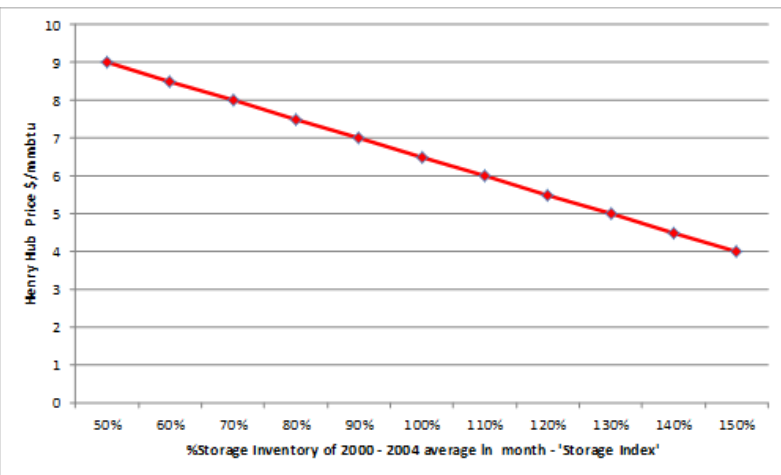
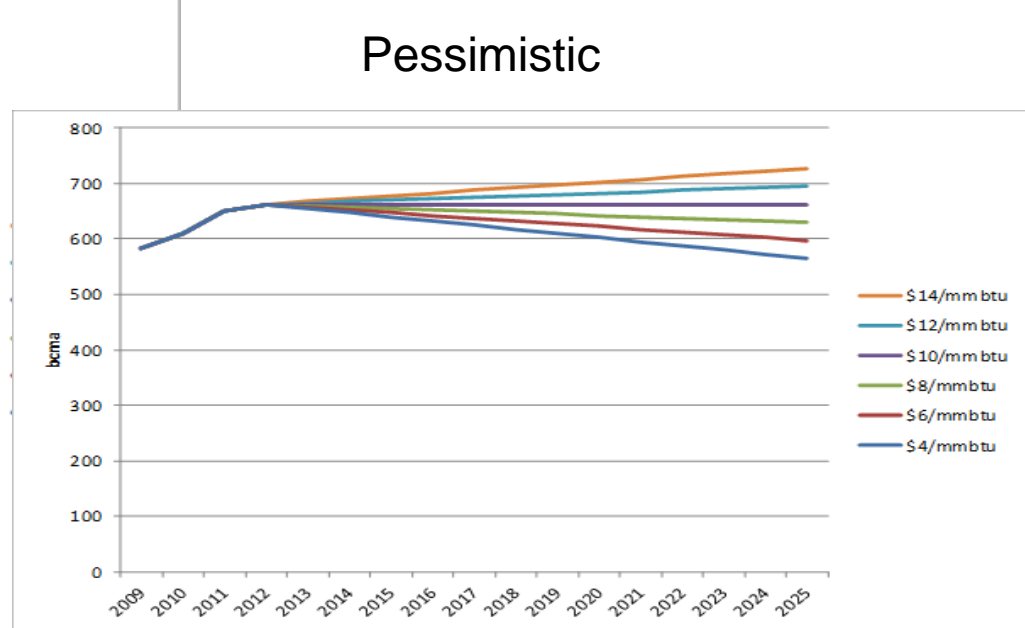
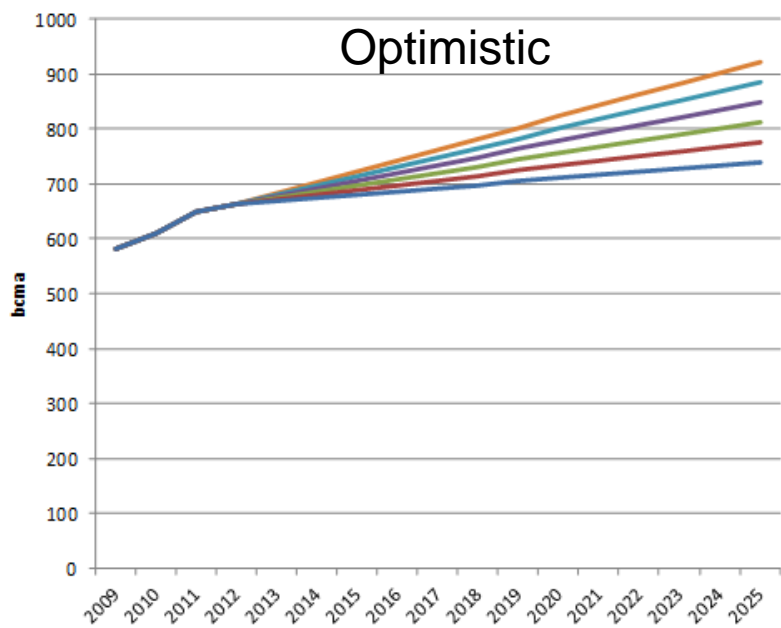
High Demand Growth
(IEA Golden Age of Gas Scenario Demand)



Asian LNG Imports



US Production Hypothetical Trajectories



Potential North American LNG Export Projects

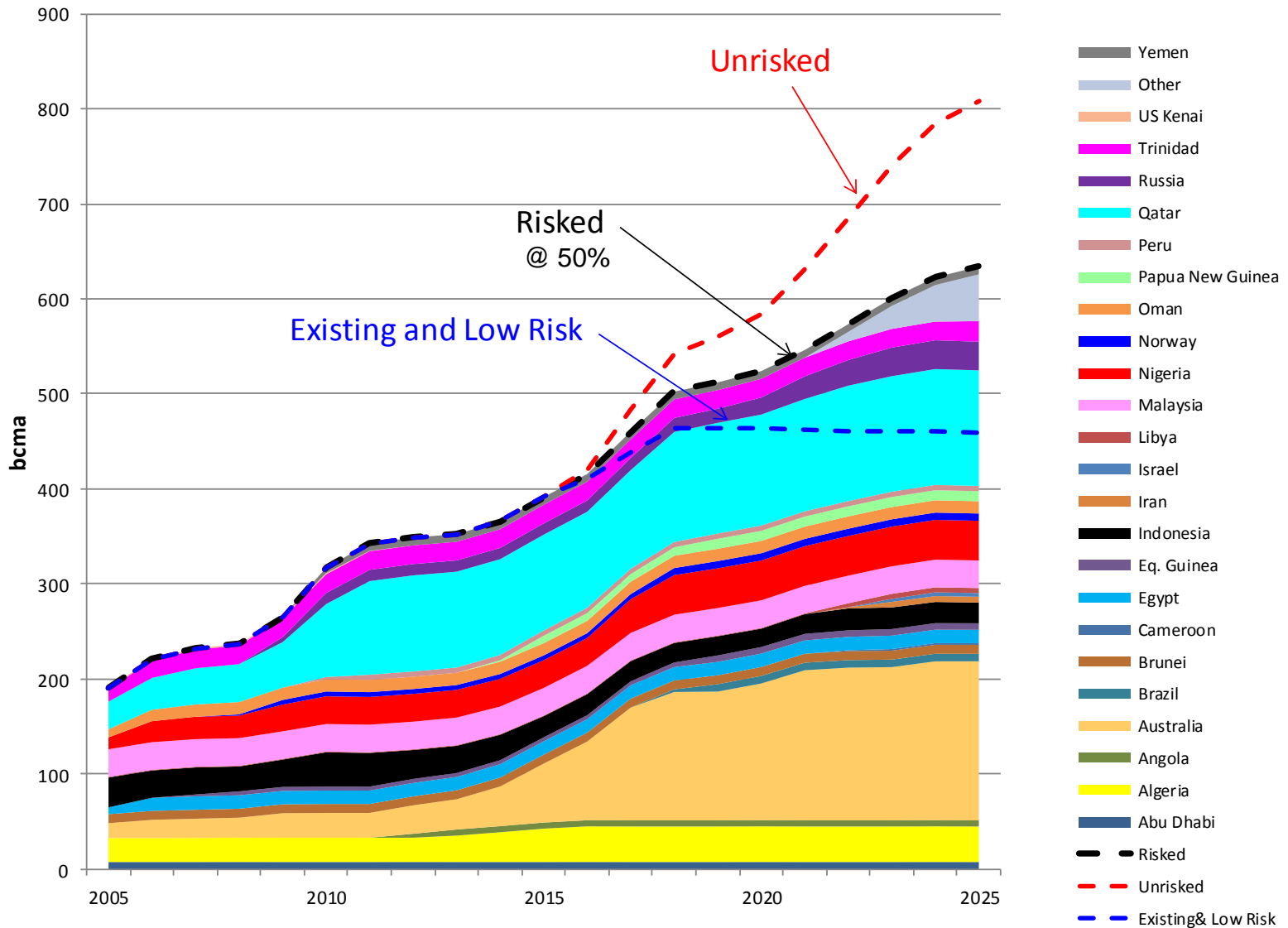
Terminal/Project - US	Commercial partners	Capacity (bcma)	DoE Status	FERC Status	Possible Start-up
Sabine Pass	Cheniere	22	Approved	Under Review	2015
Freeport	Freeport LNG, Macquarie	12.5	Approval Expected 2012	Under Review	2016
Lake Charles	Southern Union, BG	20.7	Applied, Pending	Not Yet Applied	2016+
Cameron	Sempra	16	Applied	Not Yet Applied	2016+
Cove Point	Dominion	11	Applied	Not Yet Applied	2016+
Jordan Cove	Jordan Cove Energy, First Chicago	12	Applied	Not Yet Applied	2016+
Sub-total		94.2			
Terminal/Project - Canada	Commercial partners	Capacity (bcma)	Environmental Approval	Other Approvals	Possible Start-up
Kitimat	Apache, EOG Resources	6.9	Approved	Underway	2015
BC LNG	LNG Partners, Haisla First Nation	2.5	Not Yet Applied	Not Yet Applied	2016+
Prince Rupert	Shell	13.8	Not Yet Applied	Not Yet Applied	2016+
Petronas	Petronas	10.2	Not Yet Applied	Not Yet Applied	2016+
Sub-total		33.4			
Total US & Canada		127.6			

Source: Waterborne LNG, January 6th 2012, A. Flower OIES

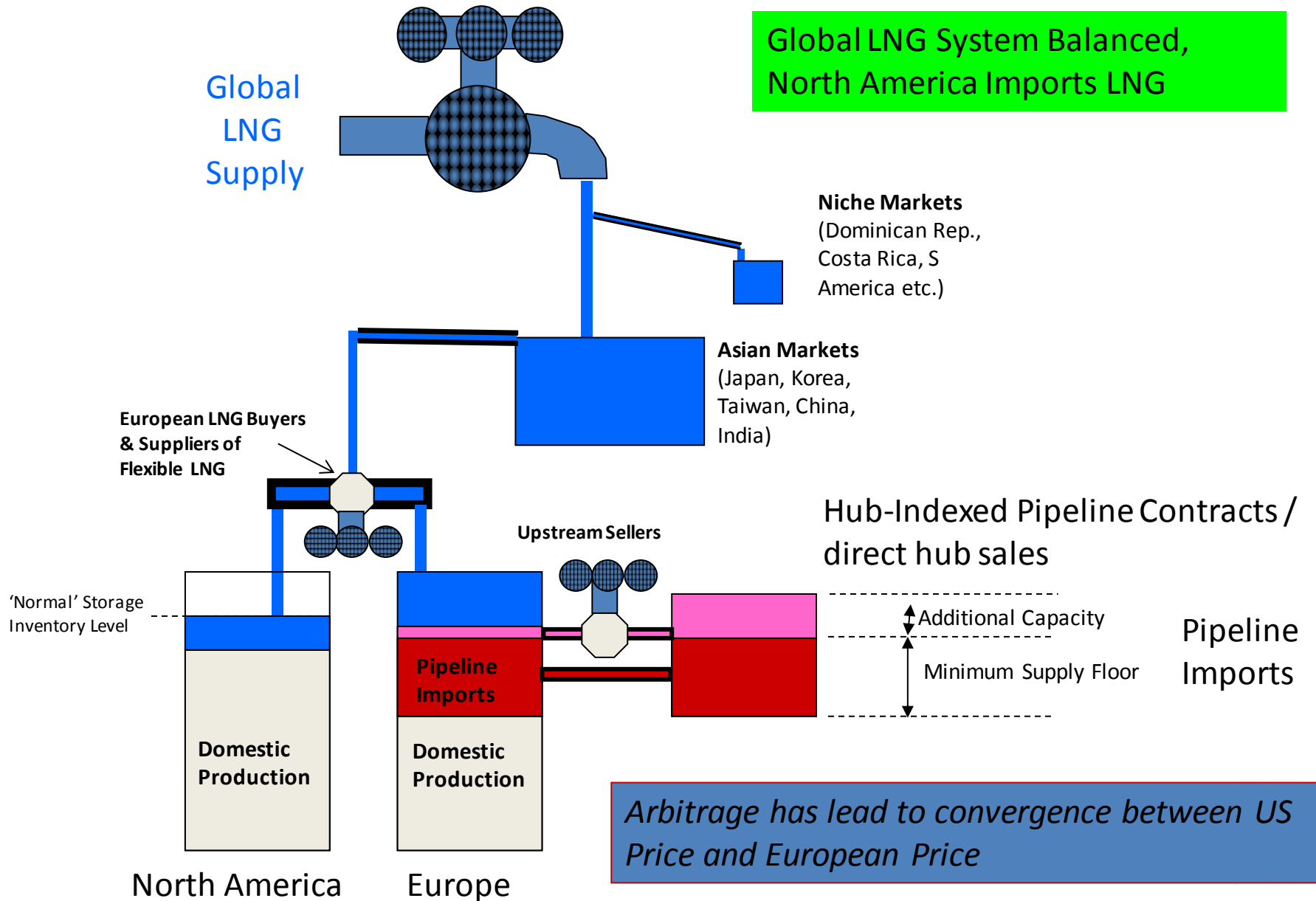


LNG Supply 2005 – 2025

(Excluding Possible US & Canadian Projects)

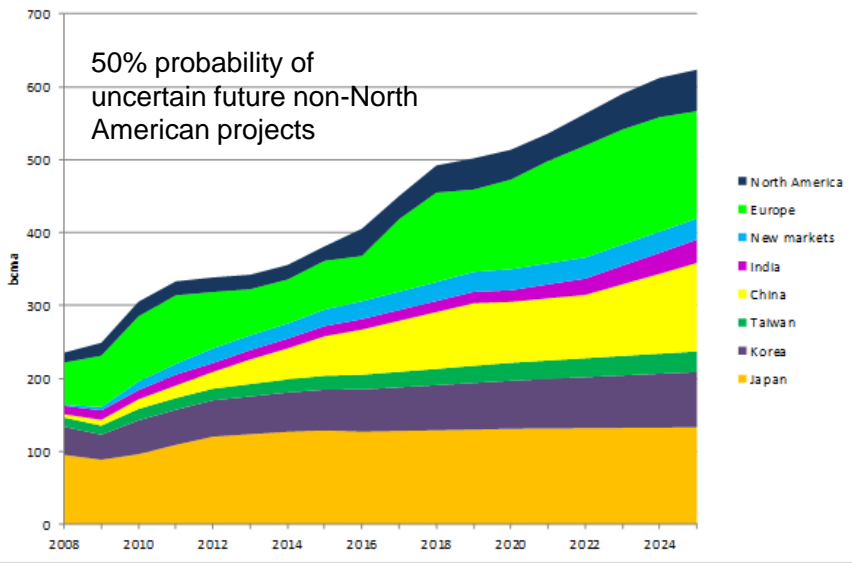


Global LNG System Low US Production

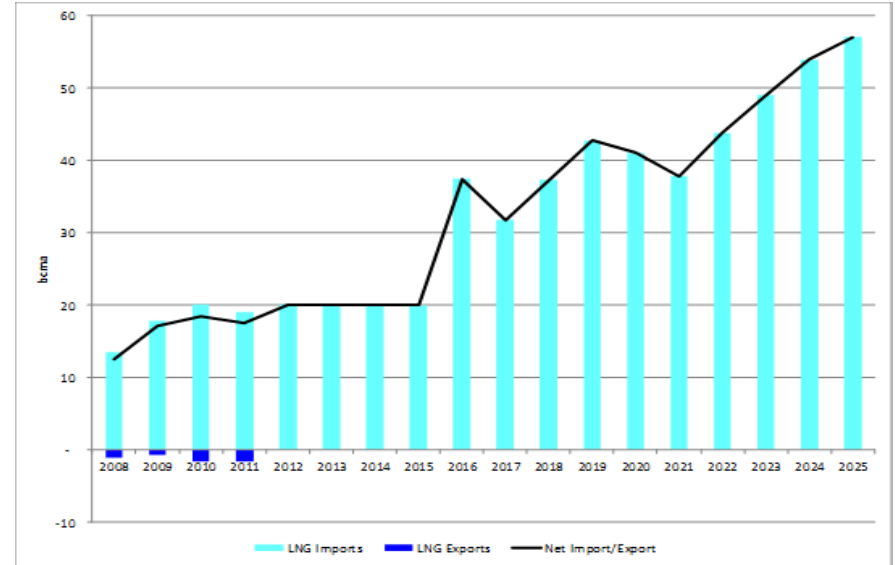


Low US Production, High Asian Demand

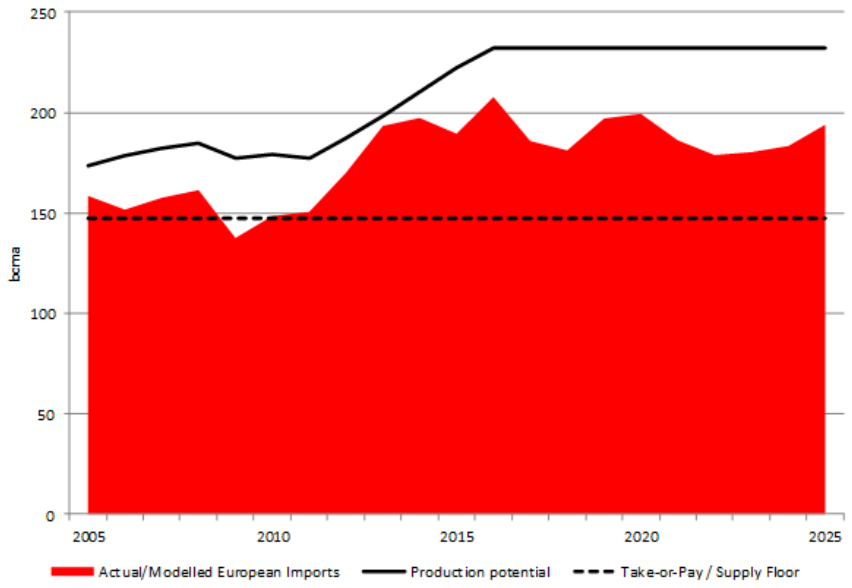
Global LNG Consumption



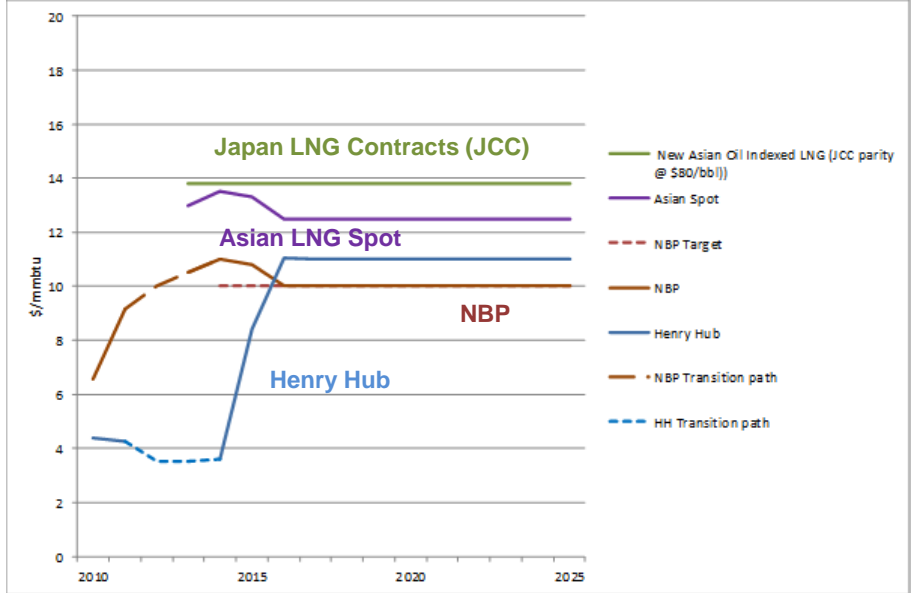
North American LNG Imports/Exports



Russian Pipeline Exports to Europe

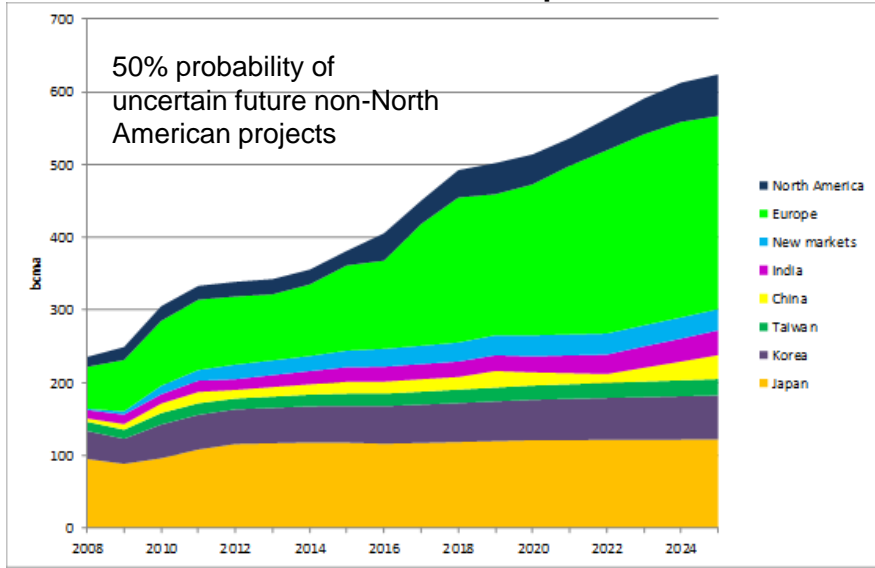


Regional Prices

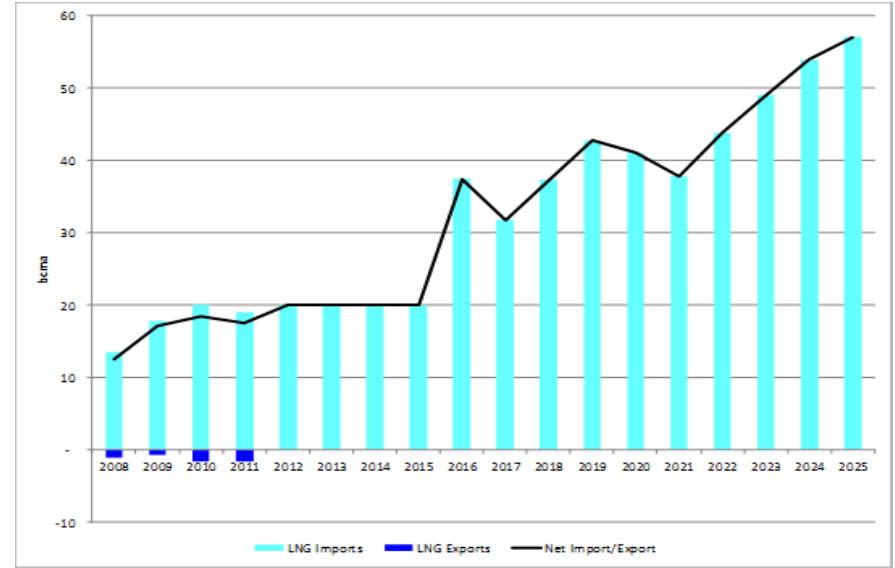


Low US Production, Low Asian Demand, European Pipeline Suppliers maintain Price Target

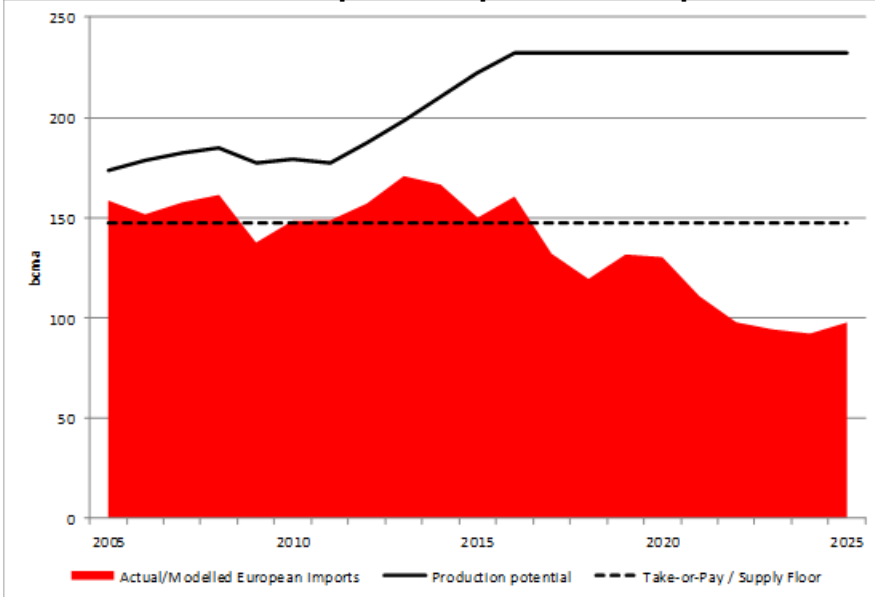
Global LNG Consumption



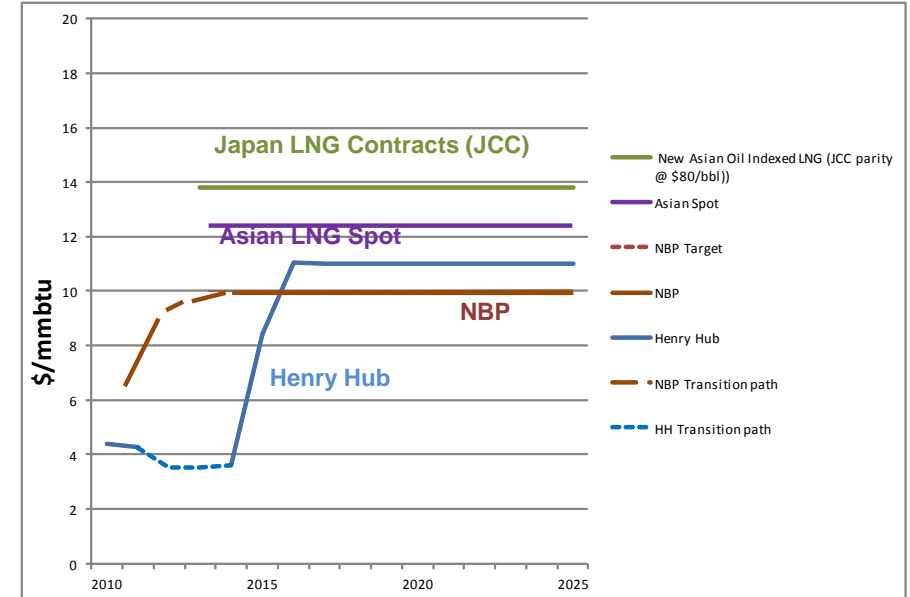
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Russian Pipeline Exports to Europe

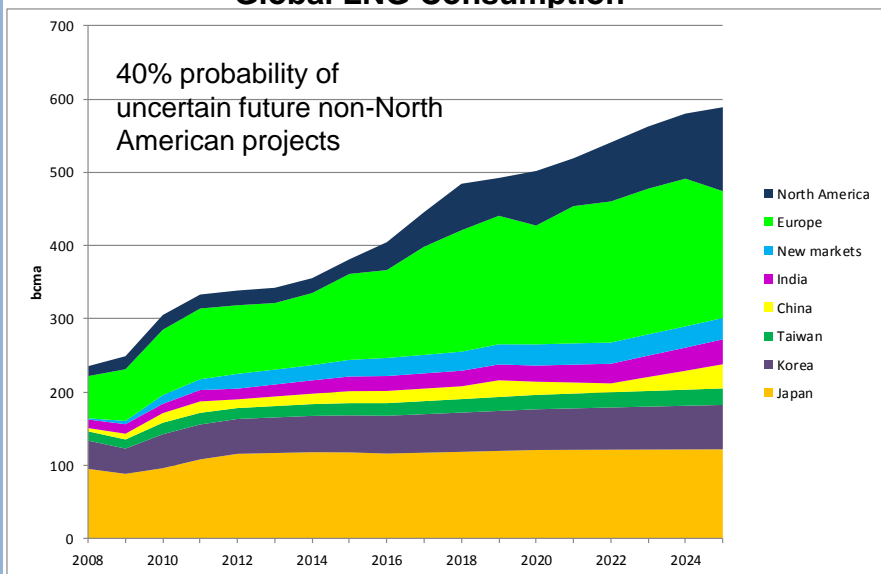


Regional Prices

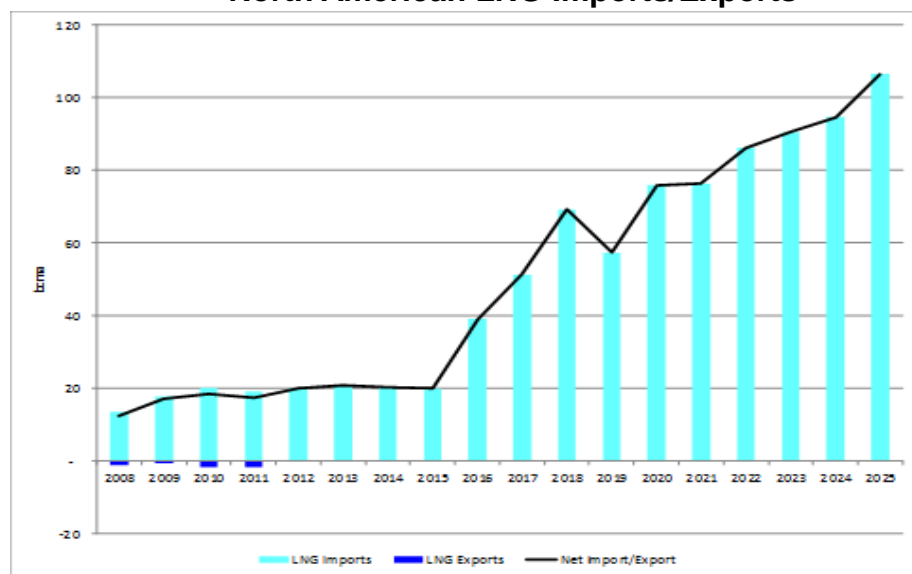


Low US Production, Low Asian Demand, European Pipeline Suppliers Maintain Export Target

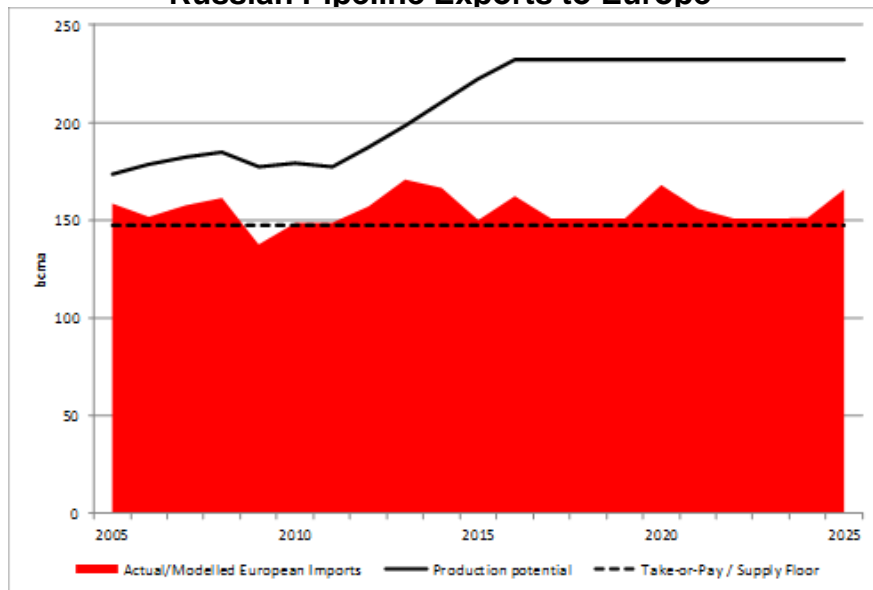
Global LNG Consumption



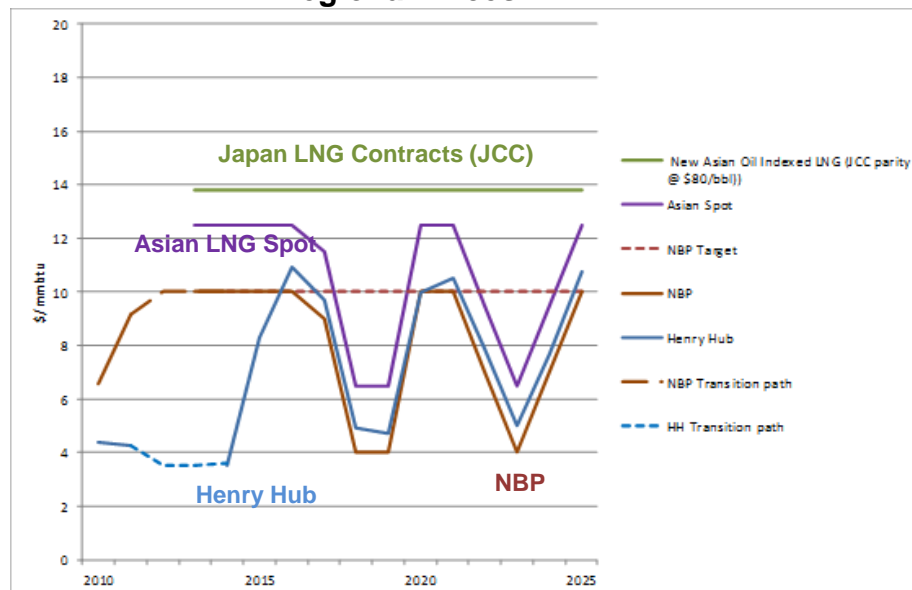
North American LNG Imports/Exports



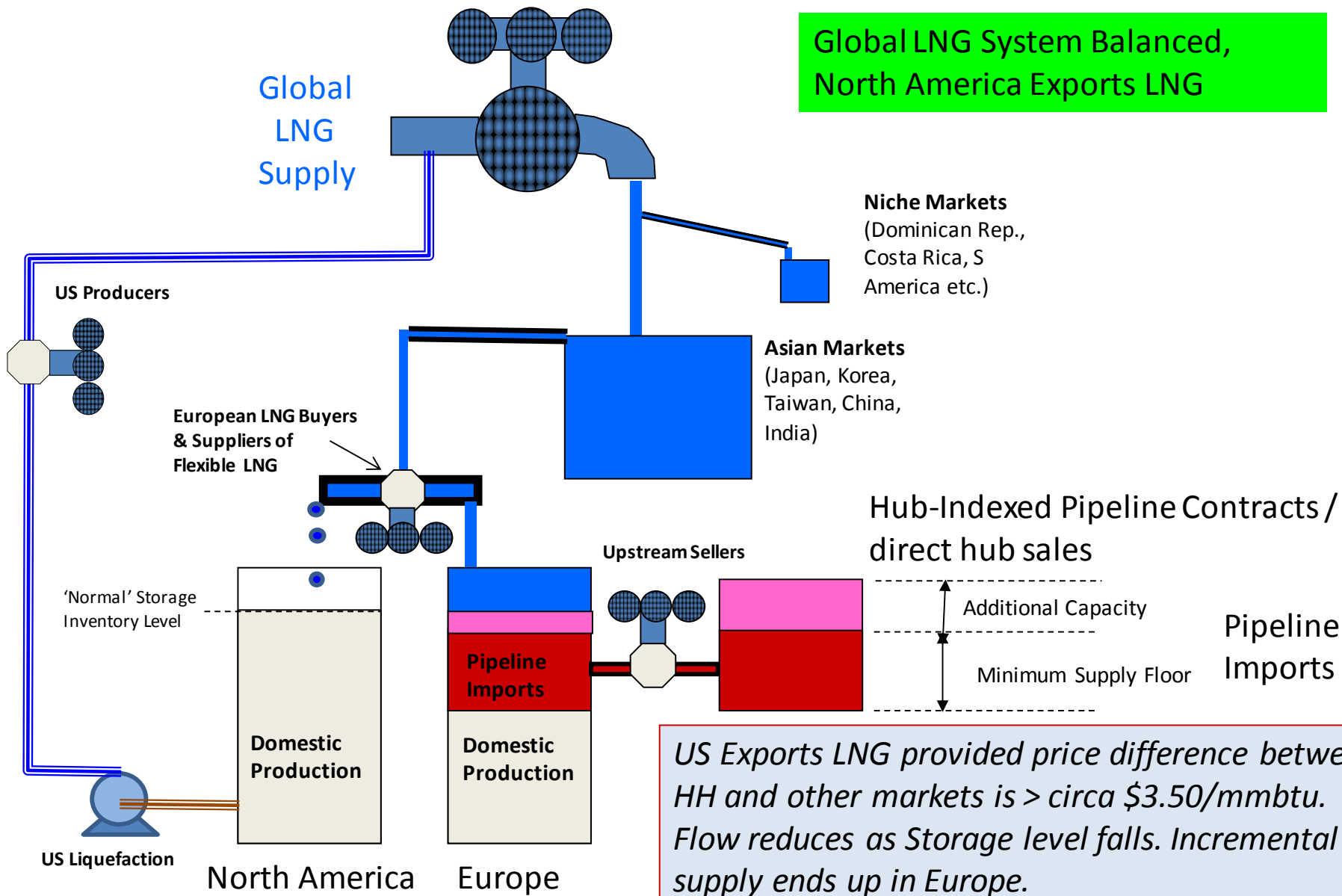
Russian Pipeline Exports to Europe



Regional Prices



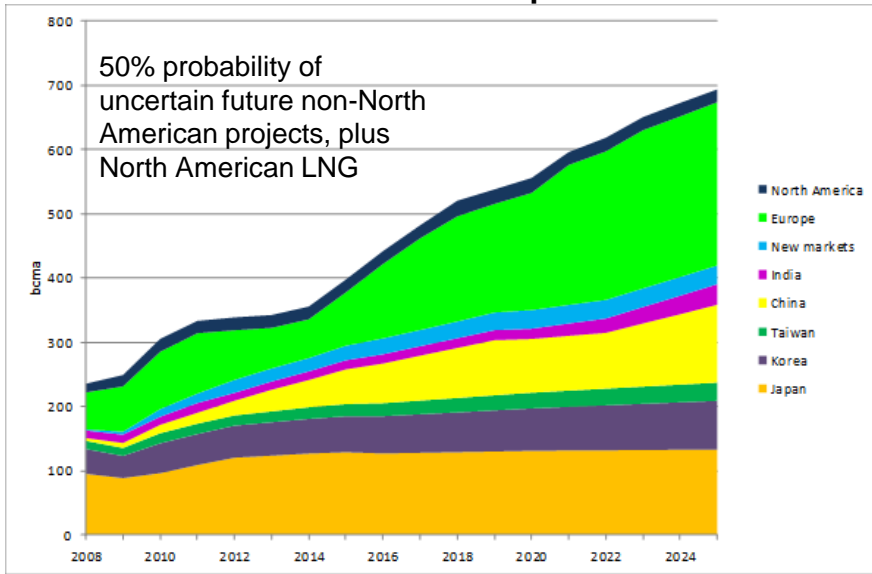
Global LNG System 2015+ High US Production



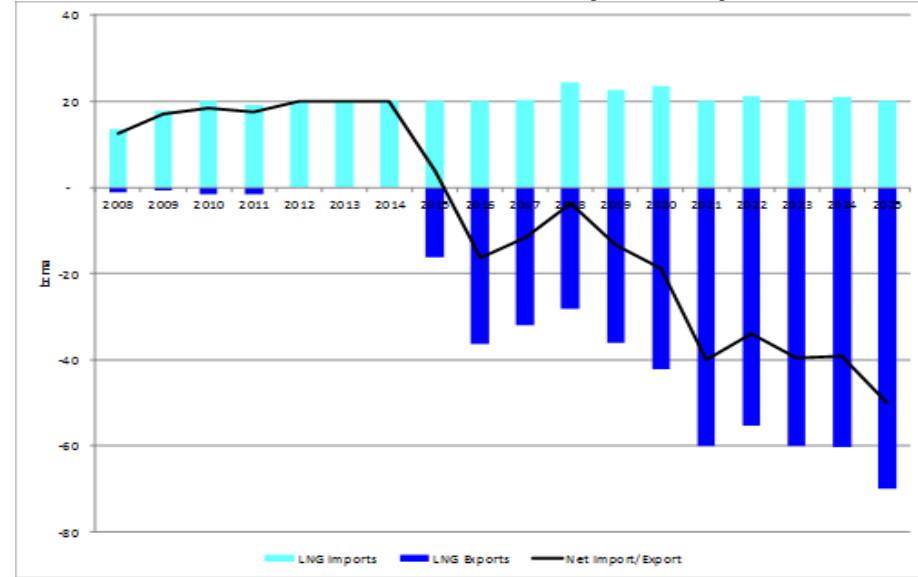
US Exports LNG provided price difference between HH and other markets is > circa \$3.50/mmBtu. Flow reduces as Storage level falls. Incremental supply ends up in Europe.

High US Production, High Asian Demand, European Pipeline Suppliers Enforce Price Target

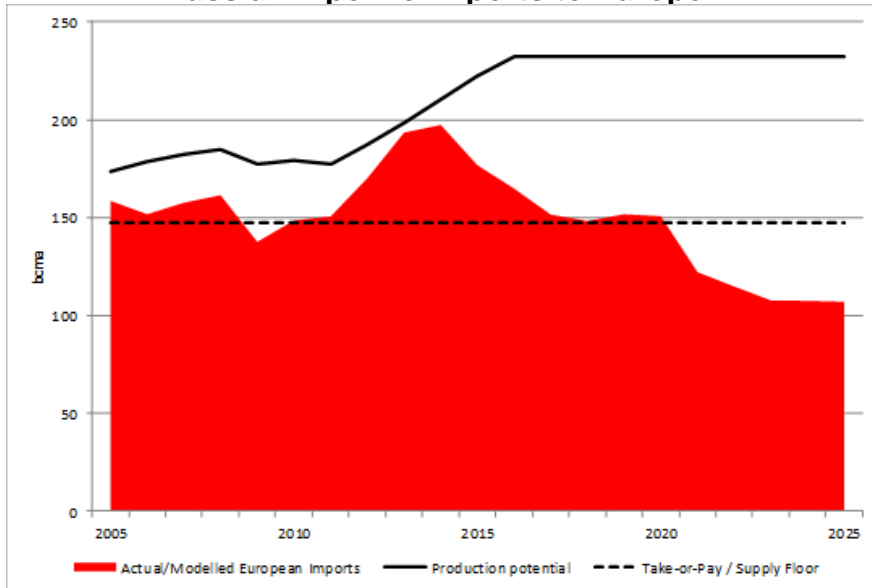
Global LNG Consumption



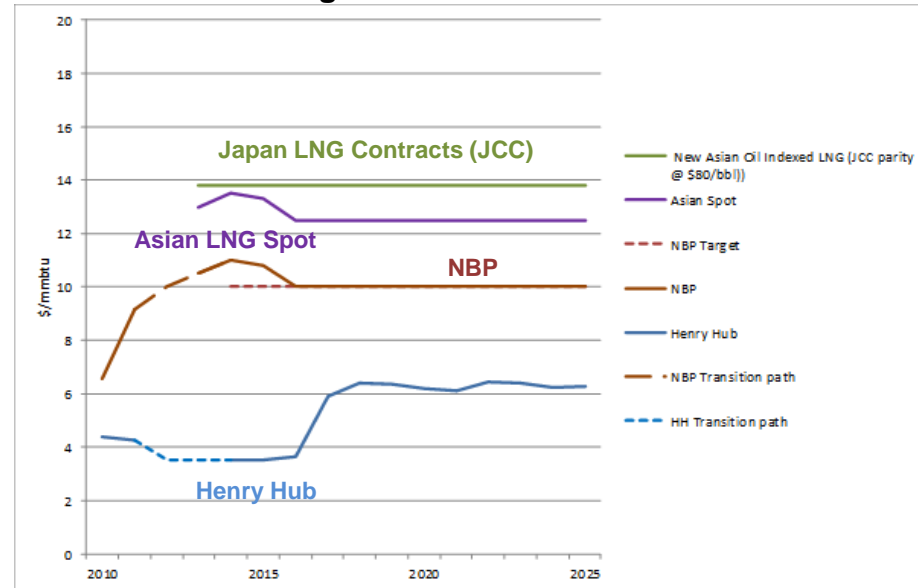
North American LNG Imports/Exports



Russian Pipeline Exports to Europe

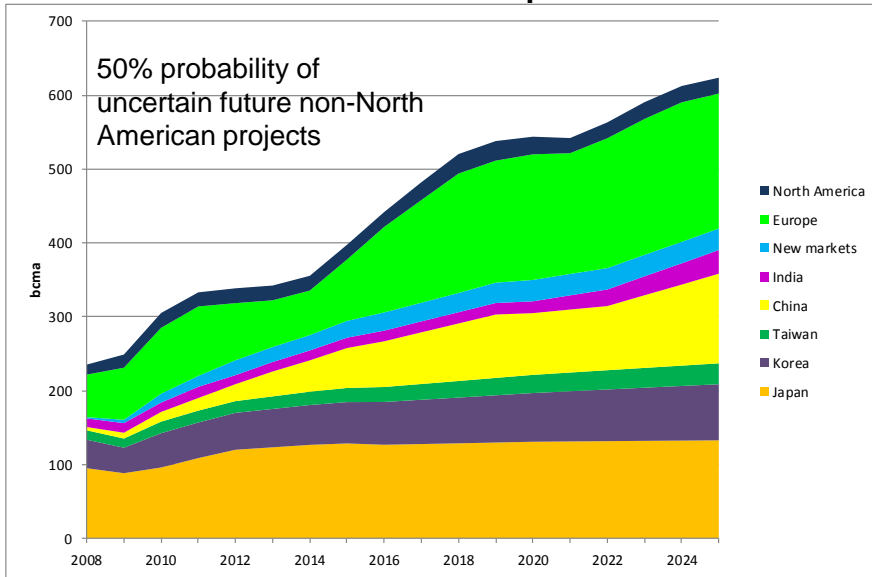


Regional Prices

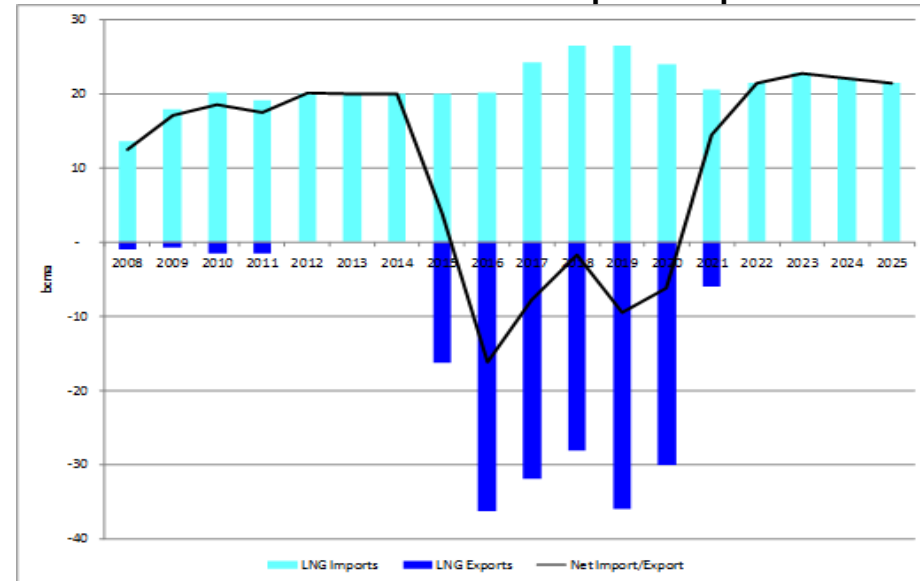


High US Production, High Asian Demand, European Pipeline Suppliers Maintain Export Target

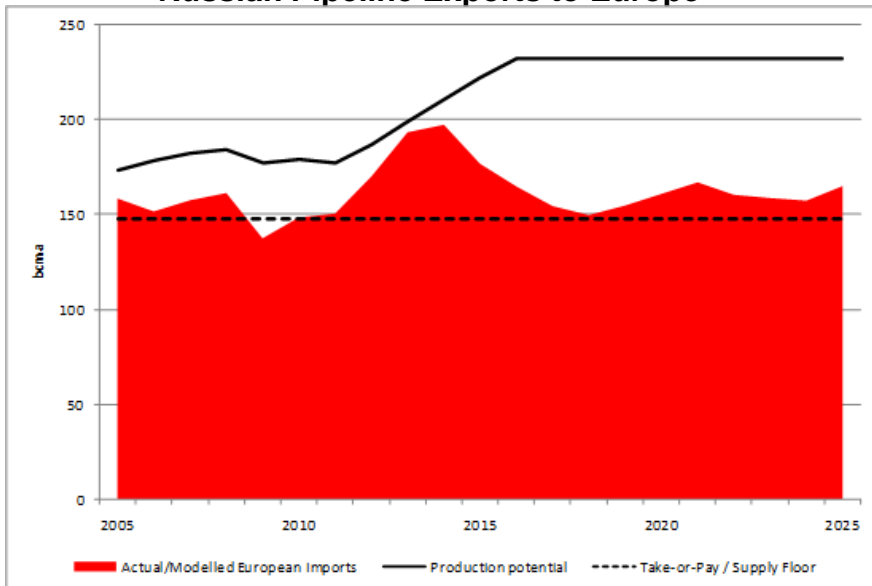
Global LNG Consumption



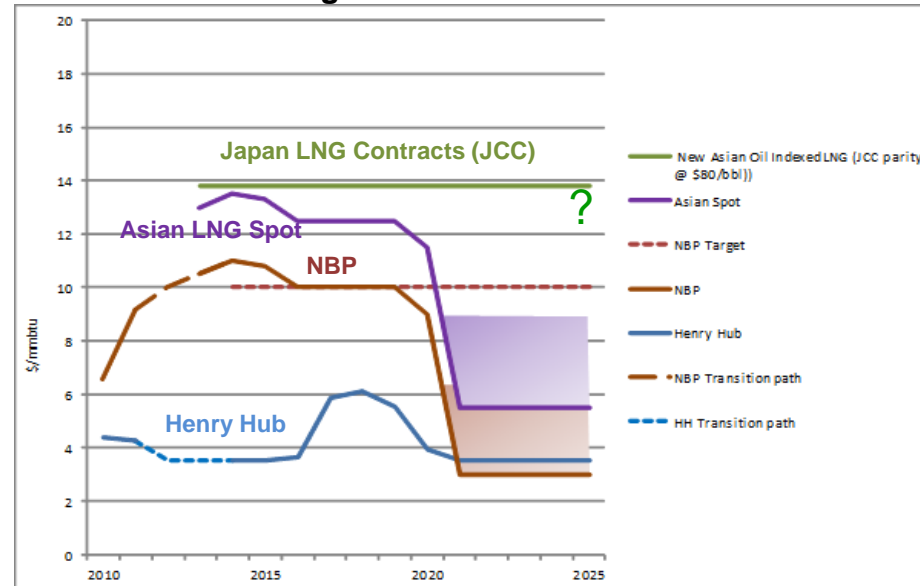
North American LNG Imports/Exports



Russian Pipeline Exports to Europe

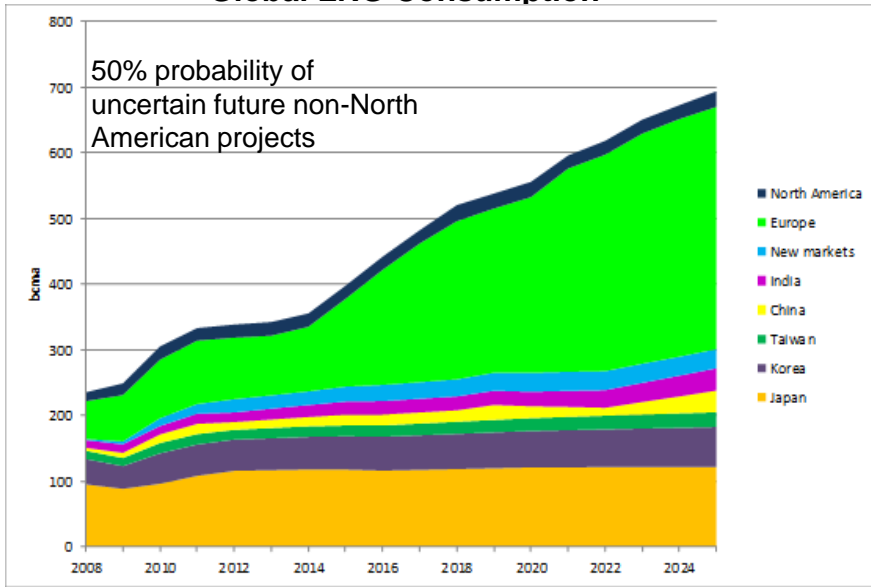


Regional Prices

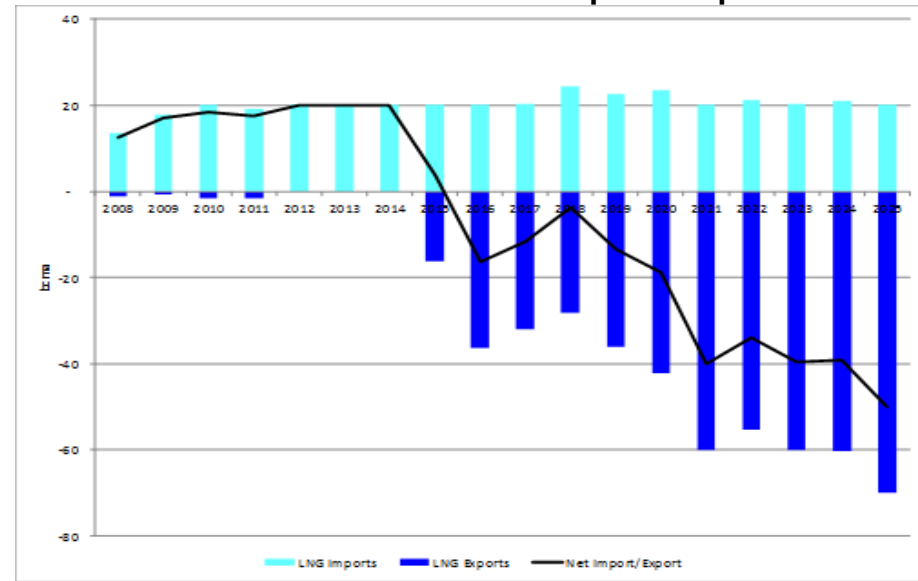


High US Production, Low Asian Demand, European Pipeline Suppliers Enforce Price Target

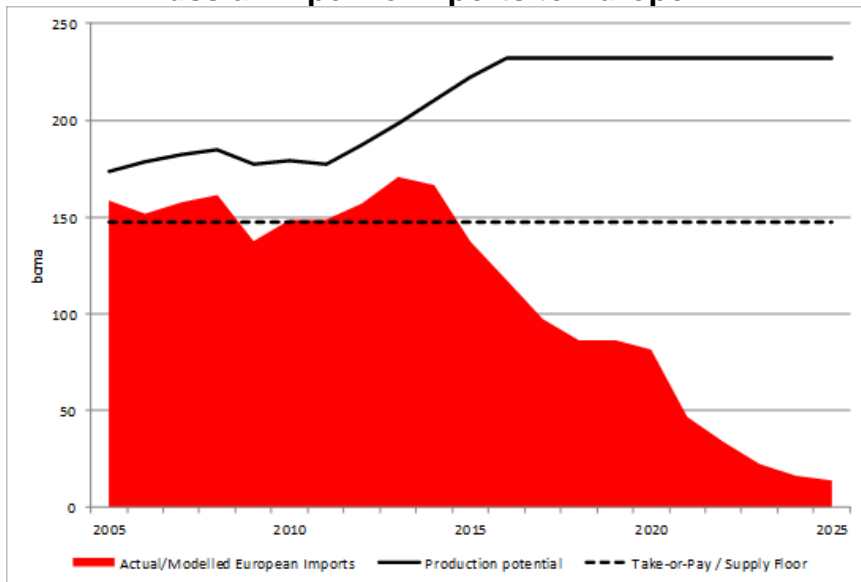
Global LNG Consumption



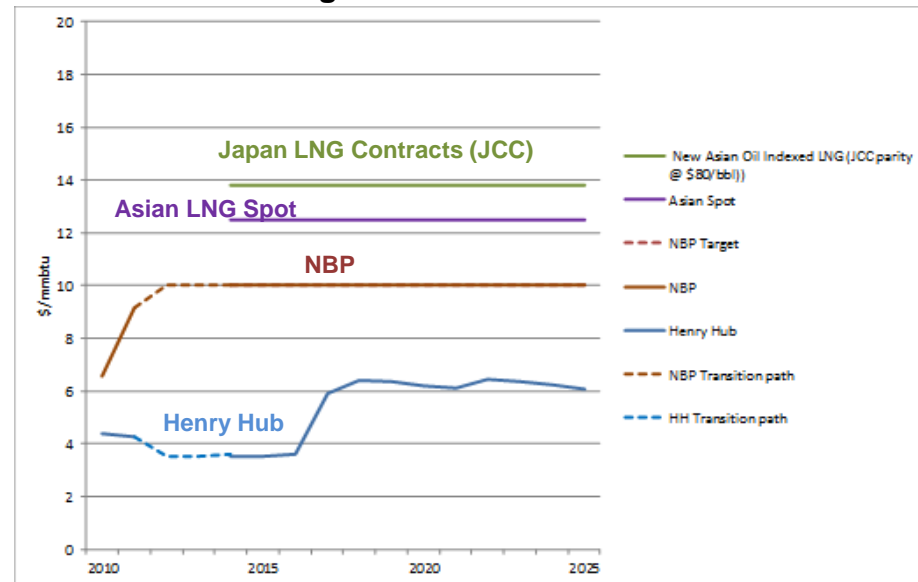
North American LNG Imports/Exports



Russian Pipeline Exports to Europe

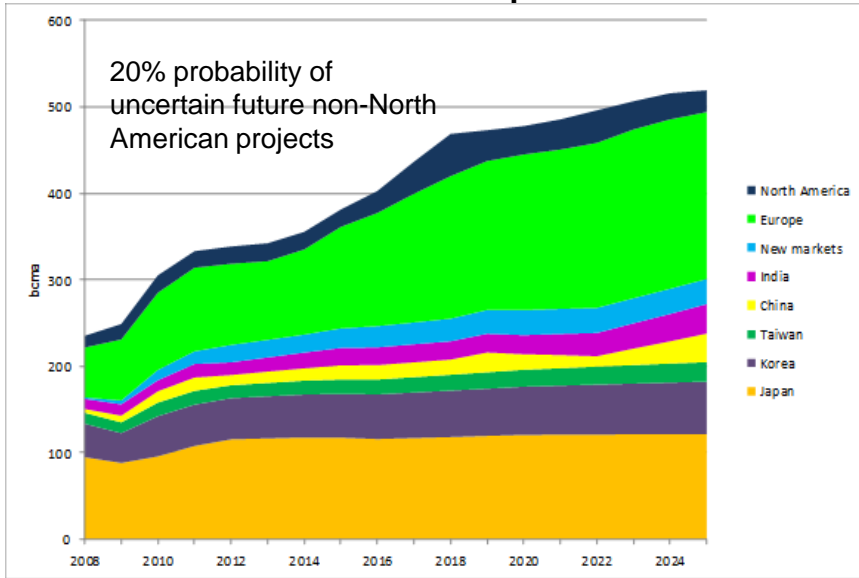


Regional Prices

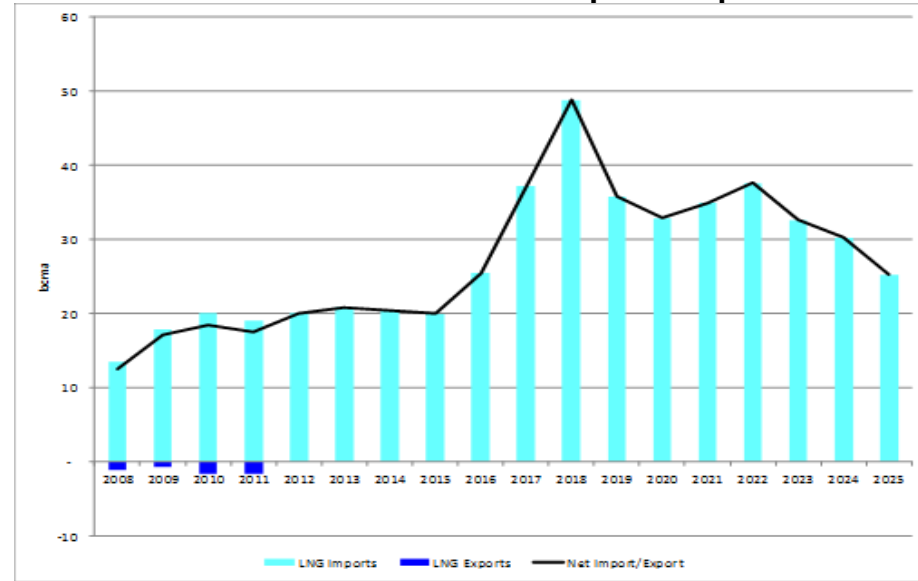


High US Production, Low Asian Demand, European Pipeline Suppliers Maintain Export Target

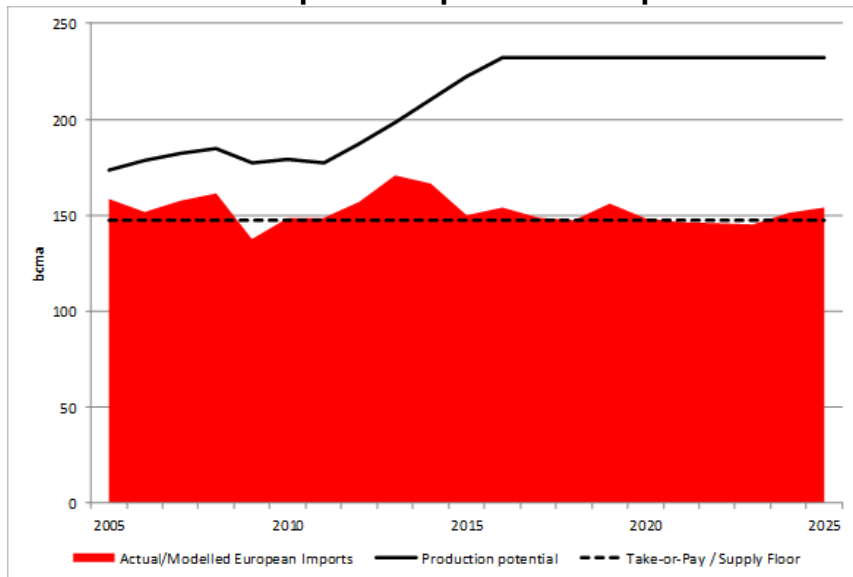
Global LNG Consumption



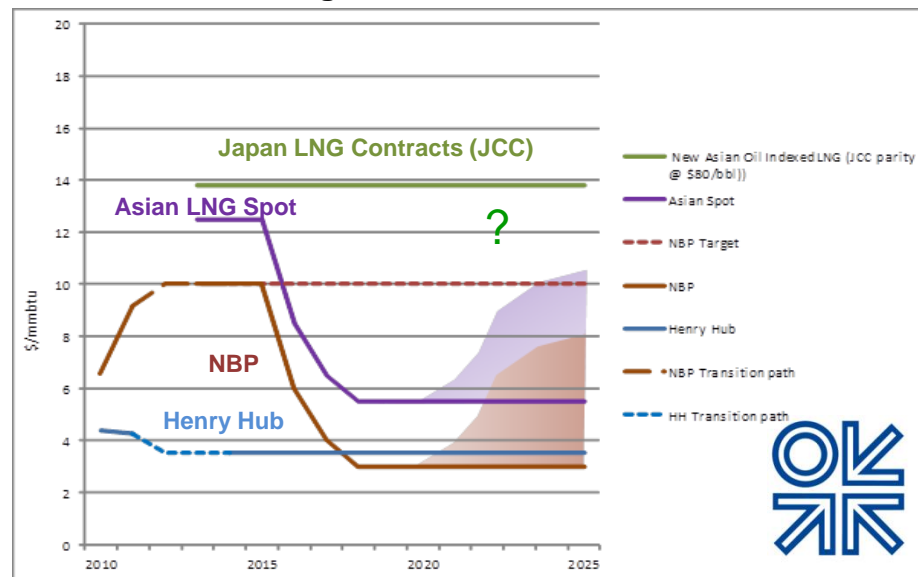
North American LNG Imports/Exports



Russian Pipeline Exports to Europe



Regional Prices



If Oil Indexation Survives ?

- Economic Viability of Midstream buyers of Russian gas unlikely on following scenarios:
 - Low US Production, Low Asian Demand (2015+).
 - High US Production, High Asian Demand (2020+)
 - High US Production, Low Asian Demand (2015+)



High Level Conclusions

- **The Past: European Gas Security of Supply = focus eastward on Russian supply capability and transit issues.**
- **The Future: What happens to US Production and Asian LNG Demand is at least as important.**
- **And these factors also challenge:**
 - Russia (in a post oil-indexation world – price vs volume)
 - Midstream buyers of Russian Gas if oil indexation survives
 - In the ‘High US, Low Asian Demand Scenario’ – the sustainability of the JCC paradigm for Asian LNG contracts.
- **...and the belief that the future is inevitably one of rising gas prices.**
- **The recent surge of LNG which ‘rattled’ the European market a foretaste of things to come ?**
- **NB These are scenarios to explore system dynamics; not predictions.**



Thank You
for your attention.

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