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**WORLD LNG SUMMIT**  
AND AWARDS GALA DINNER  
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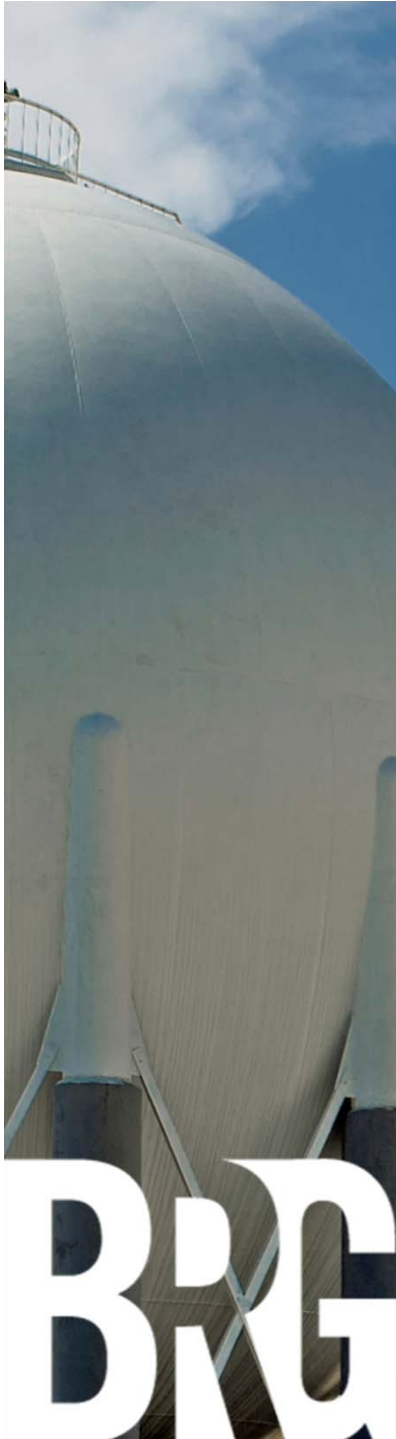


## **LNG Shakeout?**

***Liquefaction Challenges in a  
Surplus LNG, Soft Oil Market***

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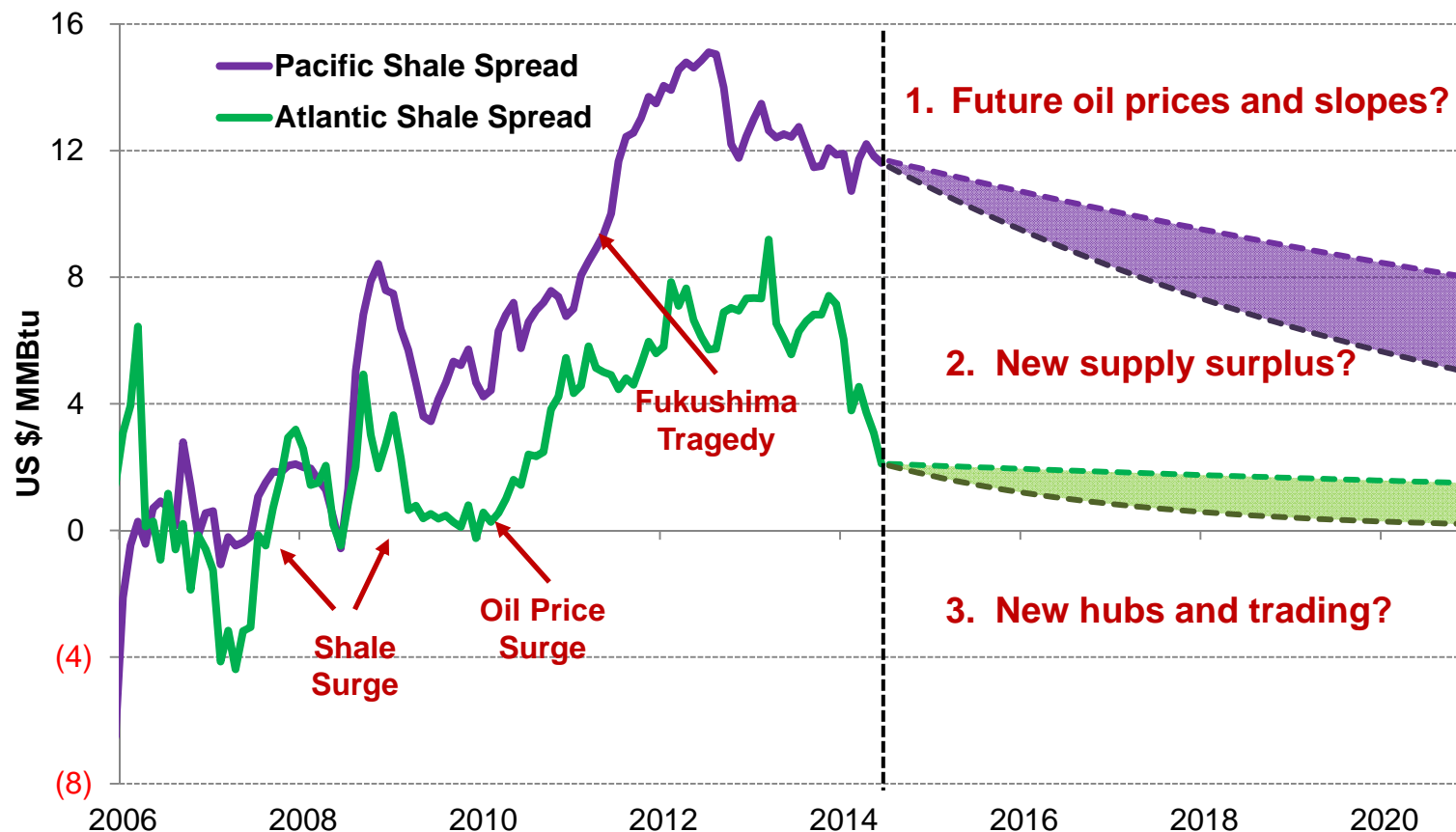


## Agenda

- **LNG Outlook to 2020**
- **Surplus LNG and Soft Oil**
- **Liquefaction Shakeout**

# Shale Spreads Driving Exports, but Softening

The shale boom collapsed U.S. prices while surging oil prices and the Fukushima tragedy boosted LNG prices leading to massive price differentials (or “shale spreads”), but the tide is turning as oil prices soften, Japanese imports stabilize, and U.S. LNG comes to market



**Bottom Line**  
Buyers and sellers will place a premium on economic efficiency throughout the supply chain

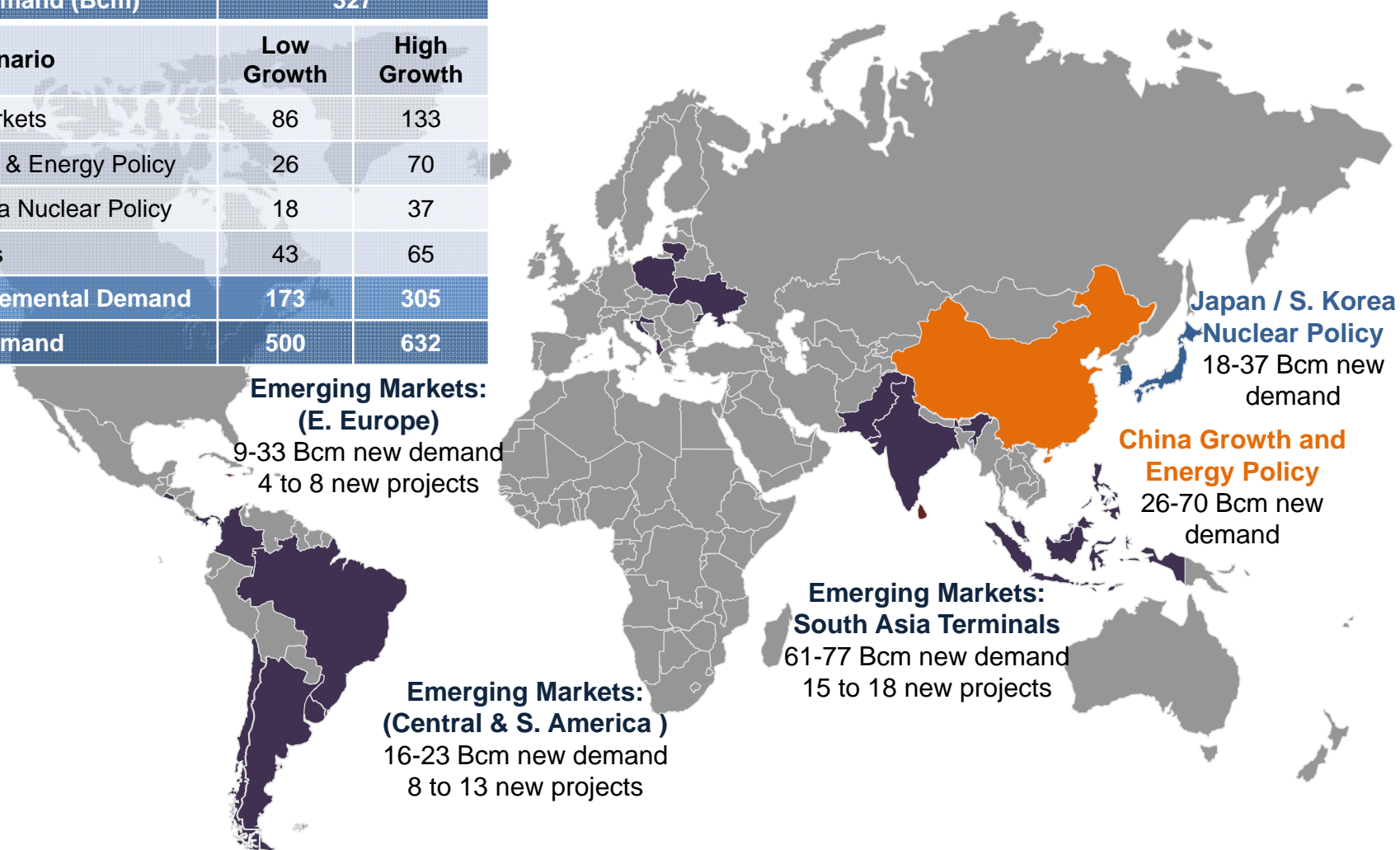
Source: Bloomberg, EIA

Note: Pacific Shale Spread = Japan LNG Custom Prices – Henry Hub (“HH”)  
Atlantic Shale Spread = National Balancing Point (“NBP”) – HH

# Demand Growth Expectations have Softened...

LNG Demand growth has softened and lower growth looks more likely than rapid growth.

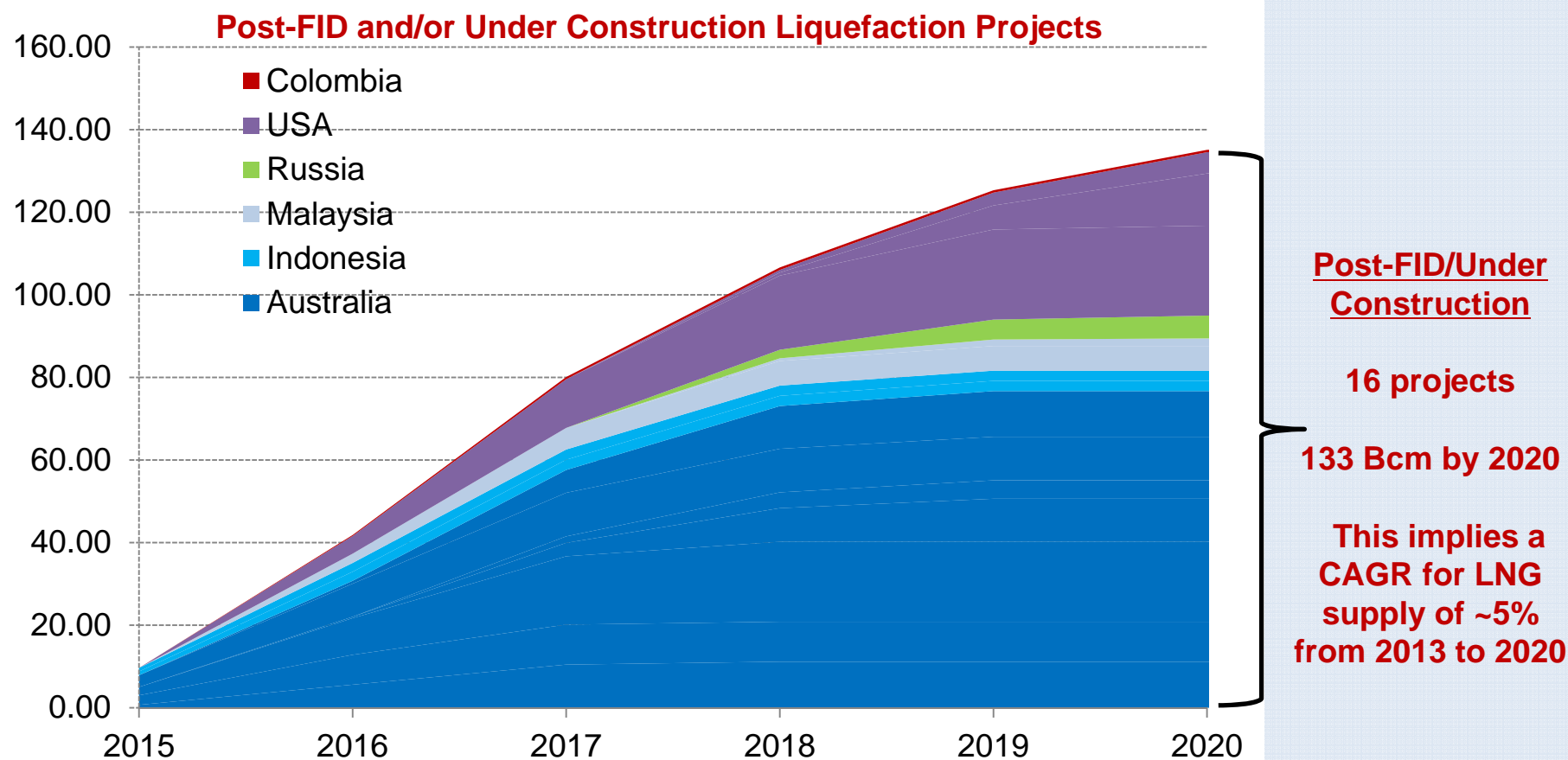
2013 LNG Demand (Bcm)	327	
Demand Scenario	Low Growth	High Growth
Emerging Markets	86	133
China Growth & Energy Policy	26	70
Japan/S Korea Nuclear Policy	18	37
Other Markets	43	65
<b>Subtotal Incremental Demand</b>	<b>173</b>	<b>305</b>
<b>2020 LNG Demand</b>	<b>500</b>	<b>632</b>



Note: LNG demand growth from new regas terminals are calculated by applying benchmark load factors

## ...But Post-FID Liquefaction is Locked

By 2020, the 133 Bcm of liquefaction projects that are post-FID and/or under-construction account for ~77% and ~44% of incremental LNG demand for the low and high growth scenarios, respectively.



Source: BRG Analysis, Global LNG Info



west arbitrage

Basin	Exporters	2020 Supply (Bcm)
Atlantic	14	180
Middle East	5	131
Pacific	9	240
Total	28	551

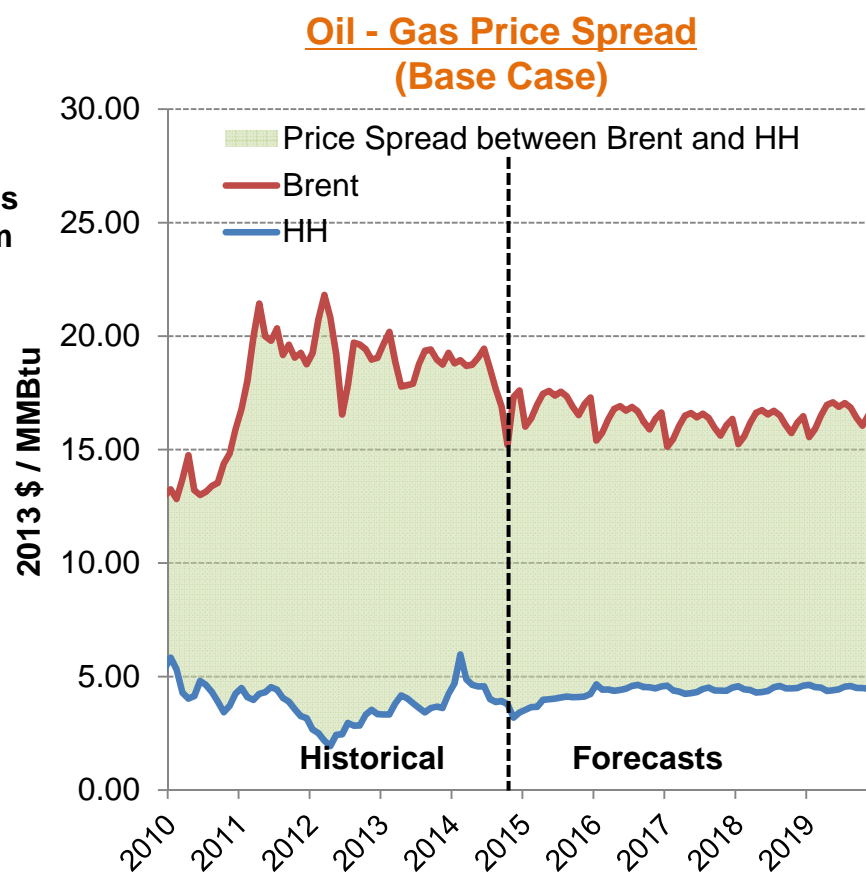
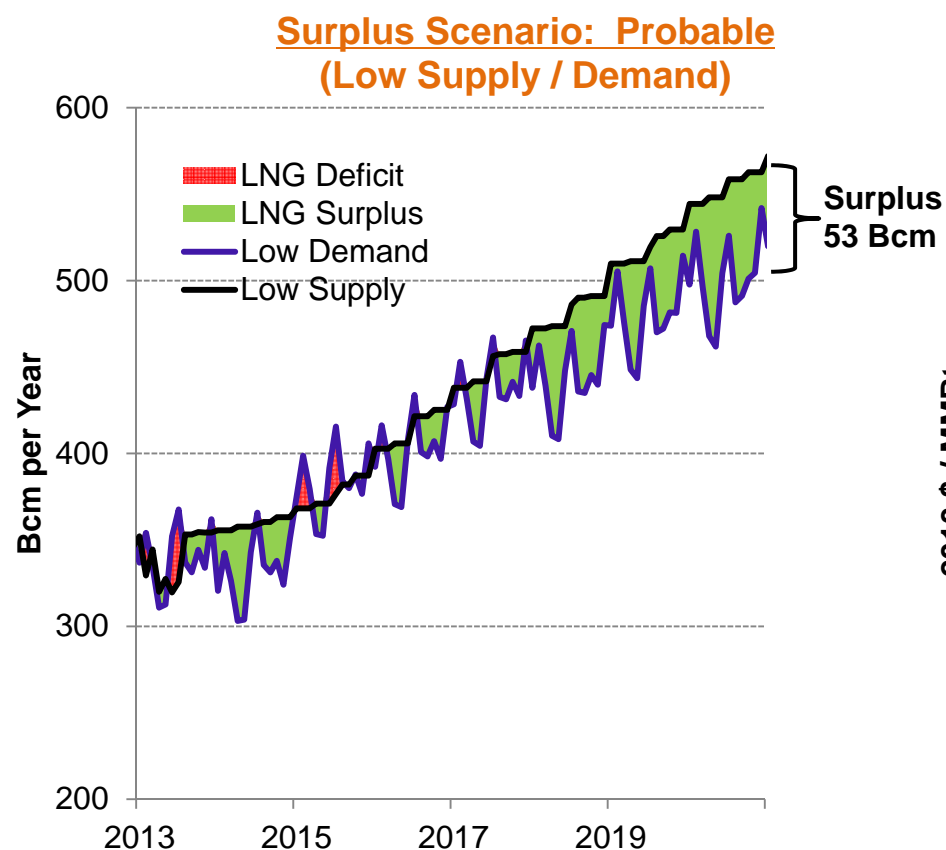
Legend:  
■ Future LNG exporters  
■ Current LNG exporters

Future LNG exporters

Current LNG exporters

# New LNG Surpluses and Softer Oil Prices...

Future LNG pricing will depend on how much LNG consumers can absorb the potentially high US LNG exports and whether oil prices remain soft or soften further.



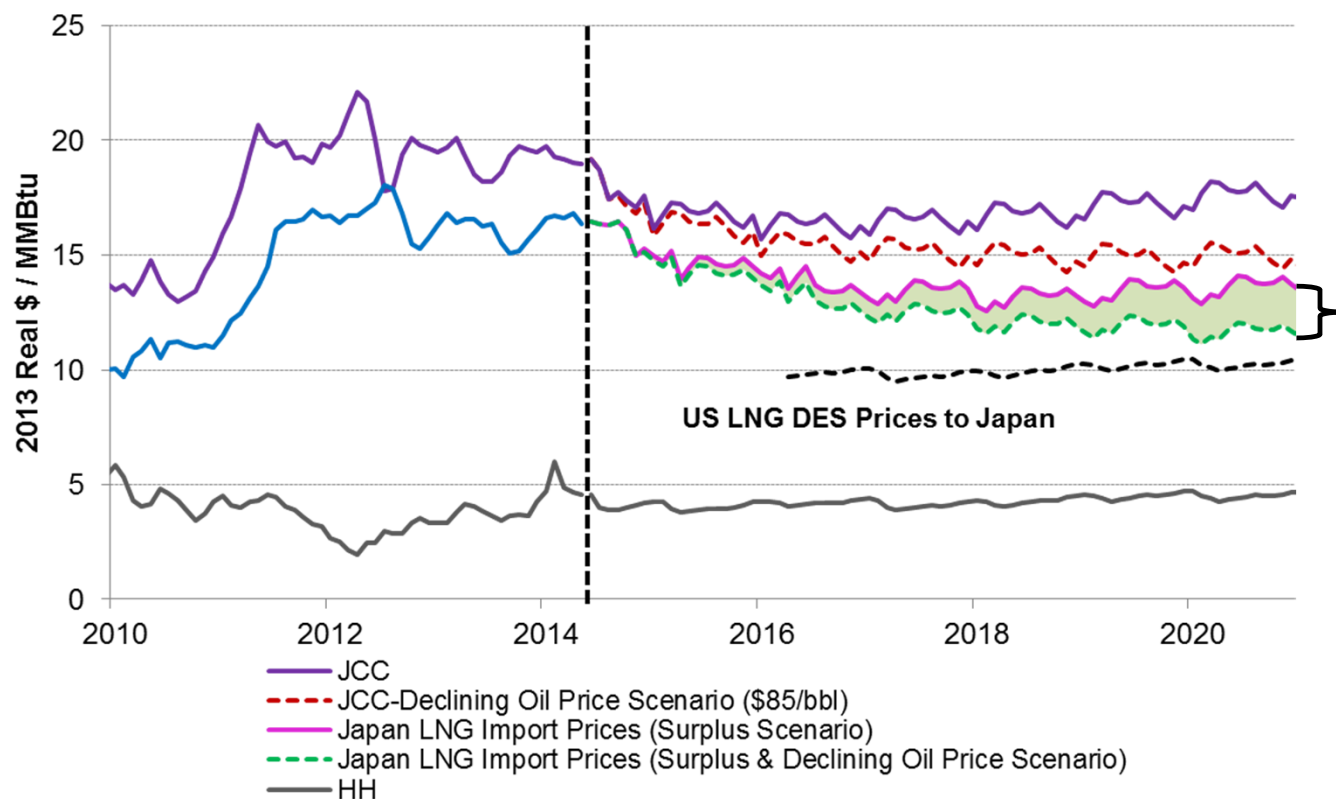
Source: BRG Analysis, BRG Global Balance ("GloBal ") Model, Bloomberg, EIA AEO 2014 Oil Reference Case



## ...Could Yield Shrinking LNG Prices

The probable outlook for LNG surpluses and softer oil could drive LNG prices and shale spreads down through lower oil indexation slopes, lower oil index values, and/or new hub pricing and indexation solutions

### LNG Price Outlook Scenario



### Asian LNG Uncertainty

**LNG surpluses and soft oil could drive prices toward the delivered cost of U.S. LNG**

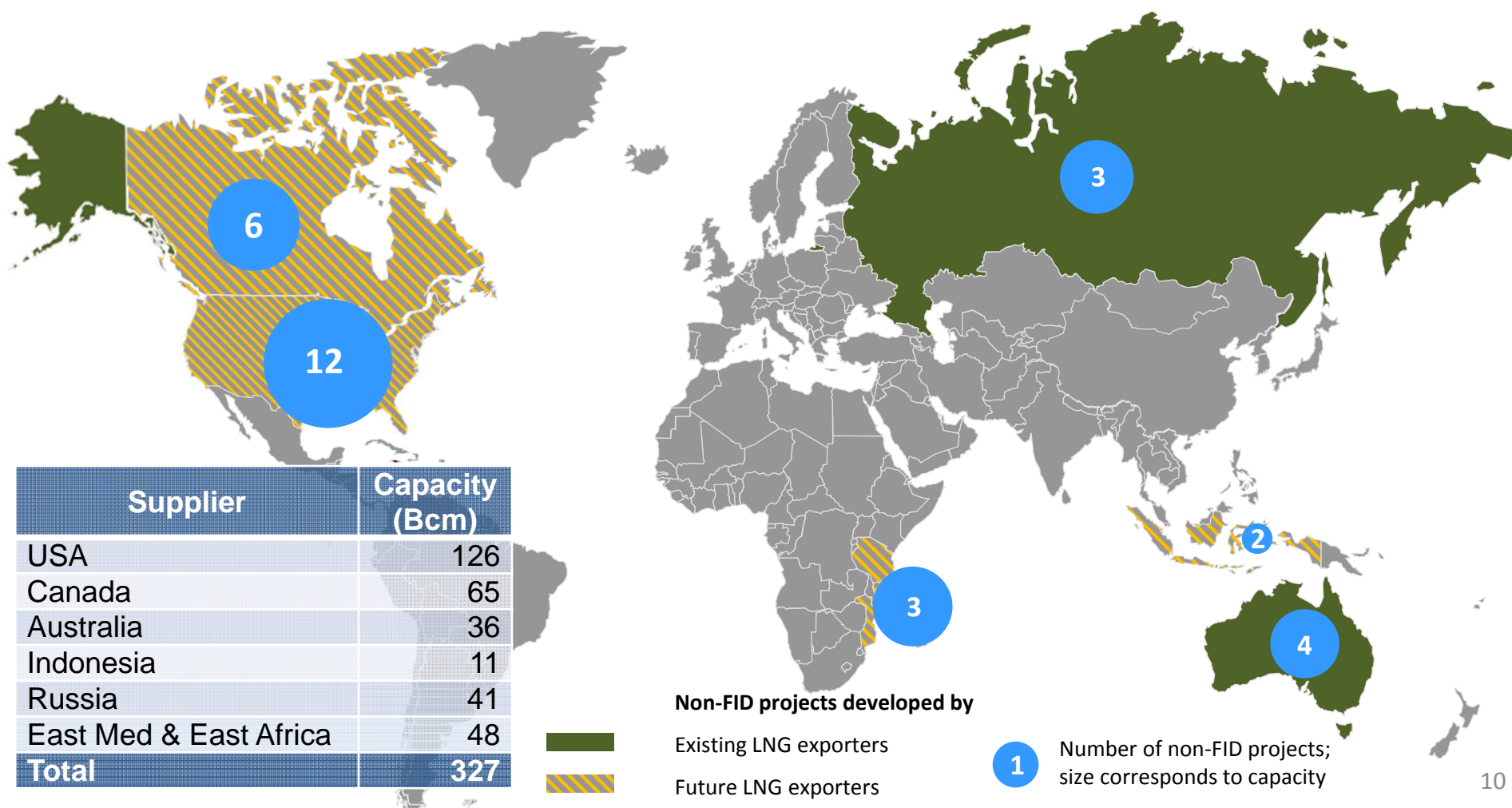
**~\$2.0 / MMBtu of Uncertainty**

**Lower shale spreads will erode the margin on U.S. LNG exports**

**Note:** US DES Prices to Japan = HH\* (1+15% Trading Margins) +\$3 Fixed Fees for liquefaction costs & Terminal Fuel + Shipping Costs to Japan + Panama Canal toll fees.

## Multiple Pre-FID Projects Compete

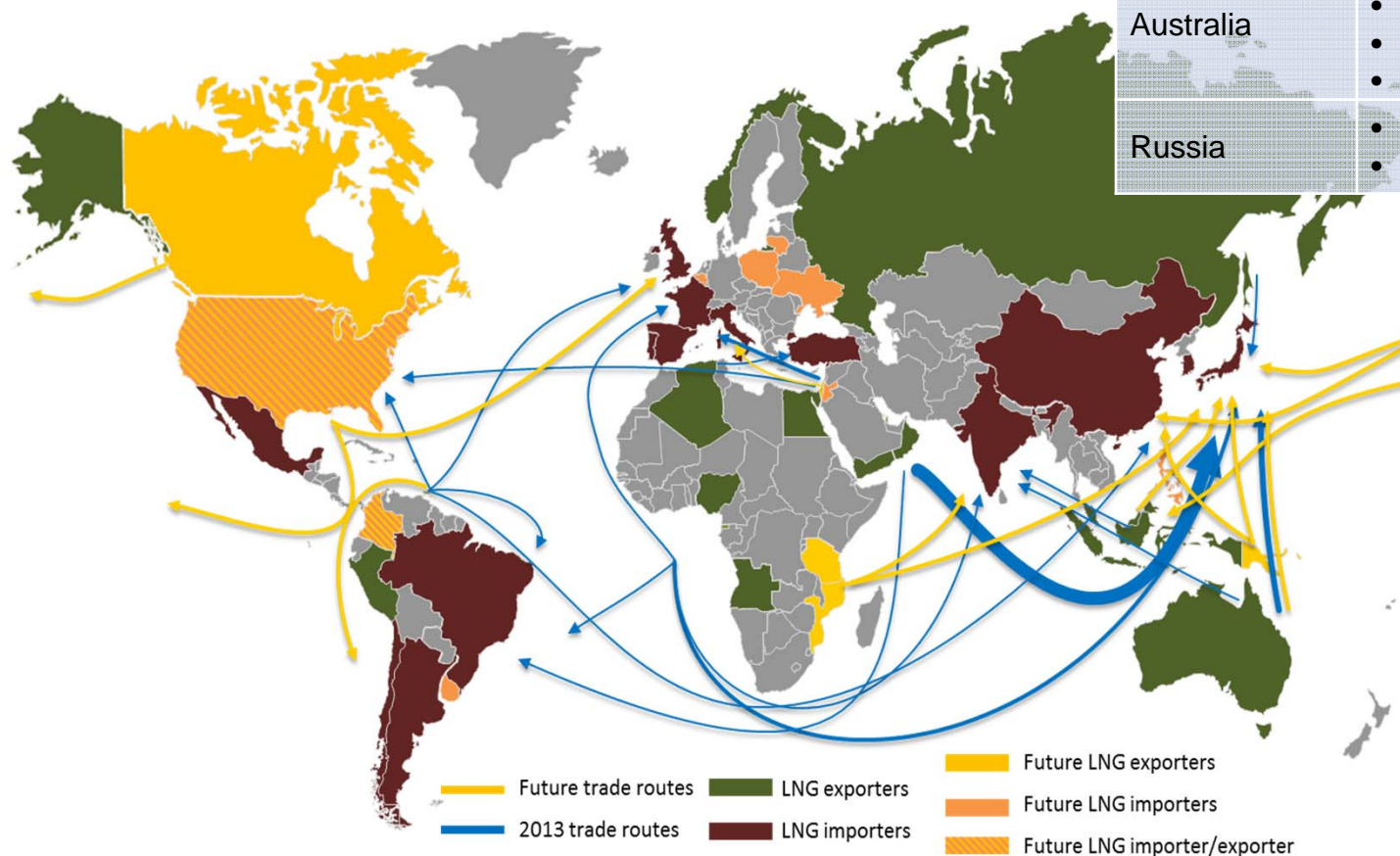
Thirty global pre-FID projects planning FID by 2016 and COD by 2020 are over 7 times greater than total 2020 unserved demand of ~40 Bcm (after considering FID projects). Higher LNG demand growth could reduce this surplus.



## Pre-FID Projects Getting Tougher

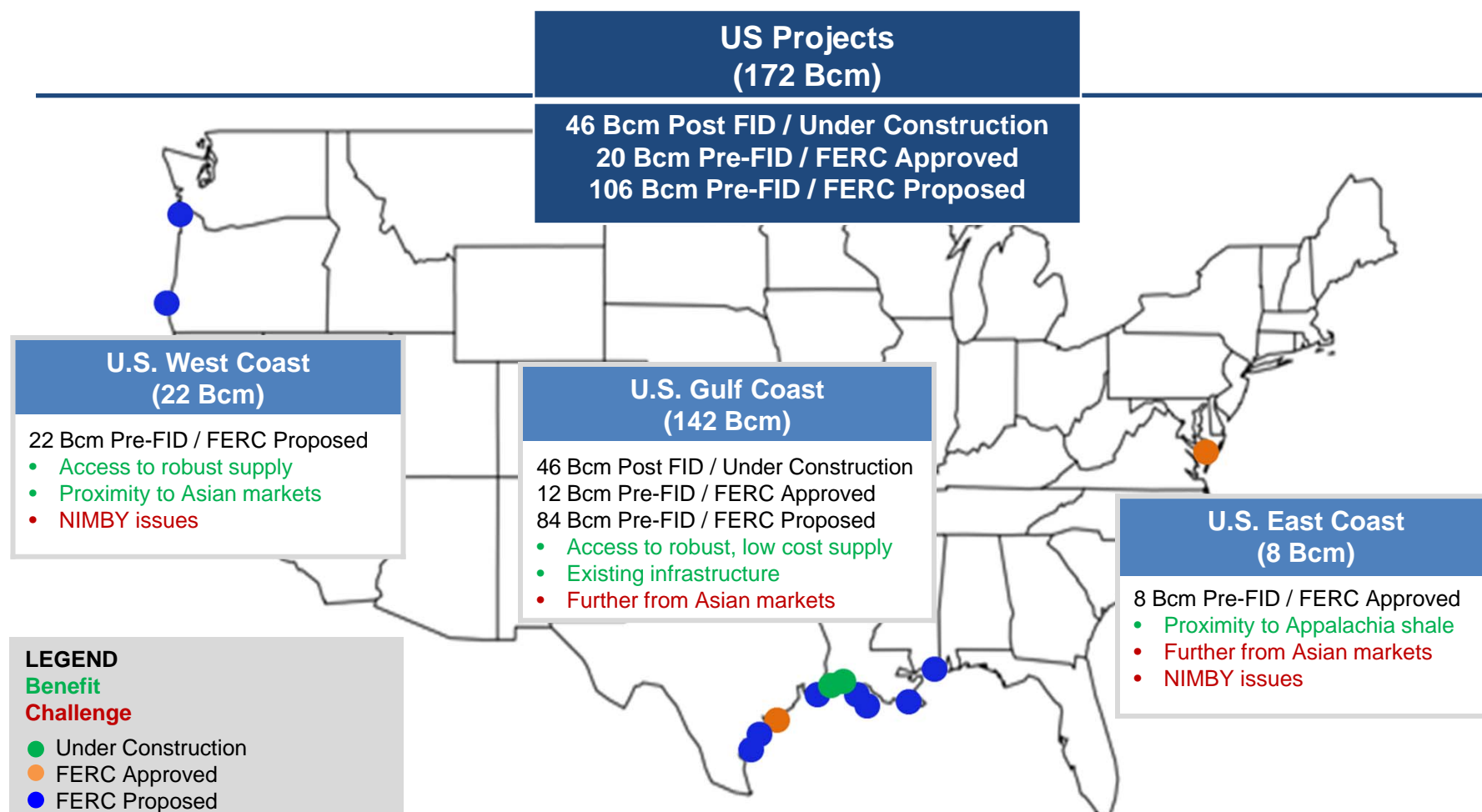
Approaching 2020, it will get harder for pre-FID projects to persuade buyers and banks of their economic value proposition. Some non-US projects already face timing and supply chain cost challenges.

Pre-FID LNG	Challenges
Canada	<ul style="list-style-type: none"> <li>• Remote locations</li> <li>• Qualified labor constraints</li> <li>• Greenfield pipelines</li> <li>• Land / aboriginal issues</li> </ul>
Australia	<ul style="list-style-type: none"> <li>• Remote greenfield locations</li> <li>• Qualified labor constraints</li> <li>• Historical cost overruns</li> <li>• FLNG technology risk</li> </ul>
Russia	<ul style="list-style-type: none"> <li>• Economic risk</li> <li>• Pipeline export competition</li> </ul>



# U.S. LNG Race for COD by 2020

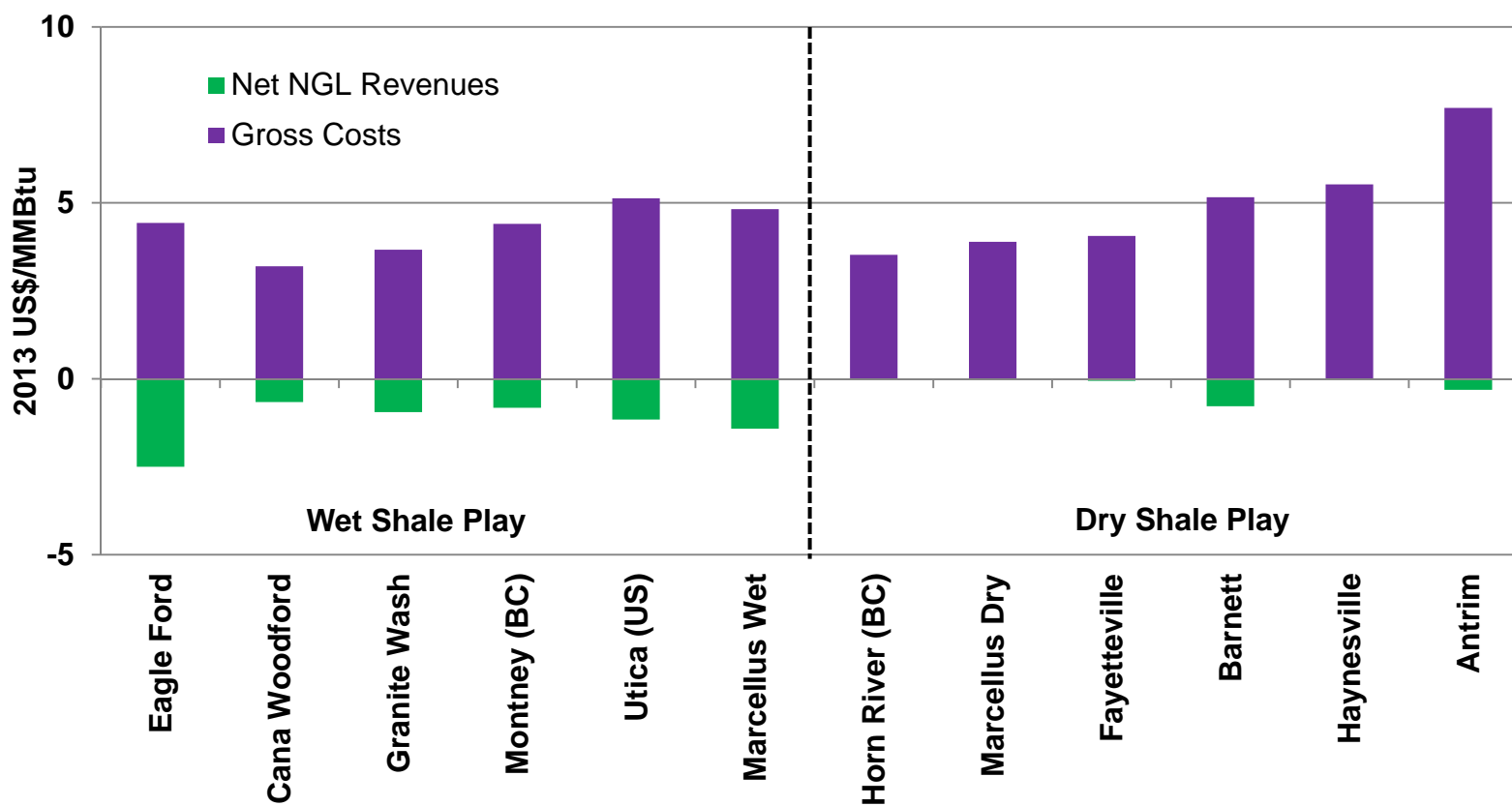
The U.S. now has over 172 Bcm of projects targeting COD by 2020 – with only 46 Bcm currently post FID and/or under construction and another 126 Bcm with FID Planned by 2016. The three regional clusters have unique challenges and opportunities.



# U.S. LNG Underpinned by Sustainable Shale

U.S. shale production economics indicate that a high volume of low cost output will be sustainable for several decades – the “sweet spot” wells represent approximately a third of reserves in lead plays

**Class I & II Wells – Average Costs by Play (2015)**



Source: BRG Analysis, BRG's Shale Resource Potential ("ShaRP") Model



## U.S. Export Prospects are Solid

Recent approvals and commercial success for U.S. LNG have enhanced prospects for terminal construction— with target 2020 exports around 61 to 91 Bcm, representing approximately 35% to 53% of the 173 Bcm of global incremental demand from our Low Growth case\*

- The new DOE review process levels the playing field by eliminating the DOE queue as a factor in project commercialization
- Project success will be driven by the FERC, buyers, and bankers

### U.S. LNG Advanced Project Capacity

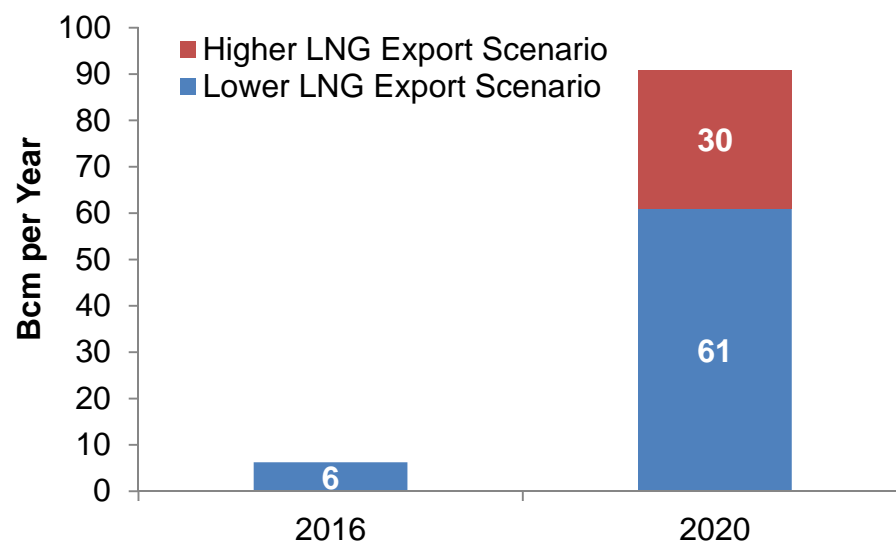
Advanced Projects Status**	No	Capacity (Bcm)	Contracted Capacity (Bcm)
Under Construction	2	40***	39
FERC Approved / Not Financed	3	26	26
Awaiting FERC Approval / Commercially Contracted	5	67	43
<b>Total Advanced</b>	<b>10</b>	<b>133</b>	<b>108</b>

\* Incremental LNG demand measured as difference between our 2020 estimate and 2013 LNG trade volumes from BP Statistical Review of World Energy, 2014.

\*\* Includes expansions.

\*\*\* Peak Capacity could reach 45 Bcm under optimal operating conditions.

### U.S. LNG Export Volume Scenarios



Sources: BRG Analysis, BRG's GIEq model



# Execution and Supply Chain Cost are Crucial

Pre-FID projects are in a race to achieve COD by or before 2020 and so need to achieve FID in 2015 or 2016. Swift execution and efficient supply chain costs will be crucial to the liquefaction project panel of judges -- buyers, bankers, and investors

## 1. Efficient execution and speed to market at a premium

- Locking in buyers early
- Getting critical path permits and environmental issues sorted ASAP
- Depending on local resources and competition, locking in qualified EPC contractors ASAP

## 2. Full supply chain economic efficiency crucial

- Irrespective of commercial structure and counterparty credit, does the delivered LNG solution have long-term staying power over the loan and SPA term?
- Will the shale wellhead costs and/or market hub prices remain competitive with regional and global supply alternatives?
- Will there be adequate, low cost pipeline capacity to deliver feed gas to the terminal, and is there any greenfield risk?
- Is the LNG liquefaction technology and configuration economically efficient and cost competitive with the regional and global alternatives?
- Who is taking EPC and cost overrun risk and how can it be managed?
- Is the shipping route to market logistically and economically efficient and well managed?

# THANK YOU

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