

# LNG - The Roadmap

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# Is this your LNG road?





# This is mine



# Where we start and finish

- Overcapacity of LNG production
- A pre-winter bonanza for LNG buyers
- Followed by high winter price markers
- Many projects announced
- And some green shoots emerging
- But what is real?



- The world needs a lot of LNG by 2022
- Demand is growing faster
- US will be the low cost supplier
- HH will be less volatile than oil
- Tenor will be shorter in some cases
- LNG will be more cost competitive

# And the things we think stand in the way

- We are somewhat stuck in the present
- Doing nothing feels like an option
- Low oil prices mask the future trends
- Indexation anxiety - the fear of being wrong
- Investments must be made now but how?
- Picking the winners
- Finance vs contract tenor?




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This time last year at LNGA

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# Five pointers from LNGA March 2016

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1. Low LNG prices are a false positive 
2. Volatility will matter as much as price
3. US LNG is the answer, but old habits die hard
4. Demand may not be what it used to be
5. Long term cost reductions must be secular not cyclical

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## Industry context today

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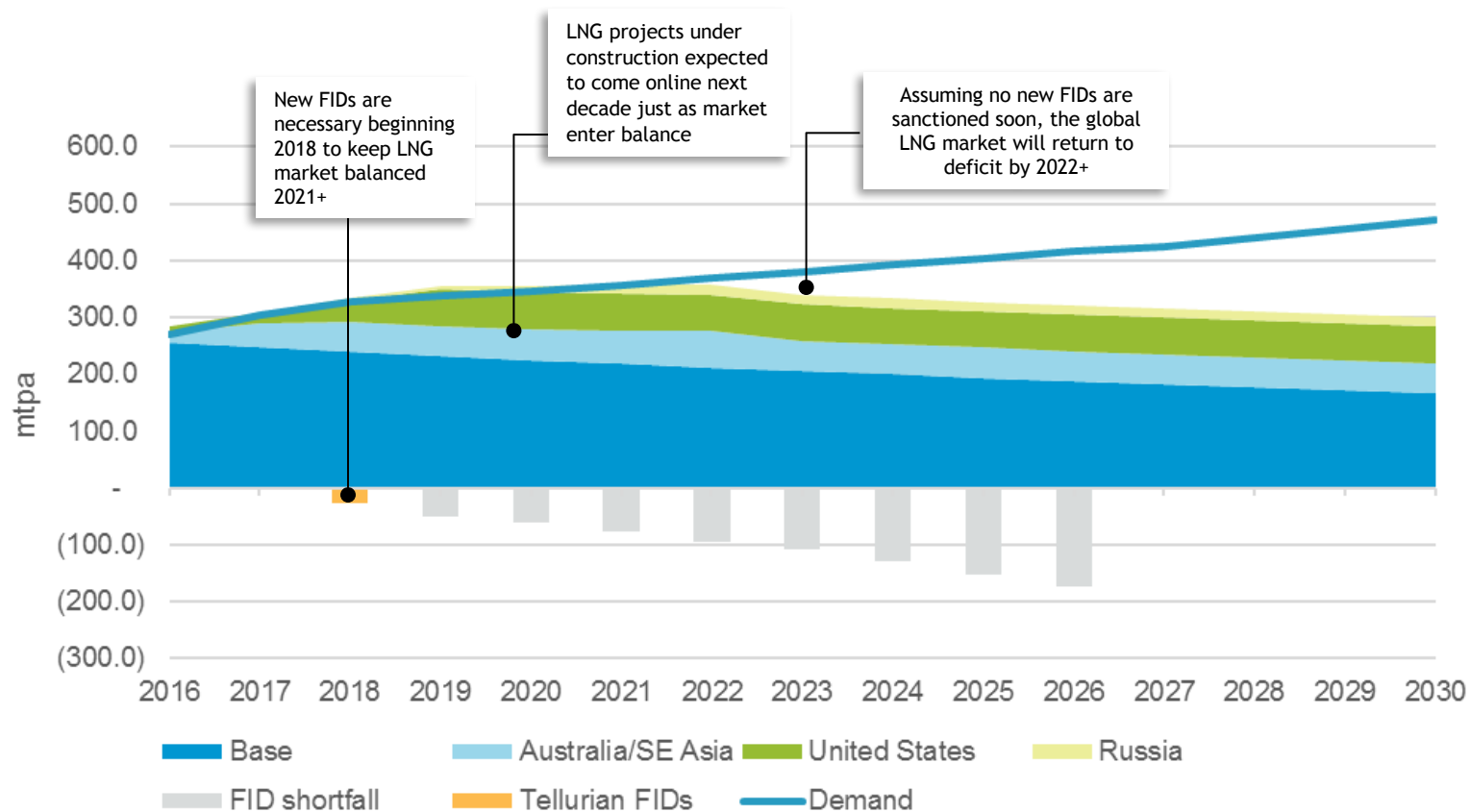
# Context

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- Overcapacity of LNG production today
- A pre-winter bonanza for LNG buyers
- No incentive to do anything
- Any move may be wrong or at least not what others will do
- But demand is growing faster than we imagined a year ago
- And if we are to match the demand in 2020+ we must invest now



# The world needs LNG - investment needs to start today



# Green shoots

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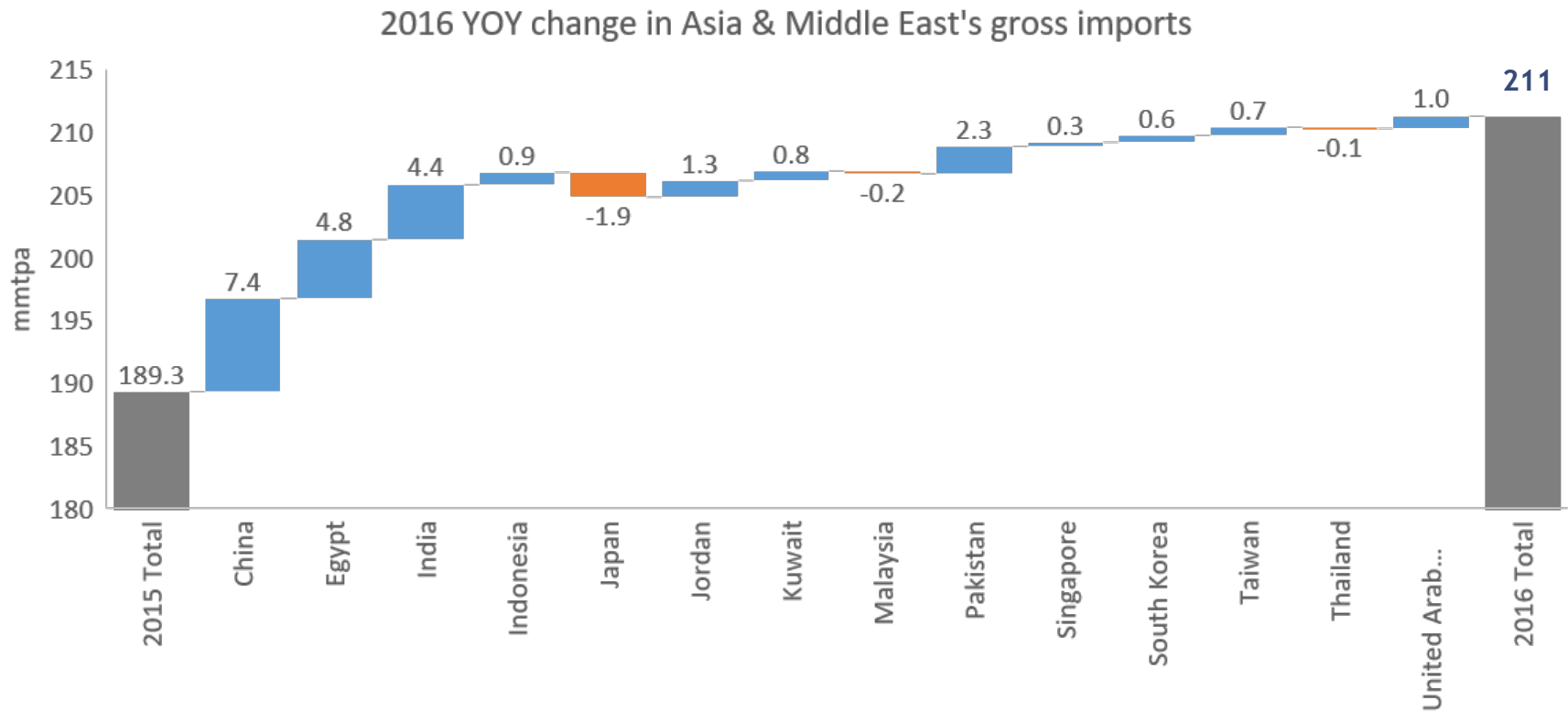
- The narrative is changing slightly
- Some brownfield and expansion projects are more vocal
- Greenfield mostly remains mired on cost and low oil price
- US projects continue - picking the winners needs care
- Winter LNG prices surprised to the upside

# LNG demand indicators

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- Gas demand (hence LNG) is growing at a multiple of oil
- China - third party access will unleash new demand
- India - the last mile is soluble; demand that can pay exists
- The hidden cost of coal is a powerful lever
- FSRUs - 10% of global regas. capacity today
- Asian indigenous production decline and 2016 LNG demand growth
- Russia - proving demand growth in Europe

# 12% growth in Asia/ME LNG demand in 2016 alone



# FSRUs reducing barriers to entry

- Faster and less expensive to construct - reduces stranded asset risk
- Scalability, flexibility - complements renewables
- FSRUs represent 10% of global regas market and growing (2016)
- 150 mtpa of new demand from FSRU projects possible next decade

Element	FSRU	Onshore
Completion	1-2 years	4-6 Years
Capex	\$100-200 million	\$1-2 billion
Annual throughput	1-3 mtpa	4+ mtpa
Storage capacity	Limited by vessel size	On-land storage available
Land use	Small footprint	Significant footprint
Contract tenor	7-15 years	20 year



# LNG contracts

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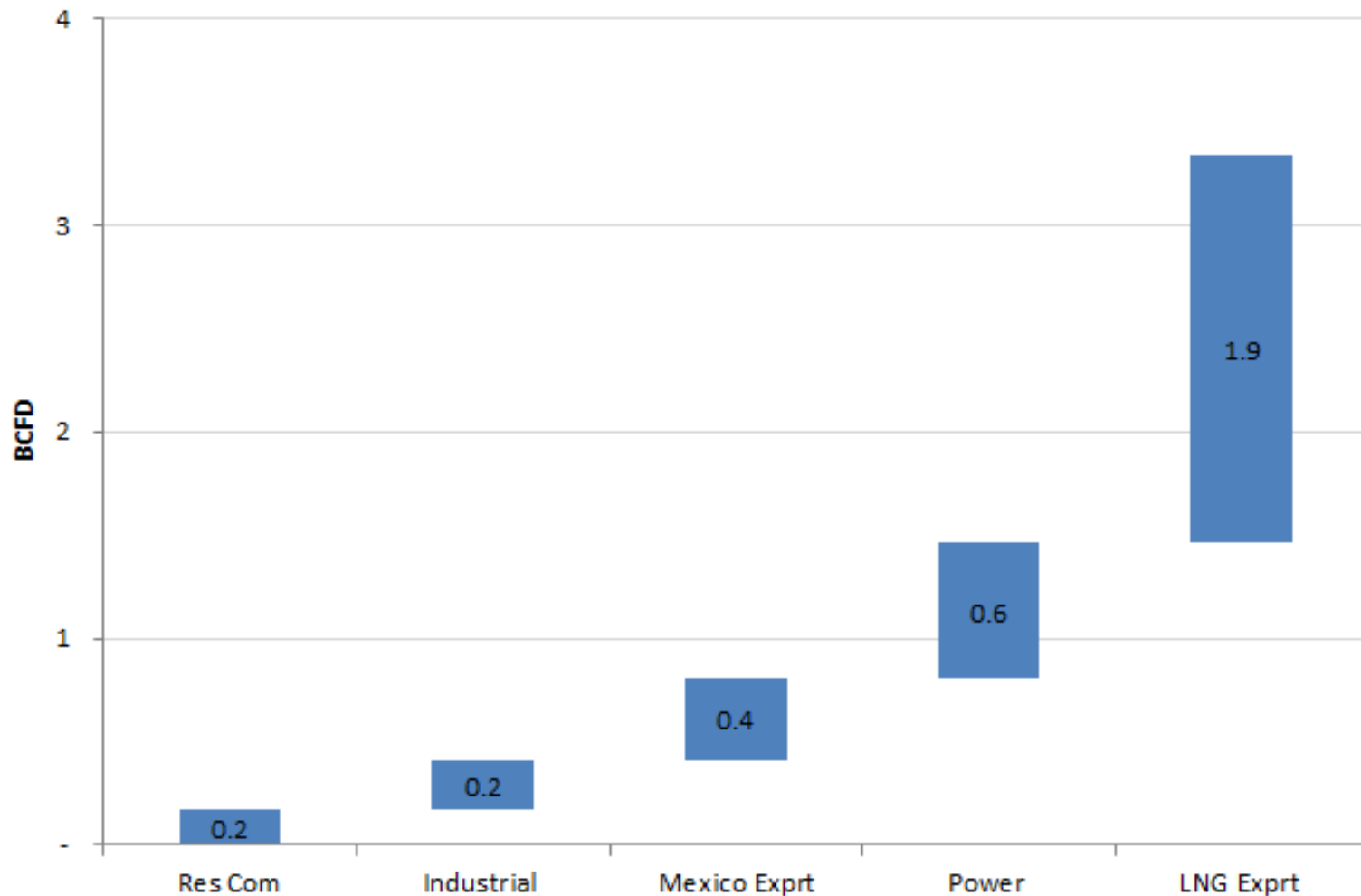
- Mid-term deals getting done
- Majority of buyers are comfortable with oil-linked products
- Lowest cost supply likely to come from new US projects
- Oil linked pricing is not enough to justify new investments today
- European customers increasingly decoupling from oil
- Coal and Russian gas set the range for gas prices

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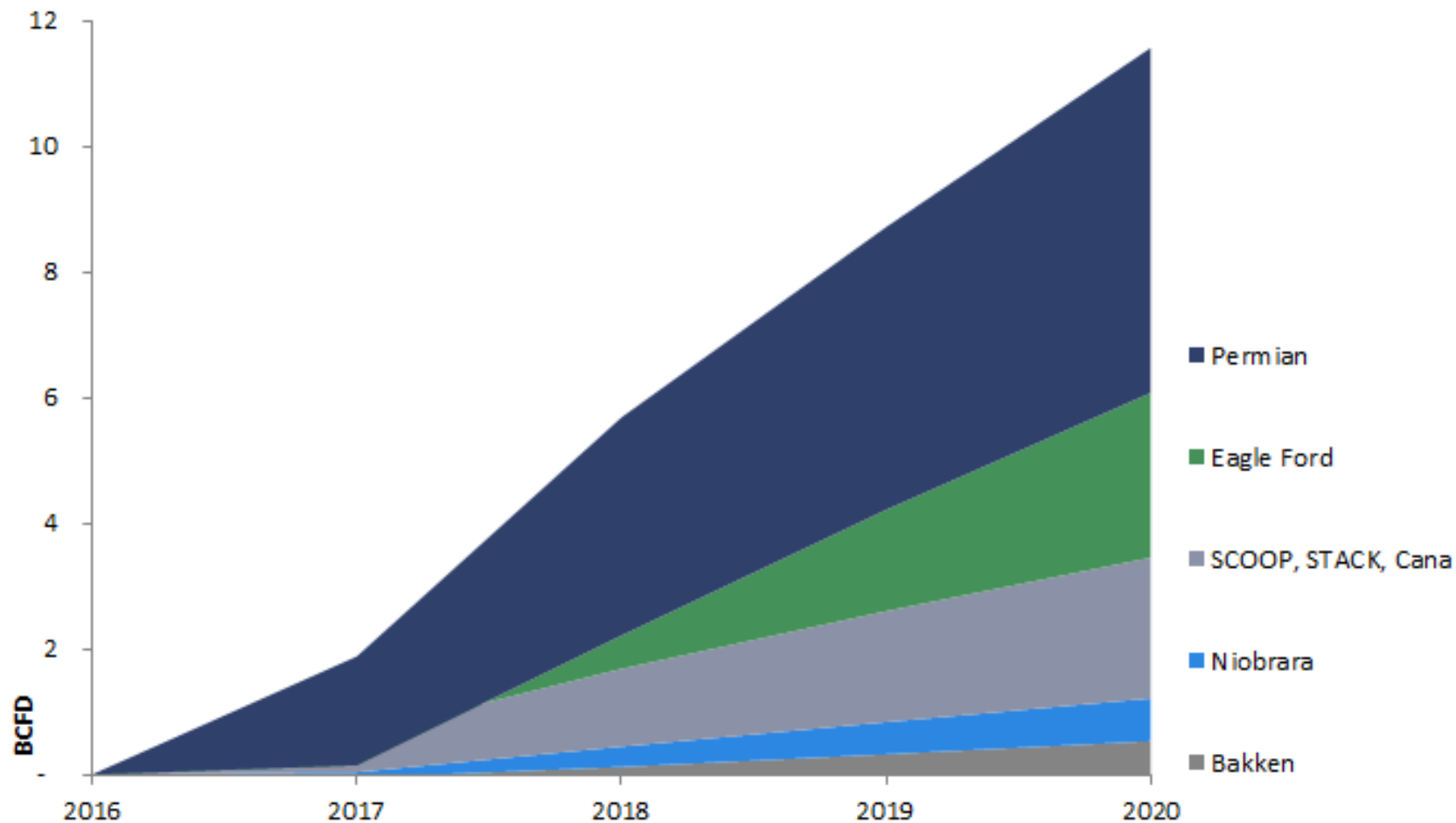
## US LNG

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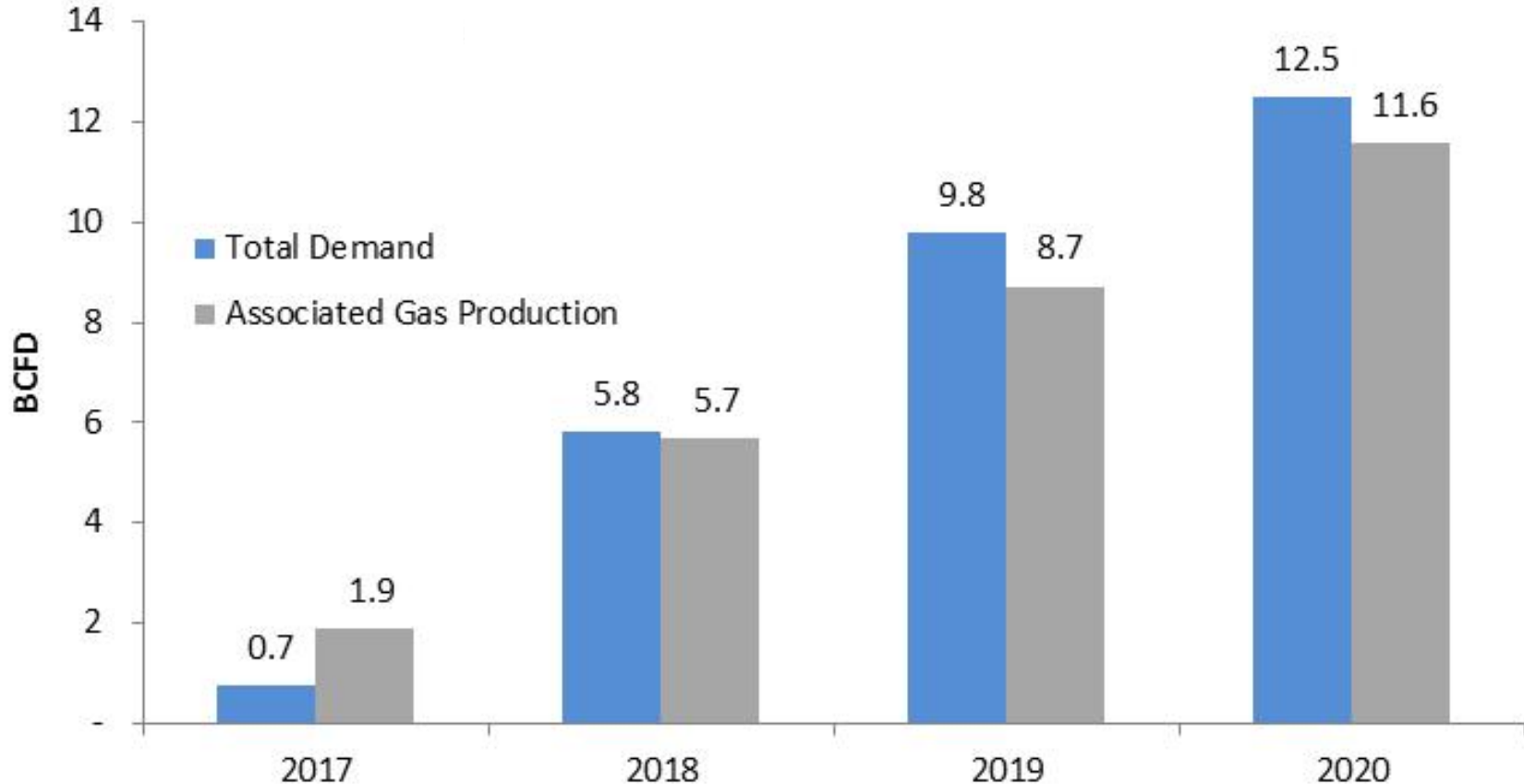
# Forecast average annual US gas demand growth



# Associated gas production growth by basin



# Associated gas growth vs demand growth





# Natural gas prices - 10<sup>th</sup> February 2017

- Henry Hub - USD 2.98/mmBtu
- NBP - USD 6.43/mmBtu
- TTF - USD 6.20/mmBtu
- Platts LNG JKM - USD 7.22/mmBtu
- Singapore SInG - USD 7.04/mmBtu

The US matters because it has a long tail of low cost natural gas that can be produced economically at between US\$3 and 4/mmBtu from multiple reservoirs over a long period of time. This gas is now available globally with the start-up of LNG exports in 2016.

# USGC - lowest cost LNG production in the world

## You know what you're getting...

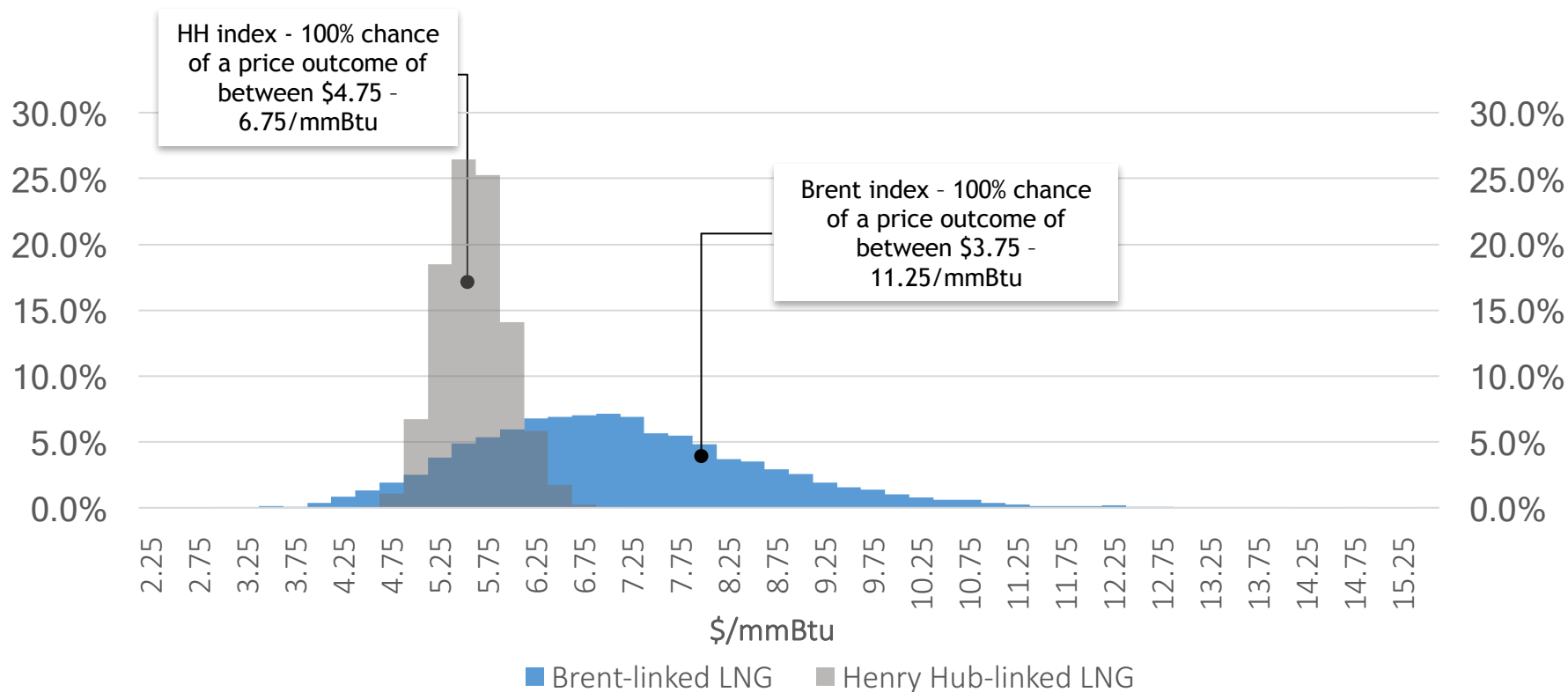
- Low cost resource base
- Labor cost
- Financing costs
- Regulatory timeline

## ...and what you're not

- Exploration risk
- Importing your own labor
- Nation building
- Moving regulatory target
- Uncertain economics

# HH indexed LNG likely to be less volatile than oil

Chart shows the probability of a 2020 price; area under each curve sums to 100%



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## Driftwood LNG

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# Cost matters

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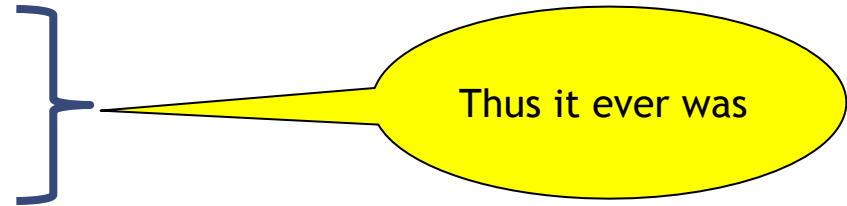
*“Cost of supply matters. Price is a derivative, not an aspiration waiting to back into a convenient pricing formula”*

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# Winning LNG projects

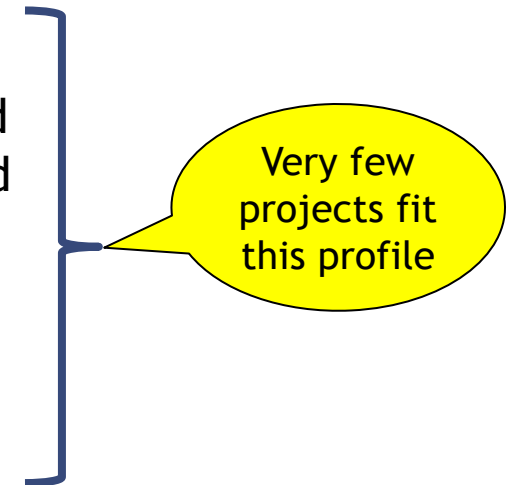
## ■ The winning LNG projects are those that can:

- Deliver low cost liquefaction
- Aggregate creditworthy demand
- Secure financing



## ■ These will be identified by:

- Credible and highly experienced developers
- Cost per mtpa claims that are credible and backed by fully wrapped EPC contracts with reputable and experienced firms
- Advantaged site locations
- The availability of low cost gas
- Regulatory clarity and local and popular support



# Our approach

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- Understand the market you are serving and have clear objectives
- Build only what you need, fit the design for purpose
- Key contractors are on the team - share the goals
- Risk has to be paid for - allocate it accordingly
- Trust your selected contractors - light touch oversight
- Safety is always the priority, but don't make it the excuse
- Remember - engineers want to engineer not to replicate
- The best people will deliver the best projects



# Driftwood LNG





# Conclusions

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- The supply fundamentals continue to worry the industry
- The demand drivers are more powerful than we thought
- A year on there are some green shoots of recovery
- The challenge of new projects in a low price environment remain
- Which means low cost projects should prevail
- The US offers low cost, low volatility and destination flexibility
- Price and indexation are second order issues after cost

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