

# What role will FLNG projects play in the next wave of LNG supply

FLNG Global, Amsterdam - May 2019

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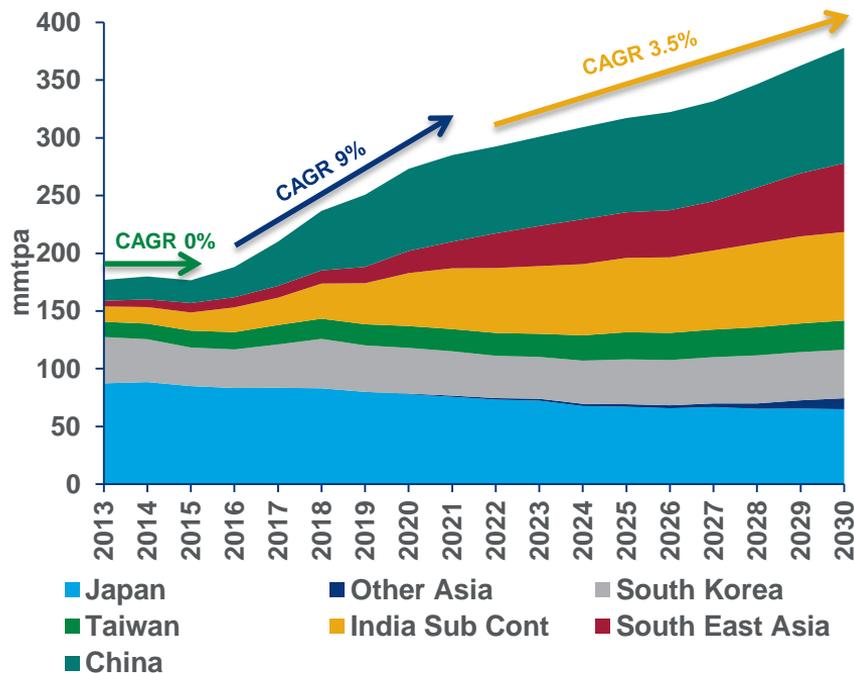
A Verisk Business



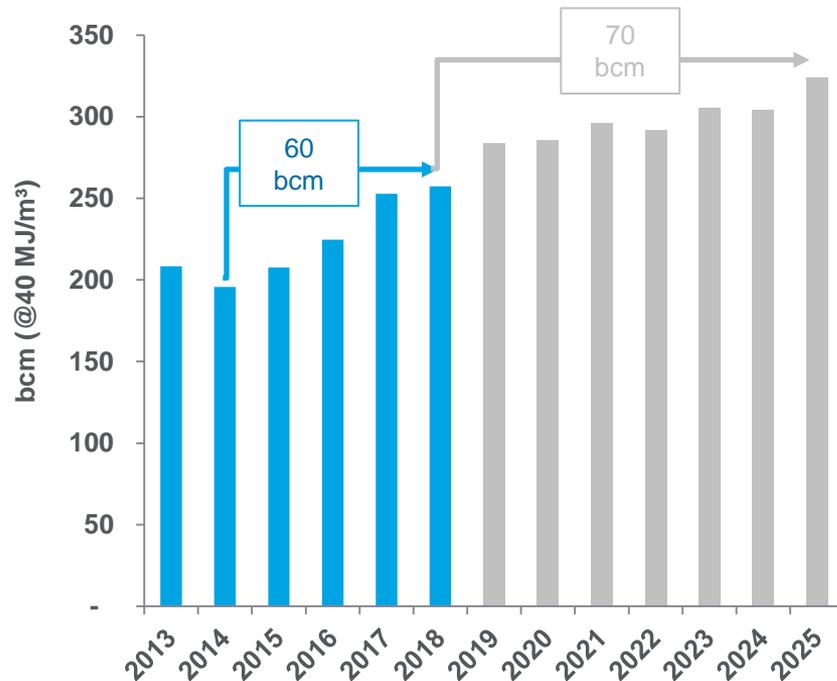
# New policies supporting gas are driving LNG demand higher in Asia

...and resilient demand and declining indigenous production are making Europe increasingly dependent on gas imports

## Asian LNG demand growth to 2030



## Europe import dependency from Russia or LNG



# Confidence in demand will make 2019 a record year for LNG project sanctions....

**FID taken in 2019**    **Expected FID in 2019**    **Wildcard FID in 2019**    **Targeted FID in 2020**

**Golden Pass:** Announced FID on 05 Feb on 16.0 mmtpa, \$10 billion project. Partners expect start up in 2024



**Woodfibre LNG:** Has HoAs for most of the capacity; needs to finalise EPC costs and SPAs



**Arctic LNG-2:** CNOOC, CNPC and Total each have 10% stake in NOVATKEK project. Further partners to be announced before FID end-2019



**Tortue Phase 2 & 3:** Partners pushing to take FID on additional phase(s) in 2020, supported by cost efficiencies from Phase 1



**Calcasieu Pass:** FID imminent for Venture Global after successful marketing campaign in 2018 and obtaining FERC approval. Initial construction underway but financing to be finalised

**VENTURE GLOBAL LNG**

**NLNG 7:** Partners and government pushing for FID but financing, marketing and partner commitments required



**Qatar Megatrans:** Partner announcements expected mid 2019 with FID planned for late 2019/early 2020



**Sabine Pass T6:** Cheniere state FID is imminent on sixth train (4.5 mmtpa)



**Other North America:** Many projects moving through legislative, environmental, marketing and financing milestones. Driftwood, Costa Azul and Freport Train 4 all targeting FID before end of 2019.

**Rovuma LNG (Area 4):** Partners announced offtake agreements end of 2018. Targeting FID mid-2019 but requires progress on government approval and clarity on financing to make FID this year



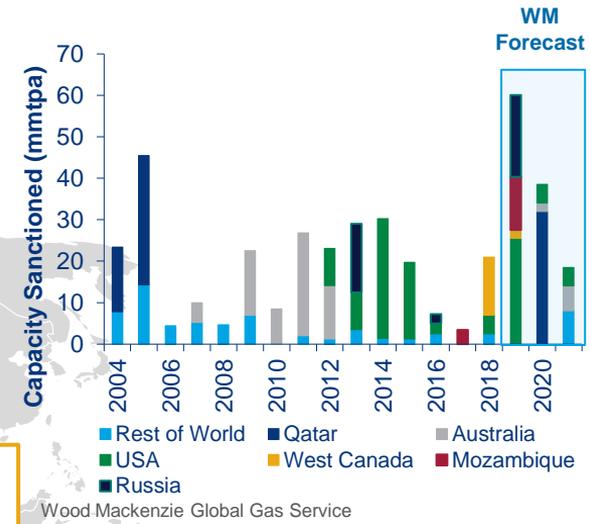
**Mozambique LNG (Area 1):** Signed 11.1 mmtpa of SPAs at the start of 2019, sufficient to secure financing. FID targeted at H1 2019



**Pluto Expansion:** Woodside selected Bechtel as EPC contractor. FID target of H1 2020, but looking to farm down in upstream asset (Scarborough)



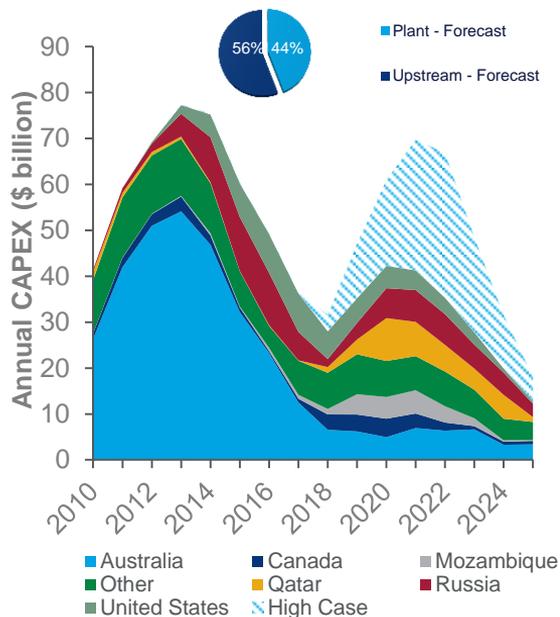
**PNG LNG Train 3 / Papua LNG:** Key terms of gas agreement. Working on Gas Agreement, engineering and offtake agreements in 2019

# Over \$200 billion in CAPEX to be spent in upcoming LNG boom

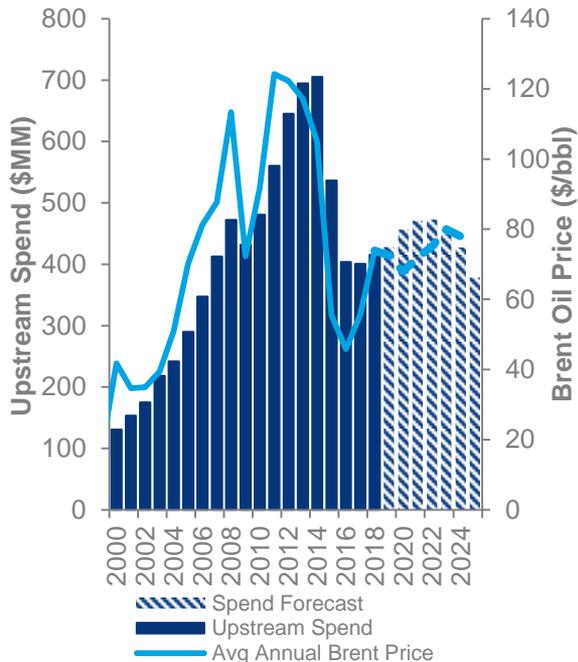
But a wide geographical spread of activity should limit localised inflation pressure, while total upstream likely to remain muted. EPC contractors could be stretched in high case

### LNG CAPEX forecast



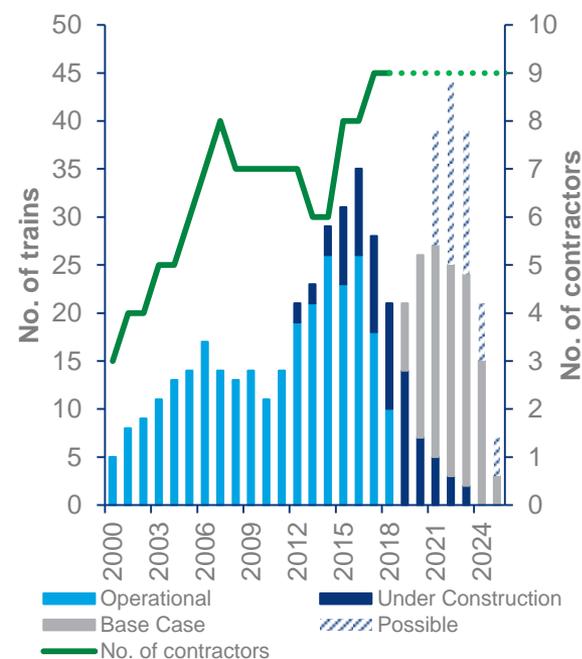
Source: Wood Mackenzie Upstream Data Tool

### Forecast upstream spend



Source: Wood Mackenzie Upstream Data Tool

### EPC contractor availability



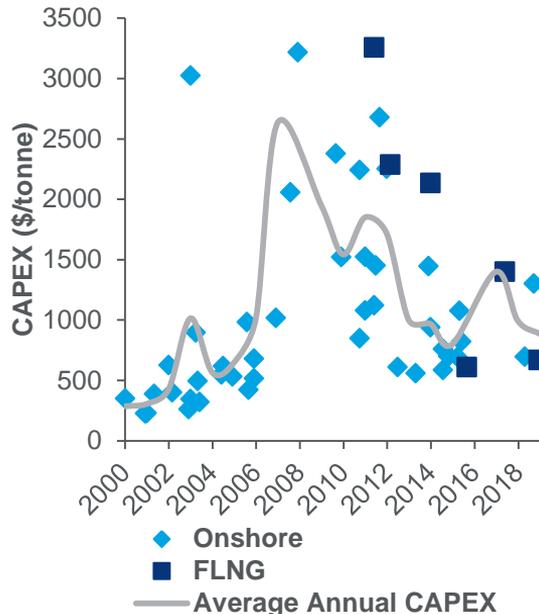
Source: Wood Mackenzie LNG Service



# While FLNG costs can be competitive, developers are looking at other ways to manage cost risk

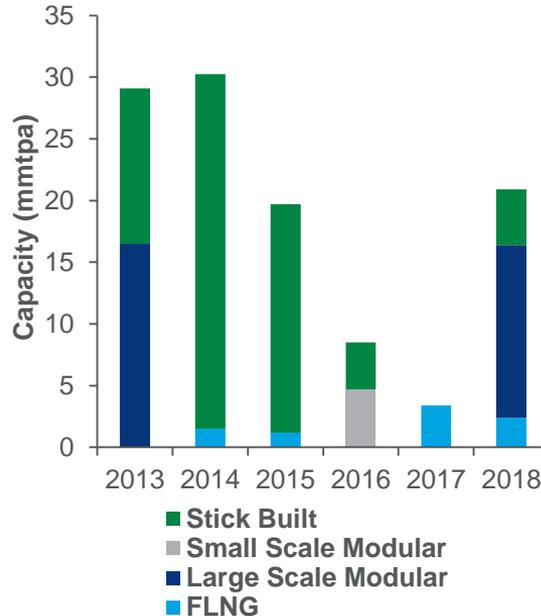
The motivation for gravity-based structure (GBS) style developments is similar to FLNG

### Onshore vs FLNG capex by year of FID



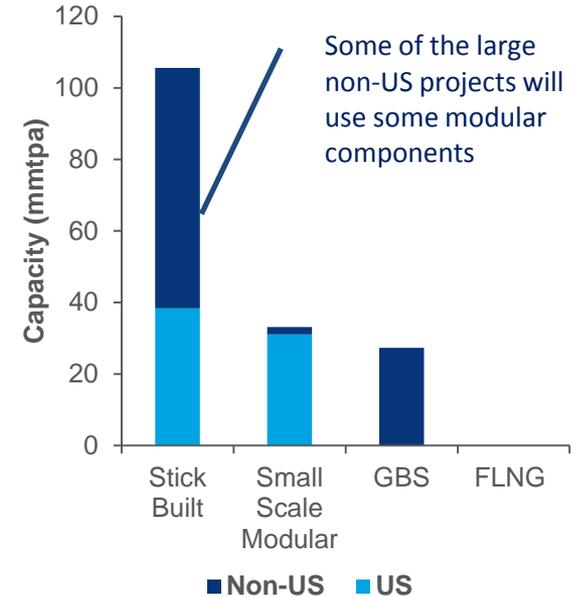
Source: Wood Mackenzie LNG Service

### Recent LNG development solutions by year of FID



Source: Wood Mackenzie LNG Service

### Construction style of projects targeting FID over next 2 years



Source: Wood Mackenzie LNG Service. Includes projects featured in the High Case on Slide 4



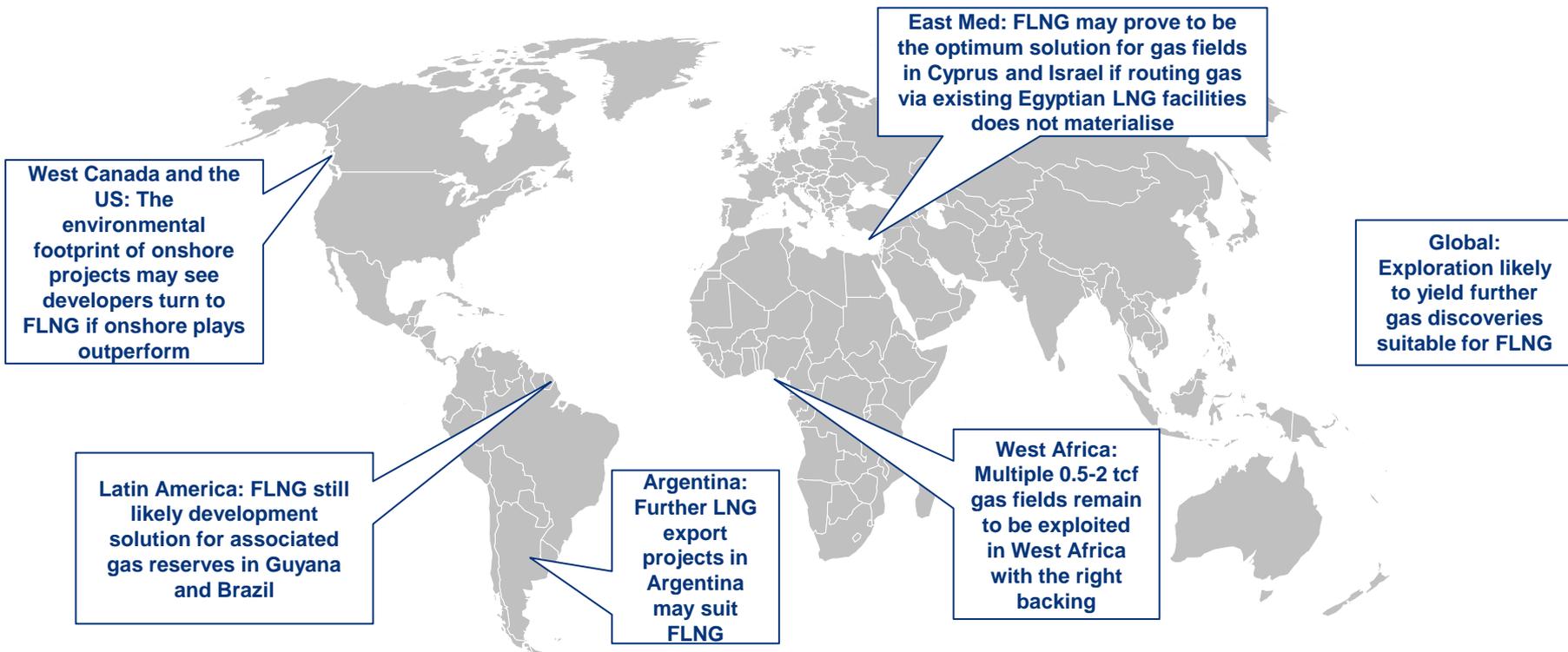
# ... and so developers of resources are choosing FLNG for alternative reasons

		Proof of concept	Access to multiple resources	Smaller fields unlocked	Removes need for pipelines to shore	Earlier cash-flow	No suitable onshore location	More manageable cost risk profile
Open-sea projects	Prelude	✓		✓	✓			
	Petronas FLNG 1 & 2	✓	✓	✓	✓			
	Coral				✓	✓		
Near-shore projects	Cameroon GoFLNG		✓	✓				
	Tango					✓		
	Tortue					✓	✓	✓



# Consequently other FLNG developments will mature

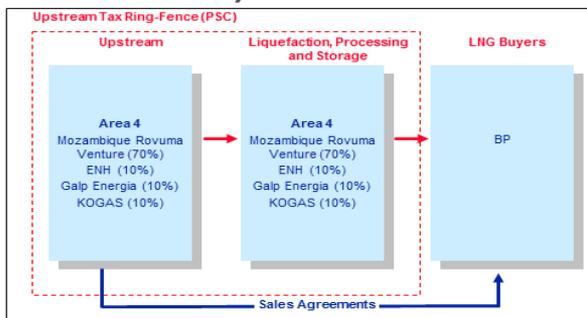
There are substantial untapped gas reserves in Latin America, Canada and West Africa which are still suited to FLNG



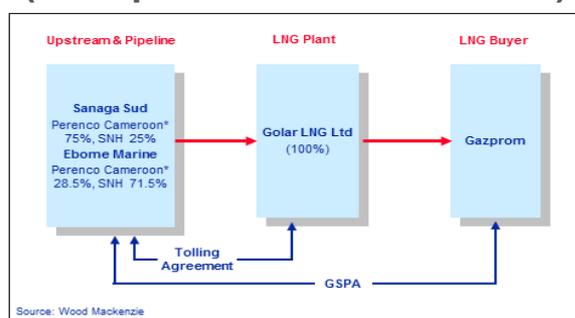
# However commercial structuring will be important to balance investment risk between counterparties

Strong partners, makes investment in any of these commercial structures easier

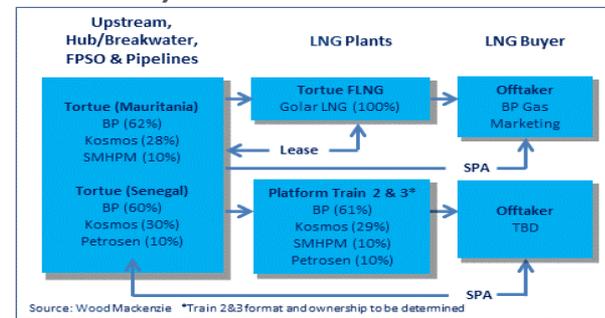
## Integrated Model (example Coral FLNG)



## Netback Tolling Model (example Cameroon Go FLNG)



## Lease Model (example Tortue Phase 1)



Integrated model: New build model is funded by partners, capital investment is recovered under the terms of upstream production sharing contract

Netback Tolling Model: LNG SPA is held between upstream and buyer but LNG toll is paid before plant is paid revenue. Upstream price is therefore FOB price minus Tolling Fee

Lease Model: Similar to an FPSO. LNG SPA is held between upstream and buyer, upstream pays vessel owner a lease, upstream incurs lease costs as an opex. Upstream price is therefore the same as FOB price. Phase 2/3 will construct additional LNG facilities as a capex (in an integrated model)



# Conclusions

- Policy driven measures are supporting rising gas and LNG demand in both Asia and Europe
- Developers are responding and about to sanction a wave of new LNG supply. However, while FLNG looks competitive from a cost perspective, developers are turning to alternative developments solutions such as modularisation and GBS structures to manage cost risk
- The multiple applications for FLNG are set to ensure that it retains a niche within the industry and interest in the concept will attract more attention as the current wave of project under-development are delivered
- Supportive host governments and strong project partners are vital for facilitating success



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