

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

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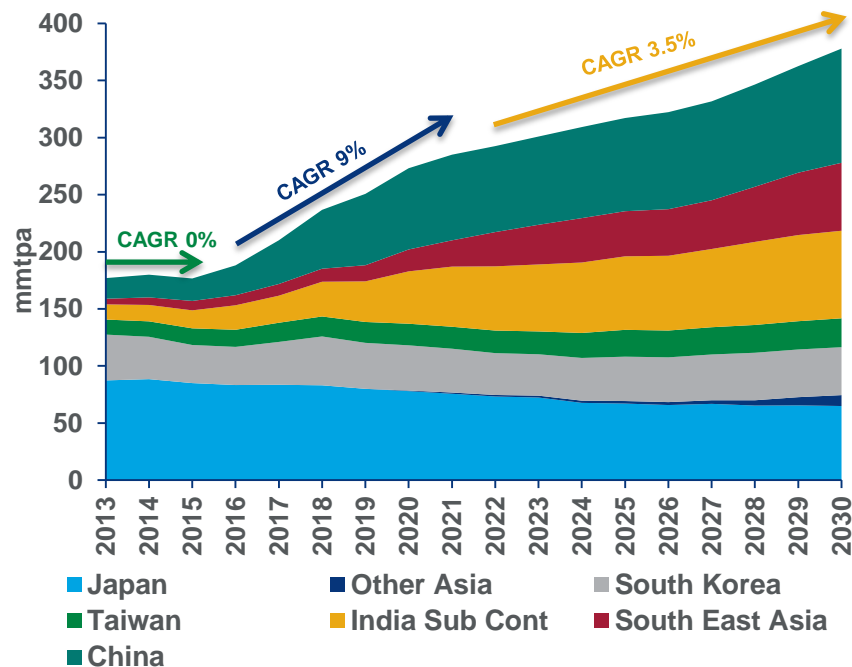




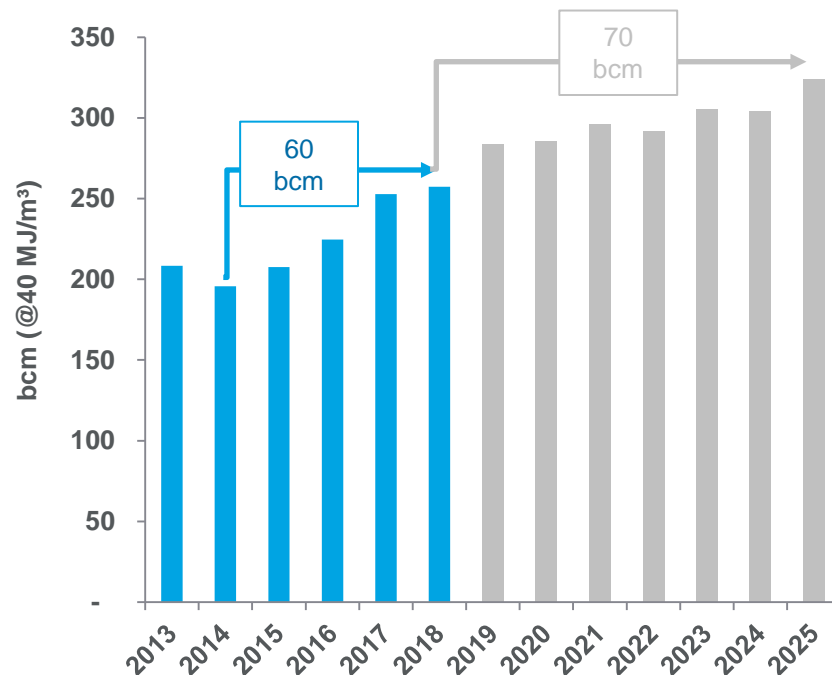
New policies supporting gas are driving LNG demand higher in Asia

...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

ExxonMobil
Qatar Petroleum

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

PACIFIC OIL & GAS

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



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



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

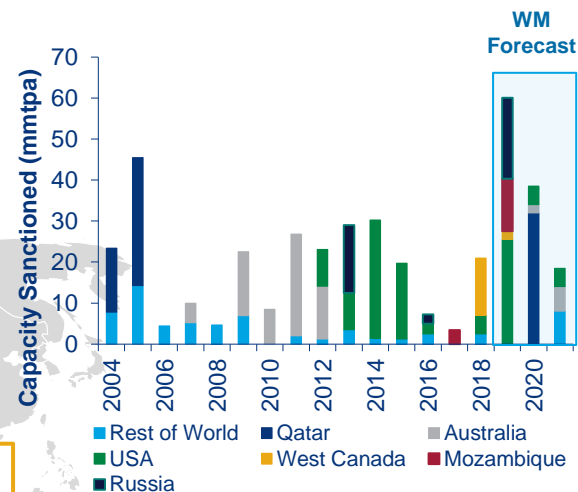
ExxonMobil



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



Wood Mackenzie Global Gas Service

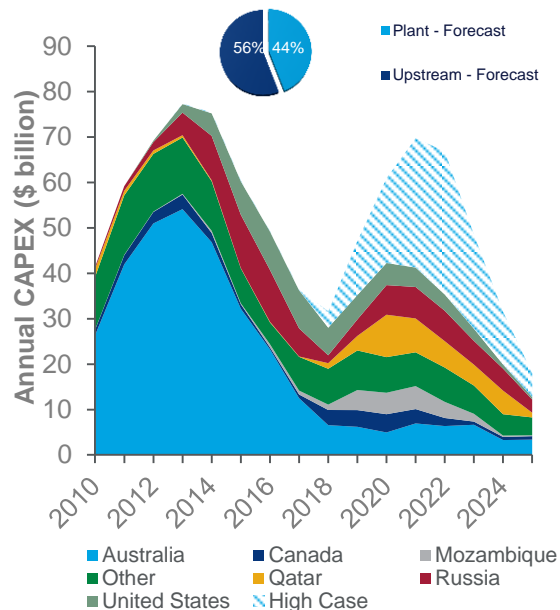
Other North America:
Many projects moving through legislative, environmental, marketing and financing milestones. Driftwood, Costa Azul and Freeport Train 4 all targeting FID before end of 2019.



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

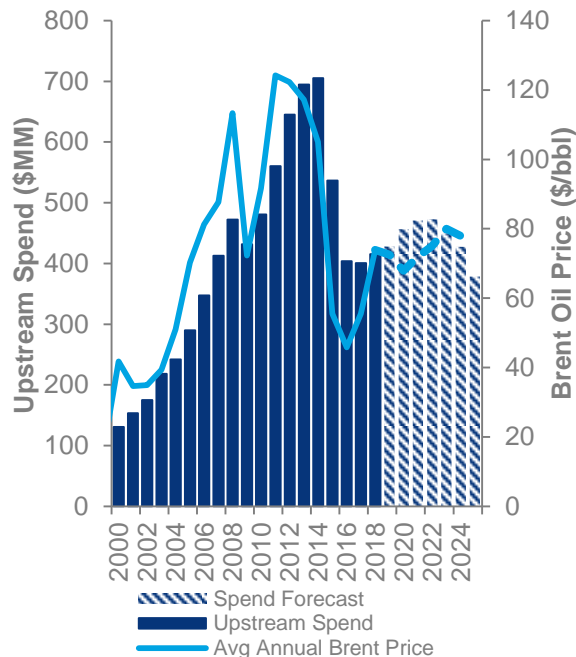
But a wide geographical spread of activity should limit localised inflation pressure, while total upstream likely to remain muted. EPC contractors could be stretched in high case

LNG CAPEX forecast



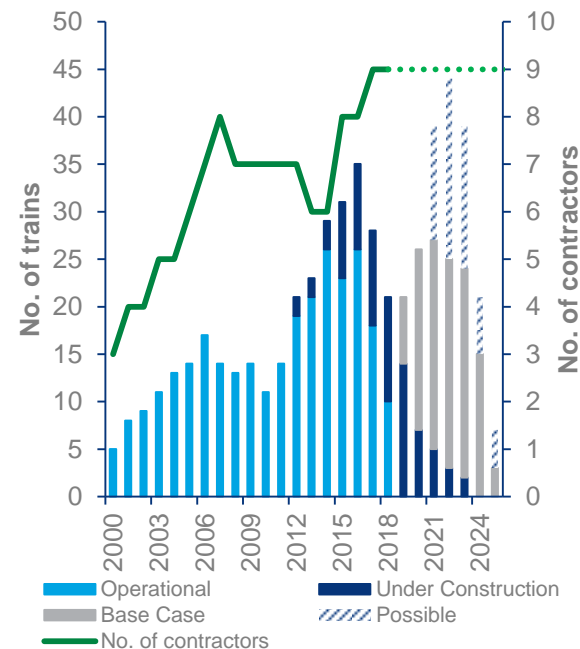
Source: Wood Mackenzie Upstream Data Tool

Forecast upstream spend



Source: Wood Mackenzie Upstream Data Tool

EPC contractor availability



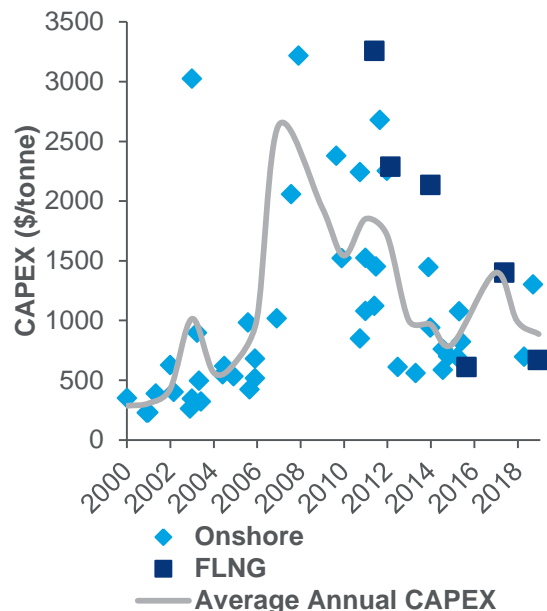
Source: Wood Mackenzie LNG Service



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

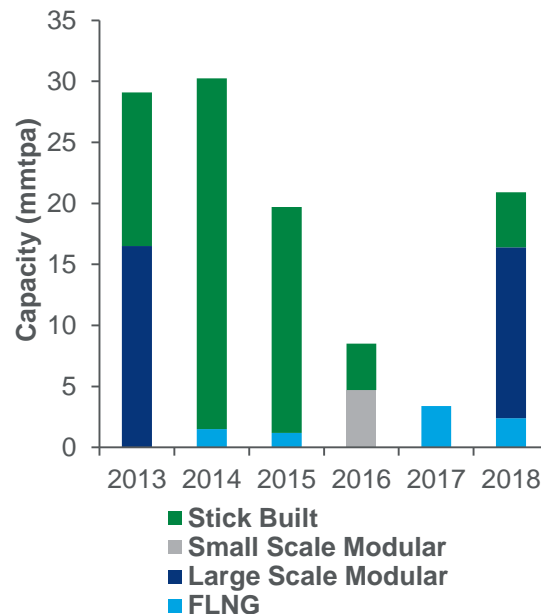
The motivation for gravity-based structure (GBS) style developments is similar to FLNG

Onshore vs FLNG capex by year of FID



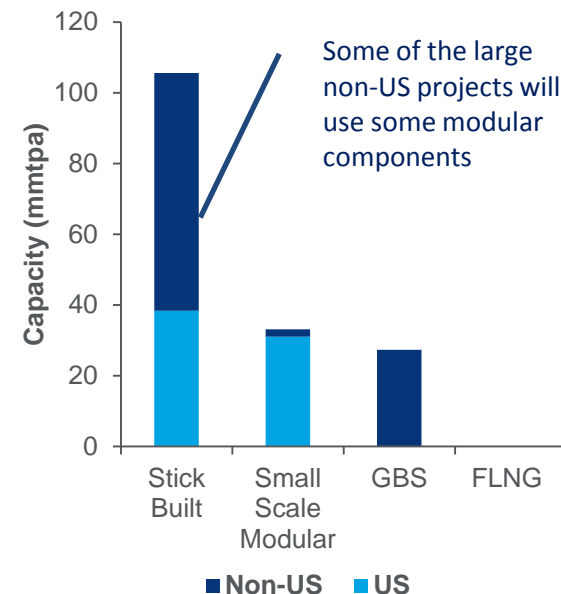
Source: Wood Mackenzie LNG Service

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



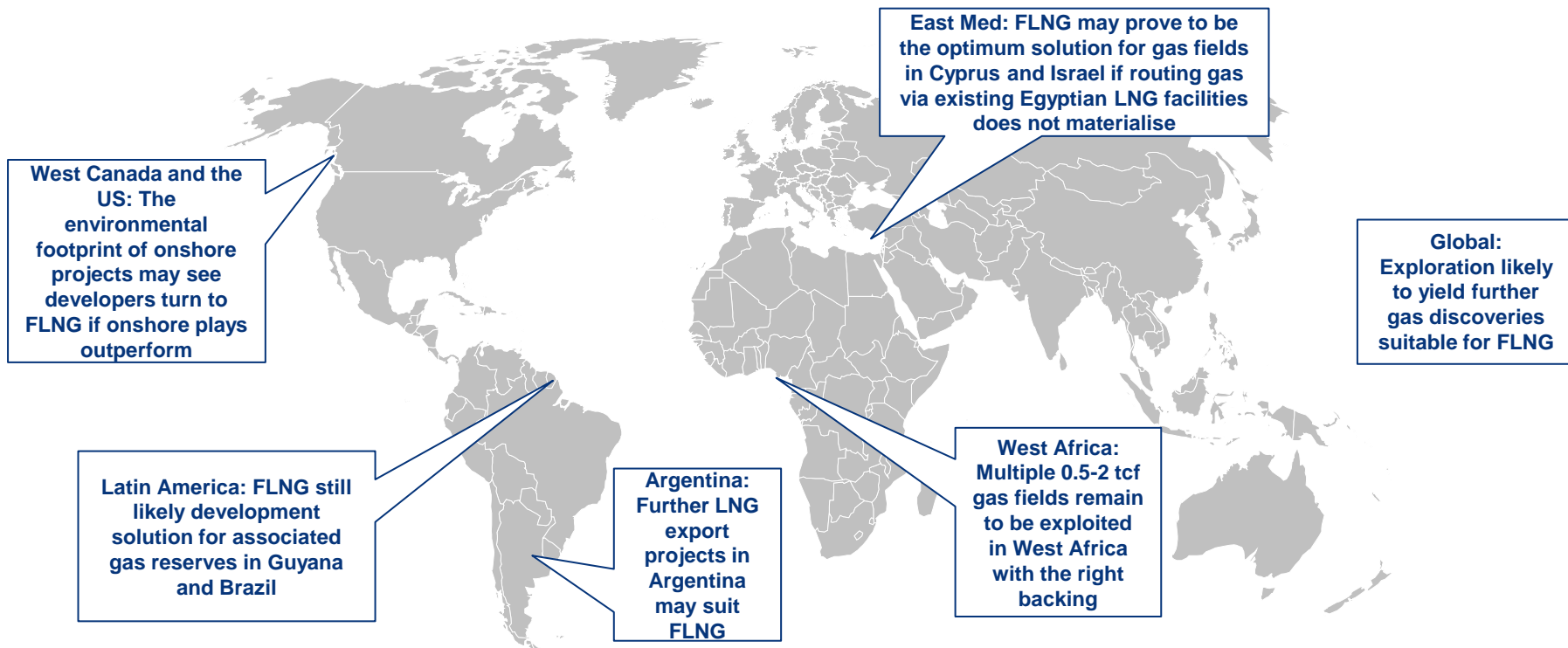
... and so developers of resources are choosing FLNG for alternative reasons

		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

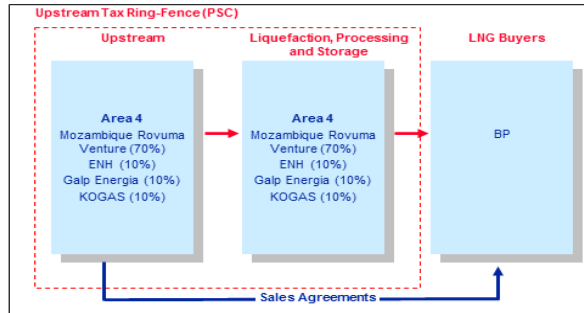




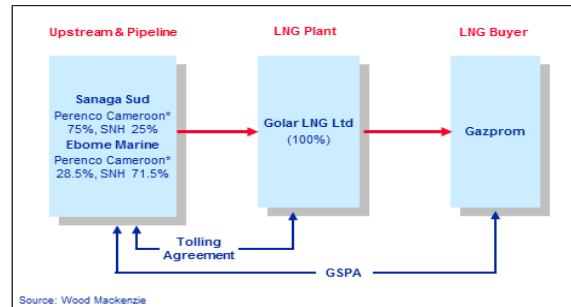
However commercial structuring will be important to balance investment risk between counterparties

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

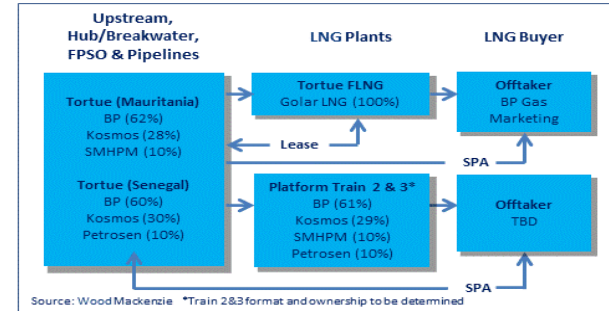
Integrated Model (example Coral FLNG)



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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