

# Texas LNG

*High Value, Low Risk*

*A contrarian view: is FLNG living up to its expectations?*



May 2018 FLNG Amsterdam

Remember this headline?



And this one...

## TradeWinds

**Shell cancels huge  
\$4.6bn FLNG  
order at Samsung**



*Three floating units due by 2023 axed  
due to worsening market conditions,  
shipyard says.*



# In 2015, there were 11 FLNG proposed projects in Asian Pacific



## FLNG seems more selective rather than structural

### Proposed and potential FLNG projects

Project	Operator	Partners	Field/Basin	Country	Status
Prelude	Shell	Inpex, Kogas, CPC	Browse	Australia	Construction. FID'd in May 2011
PFLNG 1	Petronas		Kanowit	Malaysia	Construction. FID'd in Jun 2012
Bonaparte	GdF Suez	<b>Santos</b>	Bonaparte	Australia	Currently in project recycle mode due to challenging economics
Sunrise	<b>Woodside</b>	Shell, Conoco, Osaka Gas	Bonaparte	Australia / E.Timor	FLNG preferred concept. Project in stasis due to fiscal/territorial dispute.
Abadi	Inpex	Shell	Masela Block, Arafusa Sea	Indonesia	FEED Jan 2013
Browse	<b>Woodside</b>	Shell, Petrochina, MIMI, BP	Browse	Australia	FLNG preferred concept – due to enter FEED end CY15.
Scarborough	Exxon	BHP	Camarvon	Australia	FLNG concept select. FID uncertain.
Flex	Interoil	Pacific LNG, Liquid Nuigini G.	Elk-Antelope	PNG	Uncertain - Exxon talks
Santos FLNG	Petrobras	BG, Repsol, Galp Energia	Santos	Brazil	Unlikely – domestic or reinjection now
Caldita Barossa	Conoco Phillips	<b>Santos</b> , SK E&S (Korea)	Bonaparte	Australia	Concept evaluation FLNG vs Darwin LNG
PFLNG 2	Petronas	TBC	TBC	Malaysia	

Source: Company data, J.P. Morgan estimates

Source: JP Morgan – Asia Oil and Gas – March 2015

# Now, there are only 2 (+1?) FLNG projects in Asian Pacific Region



## FLNG seems more selective rather than structural

Proposed and potential FLNG projects

Project	Operator	Partners	Field/Basin	Country	Status
Prelude	Shell	Inpex, Kogas, CPC	Browse	Australia	Construction. FID'd in May 2011
PFLNG 1	Petronas		Kanowit	Malaysia	Construction. FID'd in Jun 2012
Bonaparte	GdF Suez	<b>Santos</b>	Bonaparte	Australia	Currently in project recycle mode due to challenging economics
Sunrise	<b>Woodside</b>	Shell, Conoco, Osaka Gas	Bonaparte	Australia / E.Timor	FLNG preferred concept. Project in stasis due to fiscal/territorial dispute.
Abadi	Inpex	Shell	Masela Block, Arafura Sea	Indonesia	FEED Jan 2013
Browse	<b>Woodside</b>	Shell, Petrochina, MIMI, BP	Browse	Australia	FLNG preferred concept – due to enter FEED end CY15.
Scarborough	Exxon	BP	Camaron	Australia	FLNG concept select. FID uncertain.
Flex	Interoil	Pacific LNG, Liquid Nuigini G.	Elk-Antelope	PNG	Uncertain - Exxon talks
Santos FLNG	Petrobras	BG, Repsol, Galp Energia	Santos	Brazil	Unlikely – domestic or reinjection flow
Caldita-Barossa	Conoco Phillips	<b>Santos</b> , SK E&S (Korea)	Bonaparte	Australia	Concept evaluation. FLNG vs Darwin LNG
PFLNG 2	Petronas	TBC	TBC	Malaysia	

Source: Company data, J.P. Morgan estimates

Source: JP Morgan – Asia Oil and Gas – March 2015

When will Shell release total capex for Prelude...maybe \$15 bln? How is commissioning going?

PFLNG 1 began operations in April 2017. Why the silence since then? Rumors are that only 5 cargoes loaded since then..there should be ~25 cargoes in this time frame...

PFLNG 2 : To sail away in 2020?

# How many 'real' FLNG projects are there globally?

## 1. Features of FLNG Development by Developer's business type



Name of Project	Offshore /Nearshore	E&P or Shipping Company	Newly built or Conversion	Business Model
Shell Prelude	Offshore	IOC (Shell)	New	Integrated
Petronas PFLNG 1&2	Offshore	NOC (Petronas)	New	P1Integrated/P2 tolling
Coral FLNG	Offshore	IOC (Eni)	New	Integrated (by contract Tolling)
Kribi FLNG, Cameroon	Near Shore	Shipping(Golar)	Conversion	Tolling
Fotuna FLNG, Equatorial Guiana	Offshore	Shipping(Golar)	Conversion	Tolling
Tortue FLNG, Mauritania/ Senegal	Near Shore	IOC (BP, Kosmos Energy)/Shipping (Golar and another)	1 <sup>st</sup> Conversion (Golar)/ 2 <sup>nd</sup> (undecided)	Tolling
Delfin LNG, USA	Near Shore (instead of Onshore LNG)	Energy (Delfin) /Shipping (Golar)	Conversion or new (Golar)	Tolling
Exmar FLNG	Near Shore	Shipping (Exmar)	New	Tolling

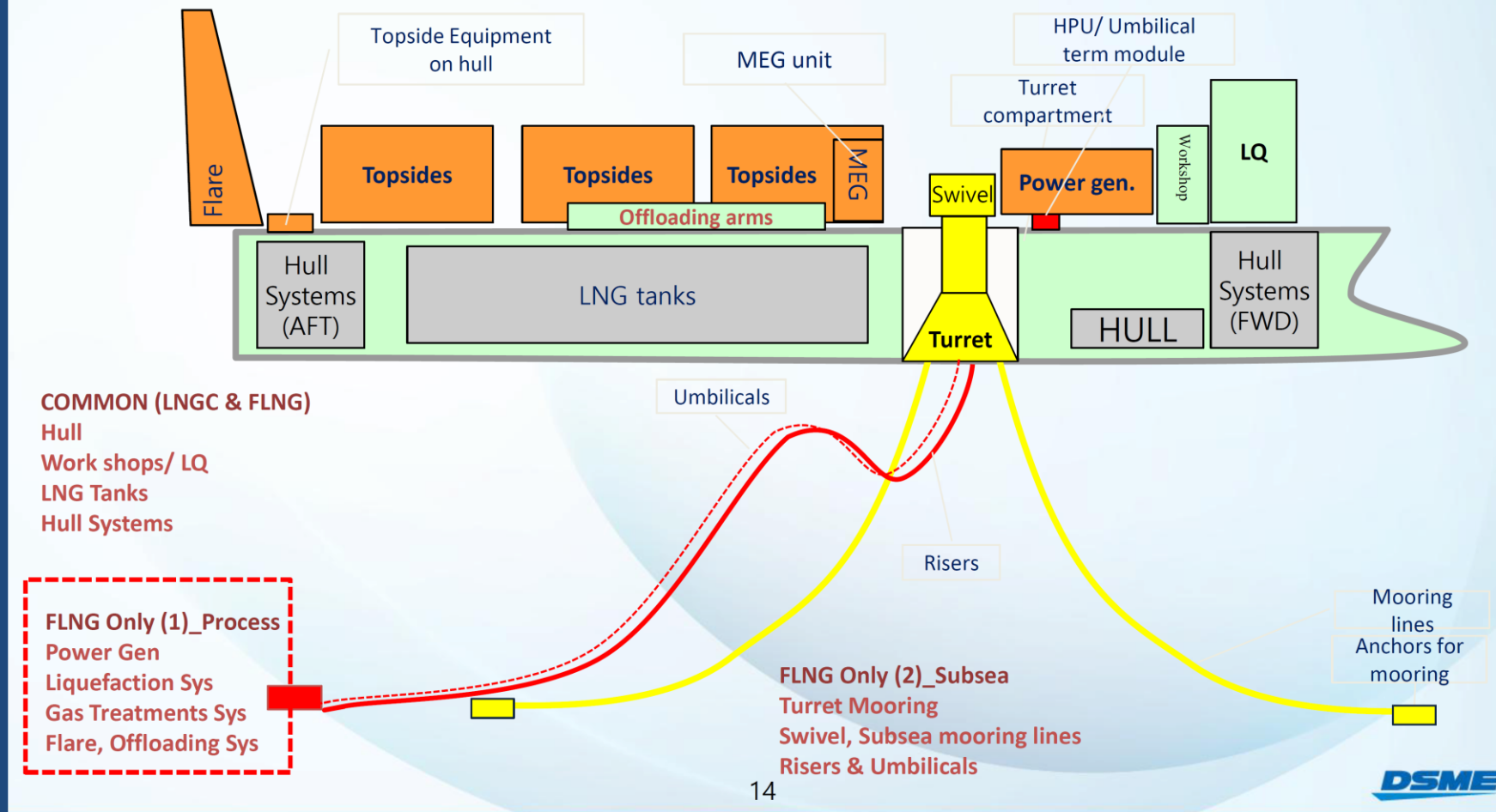
Four current projects and a few more possible....

Is this really 'success' after 30+ years of talking about FLNG, and after the massive LNG investment period of the last 20 years?

<10 MTA out of 300 MTA total (3%)

# FLNG is much more complex than simple LNG tankers

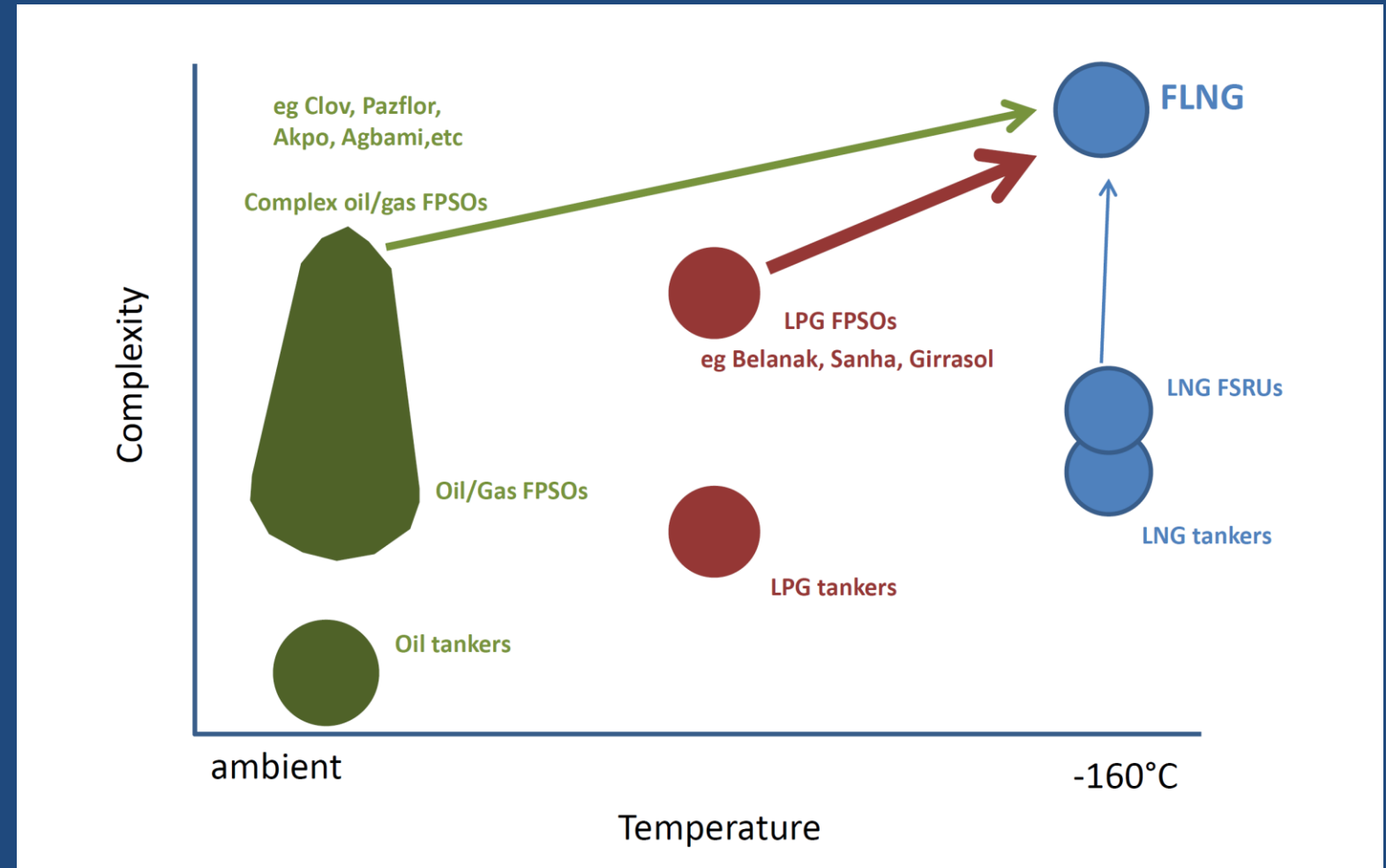
## Comparison between LNGC and FLNG



# FLNG is more complex than all other oil and gas vessels

Can not compare  
FLNG vessels to  
FPSOs or FSRUs...

Limited companies  
and shipyards can  
credibly deliver  
FLNG vessels





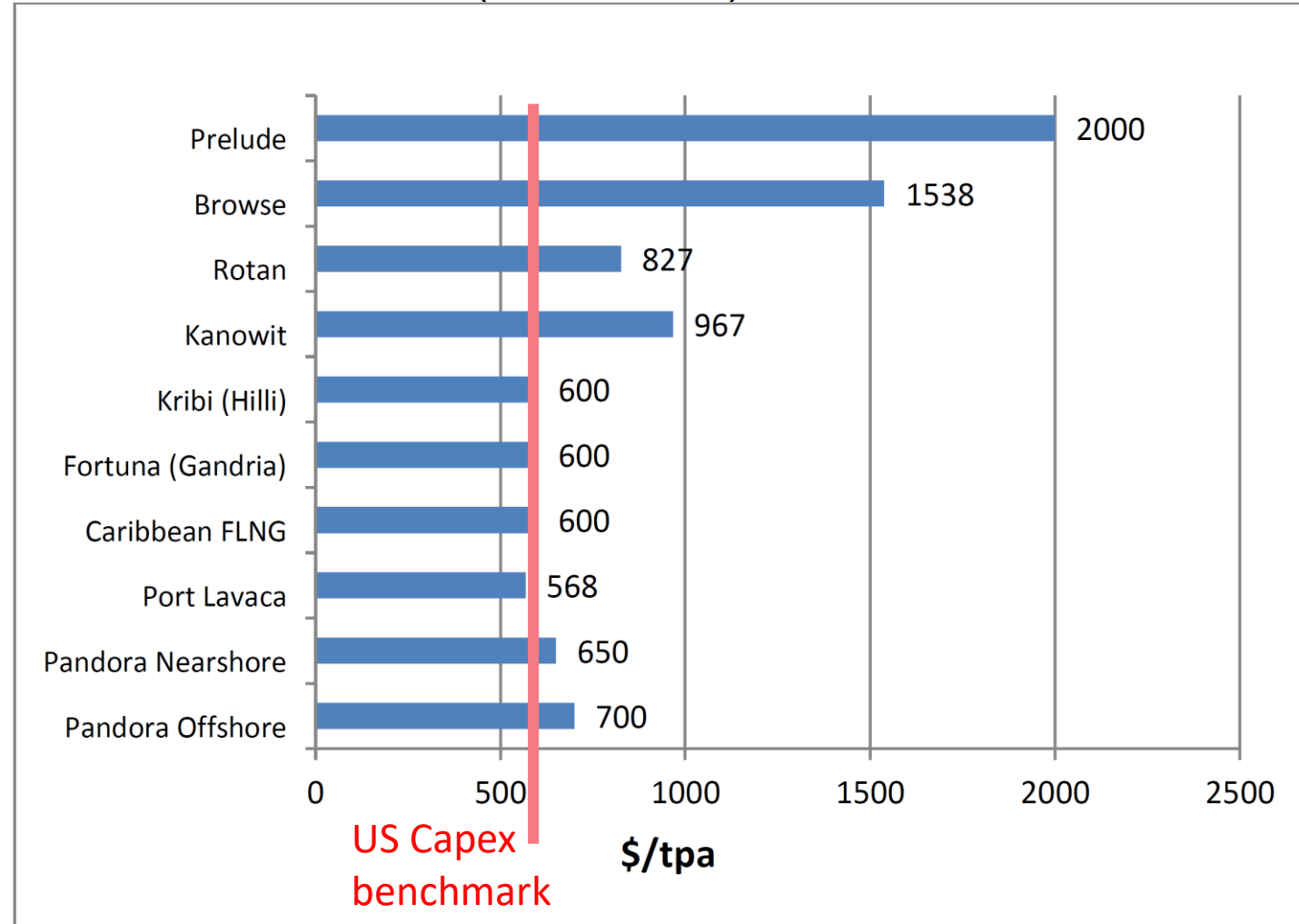
# FLNG Capex varies greatly – and shrouded in mystery!

If entire Prelude project is built for \$12 bln, the vessel cost is estimated at \$7 bln, giving a cost \$2000/tonne.

US projects such as Texas LNG are being built for \$550 / tonne.

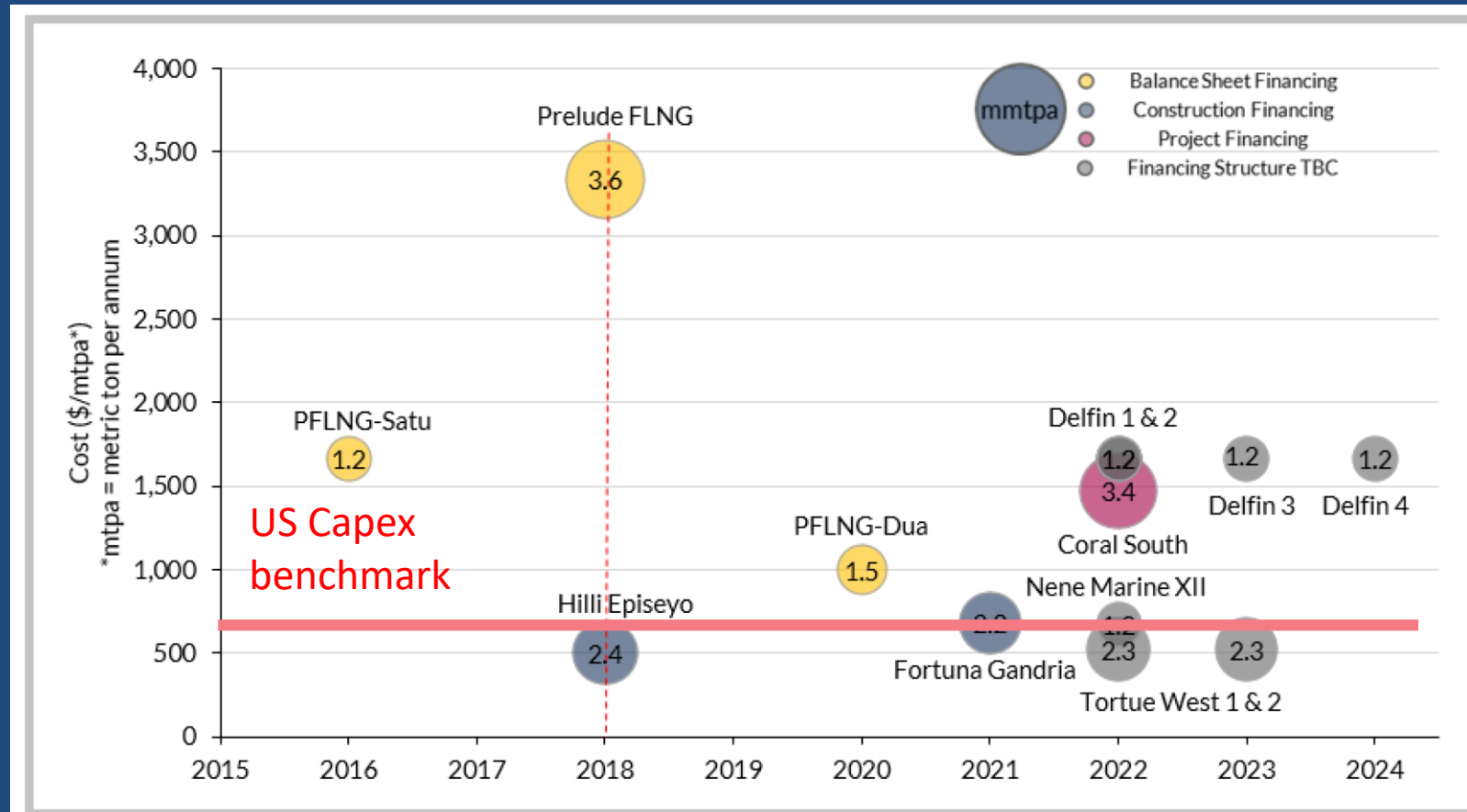
PFLNG is more reasonable at \$770/tonne.

Figure 6: INDICATIVE FLNG CAPEX (VESSEL ONLY)



Source: Industry sources collated by author

# Another view on FLNG Capex



FLNG Liquefaction Cost & Financing Structure (2015-2024)

Source: Westwood

March 2018

# Opex is much higher for FLNG than land based projects

Texas LNG's total pipeline and opex cost = \$0.65/MMBtu

(50% of typical FLNG project as estimated by study)

## OPEX Estimate

Recent proposals by the solution providers for a 2.5 mtpa vessel indicated an OPEX of \$250,000/day i.e. approximately \$90 million/year excluding fuel cost. Feed gas will be used as fuel at a typical rate of 12% of the feed rate and assuming \$5/MMBtu adds a further \$69 million/year. This total OPEX of \$159 million/year represents \$1.3/MMBtu as shown in table 3.

**Table 3: OPEX Cost Estimate for 2.5 mtpa**

Component	\$ m/year		
Manning (100 people)	10	100,000	\$/year per person
Maintenance	45	3%	CAPEX
Consumables refrigerant make-up, lubricants & chemicals	5		
Tugs, Support, Security Vessels	10	3	Tugs
Base Support, Helicopters	10		
Miscellaneous	10		
<b>Sub total excl fuel</b>	<b>90</b>		
Fuel Gas (12% Gas Feed)	69	5.0	\$/mmbtu
<b>Total</b>	<b>159</b>		
<b>OPEX</b>	<b>1.3</b>	<b>\$/mmbtu</b>	

Source: By author based on proposals

# How can FLNG can be competitive with onshore LNG....

But, best to stick with these rules..

1. Keep the complexity as low as possible
2. Try to locate in 'safe countries'  
>> both first two projects are in established LNG exporting countries).
3. Try to finance on balance sheet  
>> both first two projects were financed this way, more complex in other two projects)
4. Keep size manageable – new projects are around 2 MTA
5. Keep Capex manageable, use experienced ship yards, and do not forget about Opex.

***Unless there is are VERY GOOD reasons not to build onshore facilities,  
keep things simple and stay away from FLNG!***

# Texas LNG

## Project Highlights



- US Government FERC Permitting process nearing completion
- US Coast Guard Approval in place
- DOE Export permit for FTA nations secured – non-FTA permit in process
- FEED Engineering complete. Detailed Engineering to commence in 2018.
  - 200,000 engineering man-hours completed over 4+ years
- Feed gas pipeline negotiations advanced
- Offtake Agreements (LOI/MOU) for 3x Phase 1 capacity with customers in China, SE Asia & Europe
- Minority equity partners include Samsung Engineering and Third Point, a New York based investment firm
- Final pre-FID fundraising round underway



# Texas LNG Project Overview



- Port of Brownsville, Texas
- 4 MTA in 2 Phases
- FID expected 2019  
Commercial operation 2023
- Oversubscribed offtake capacity (Phase 1)
- Seeking pre-FID investment at attractive terms

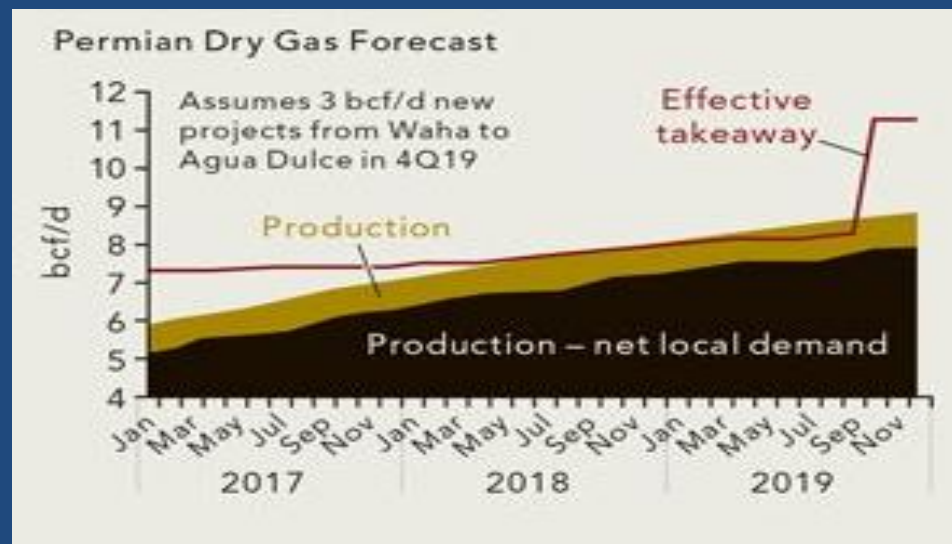


## Access to Growing production

Proximity to Permian and EagleFord gas production

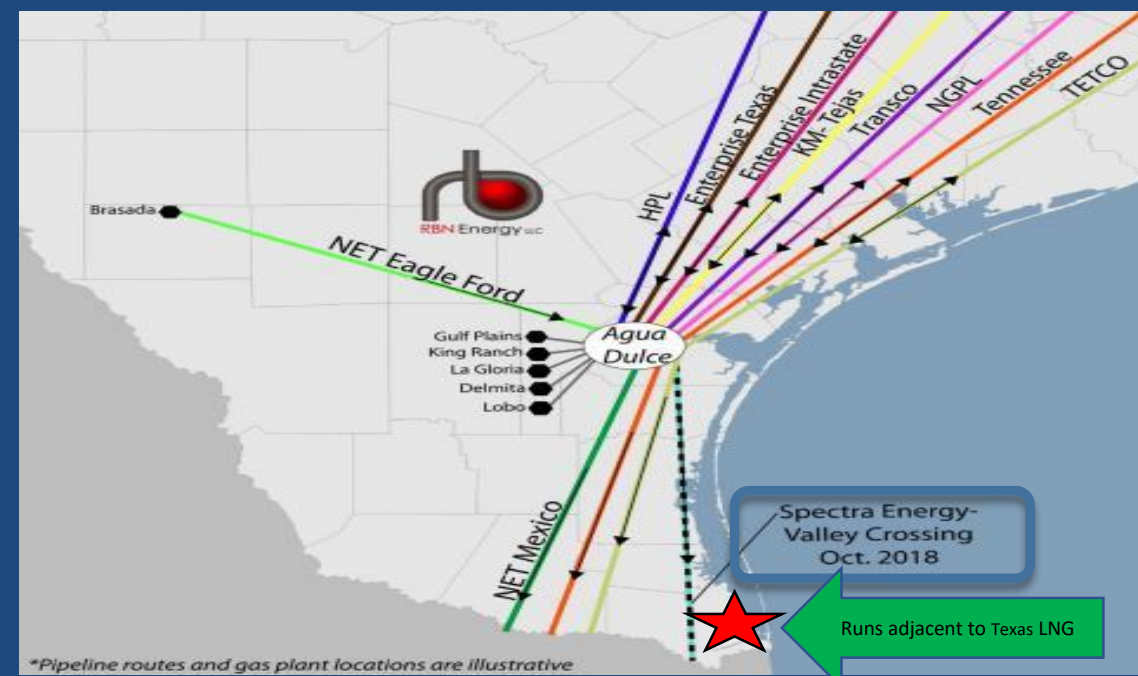
Future gas prices expected to be equal or lower than Henry Hub.

Growing Hub liquidity at Agua Dulce

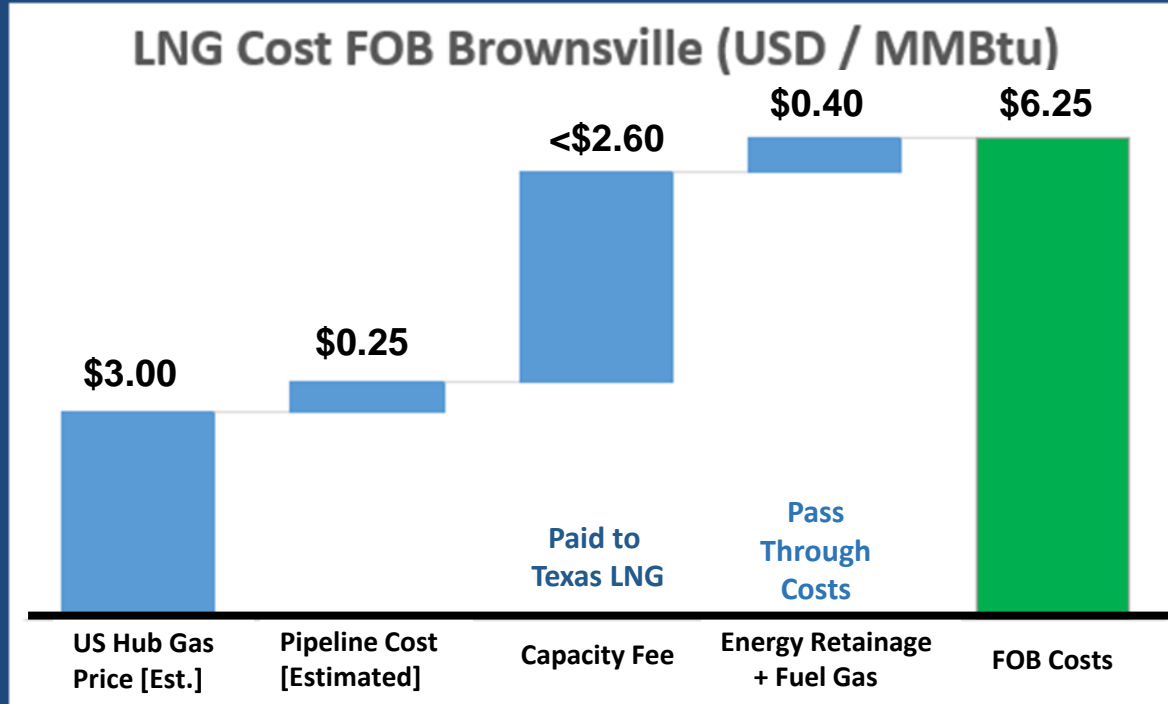


## Multiple Pipeline Options

Advanced negotiations with large capacity pipeline under construction from Agua Dulce gas hub to Texas LNG site



# Texas LNG: Low LNG prices for customers



**+ Shipping Costs = Delivered Cost**



**Spot DES: <\$6.75/MMBtu, <\$7.75/MMBtu**

Europe / Latin America, Asia / Mid East, respectively

(Potential lower capacity fee based to capex savings from modular build)

***Texas LNG continues to focus on cost reductions for reduced tolling fees.***

***Tolling fees paid to Texas LNG are NOT indexed to feed gas or oil prices***

Assumes \$3 feed gas; Shipping estimate \$1.50 (Asia / Mid East), \$0.50 (Europe).  
Texas LNG believes that energy retainage charge (majority for electricity consumed during liquefaction process) pass-through should be transparently disclosed



# Disclaimer



## *Cautionary Statement:*

*The information and materials in this document are ; Provided for informational purposes only and are subject to addition, deletion and modification without notice at the sole discretion of Texas LNG LLC and Texas LNG Brownsville LLC.; Not warranted or guaranteed to be correct, complete or up-to-date. The information and materials could include technical inaccuracies and other errors. ; Provided “As Is” without any representation or warranties of any kind. No liability, direct or consequential, of any kind arising from the use of information and materials contained in this document or linked website is accepted. ; Not to be considered or to be constituted as investment advice or as any type of offer, offer, invitation, solicitation or recommendation in relation to the purchase or sale of any type of financial instruments or security in any jurisdiction.*

*Any forward looking statements contained in the information and materials in this document are only predictions and are subject to risks, uncertainties and assumptions, many of which are outside the control of Texas LNG LLC or Texas LNG Brownsville LLC or its officers or representatives. These risks, uncertainties and assumptions include commodity prices, currency fluctuations, economic and financial market conditions in various countries and regions, environmental risks and legislative, fiscal or regulatory developments, political risks, project delay or advancement, approvals and cost estimates. Actual values, results or events may be materially different to those expressed or implied in this document. Given these uncertainties, readers are cautioned not to place reliance on forward looking statements .*

*Readers are strongly advised to complete their own investigations to the accuracy and completeness of the contents of this or any other communication or document, written or oral, provided by or referred to by Texas LNG LLC or Texas LNG Brownsville LLC or its officers or representatives.*