# **Liquefied Natural Gas Limited**



### **Greg Vesey – Managing Director and Chief Executive Officer**

### **Regaining the Balance**





**CWC Seventeenth Annual World LNG Summit – 14 December 2016** 

**ASX: LNG and OTC ADR: LNGLY** 

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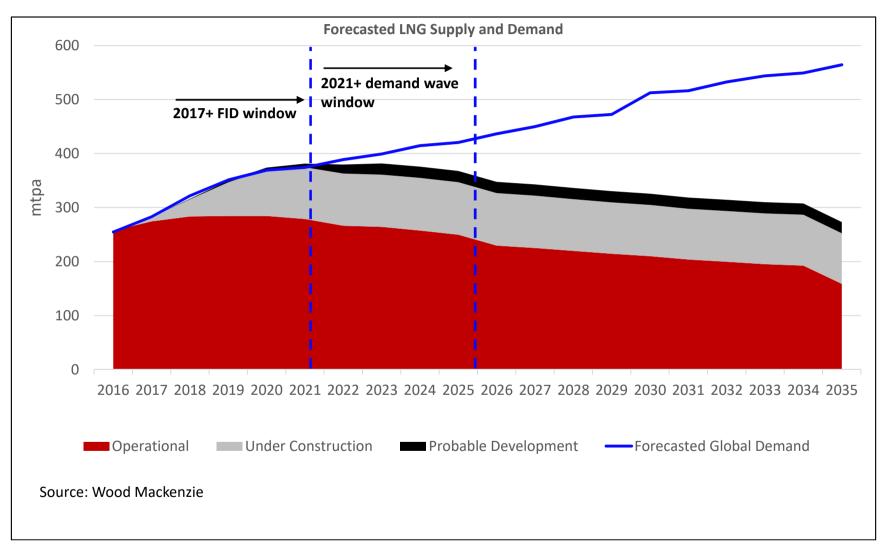
### **About LNG Limited**





## **Global Supply / Demand Imbalance Projections**





## **North American Shale Gas Plays**

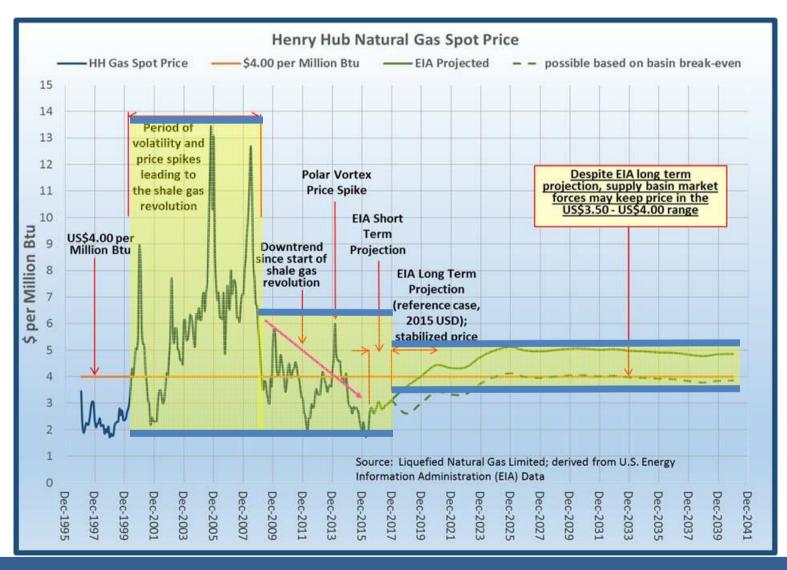




Source: U.S. Energy Information Administration based on data from various published studies. Canada and Mexico plays from ARI. Updated: May 9, 2011

## **Henry Hub Price History And Outlook**

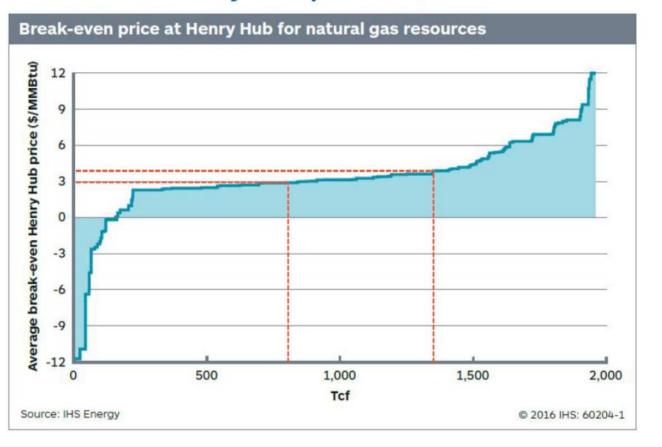




## **Shale Gas Resource Break-Even Henry Hub Prices**



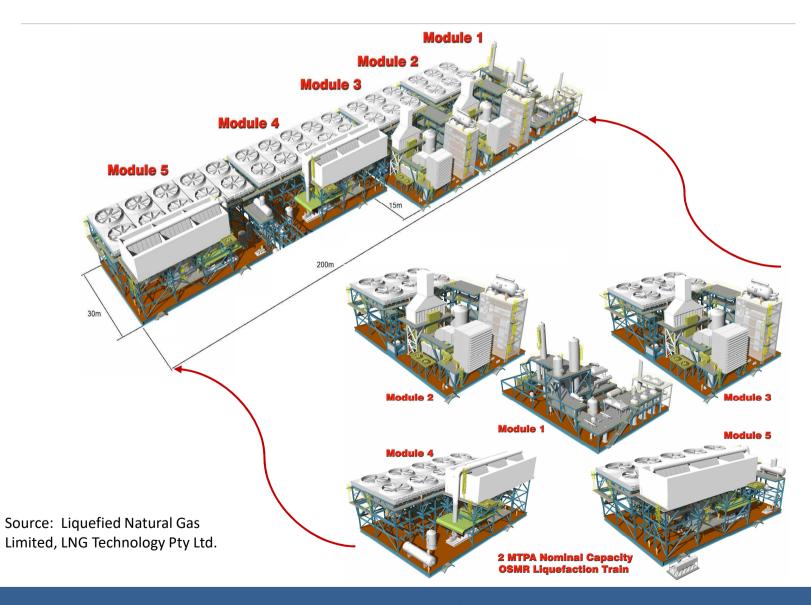




Source: IHS Markit Energy, "Global Gas & Power Outlooks", May 2016. Used by permission of IHS Markit Energy.

## **OSMR®** Liquefaction Process Technology





## **OSMR®** Key Advantages

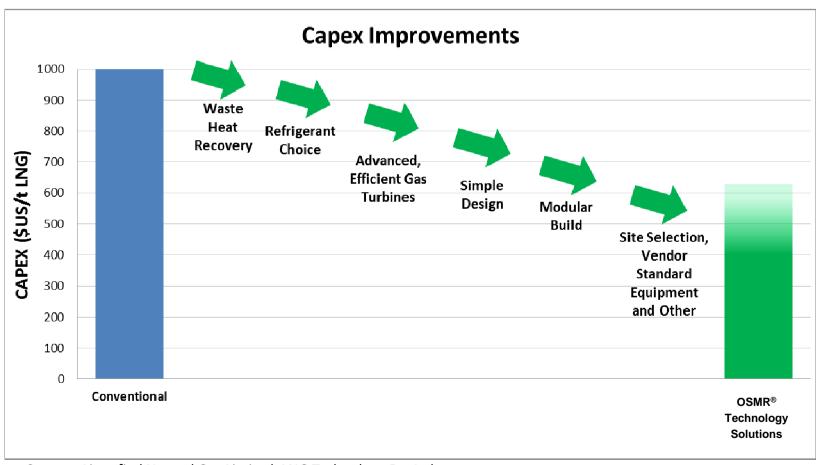


- Mid-scale compact modular design
- Ammonia's superior thermodynamic qualities in closed-loop configuration
- Mixed refrigerant pre-cooled by the Ammonia (NH<sub>3</sub>)
- Dual drive "2-in-1" configuration
- Driver selection & use of combined cycle power
- Gas turbine inlet air cooling
- Low pressure boil-off gas (BOG) re-liquefaction
- Highly efficient fuel gas consumption
- Site selection & fit-for-purpose philosophy

## **CAPEX Savings of Future LNG Projects**



LNG customers are looking for lower liquefaction costs, requiring developers to deliver lower CAPEX to realize financeable project returns



Source: Liquefied Natural Gas Limited, LNG Technology Pty Ltd.

## **CAPEX** is Complete, Contracted, or Confirmed



#### **Magnolia LNG Project**

- EPC + Owner's Costs per tonne range of US\$549 to US\$628 based on final FID design capacity
- Executed Lump Sum, Turnkey EPC Contract (\$499-544/mtpa)
  - 4 x 2 trains, 2 tanks, all amenities
  - Gas turbines, compressors, cold boxes, bulk materials
  - Mob / de-mob costs
  - Capital spares / contractor insurance
  - EPC profit, risk funds, escalation, contingency
- Owner's Costs contracted or verifiable (\$50-84/mtpa)
  - Owner's engineer
  - Remaining regulatory, permitting, and environmental costs
  - Commissioning gas and cost
  - O&M mobilization
  - Other minor non-EPC contracts
  - Internal capitalized costs from financial close
- Financing costs will be at market rates as at Financial Close



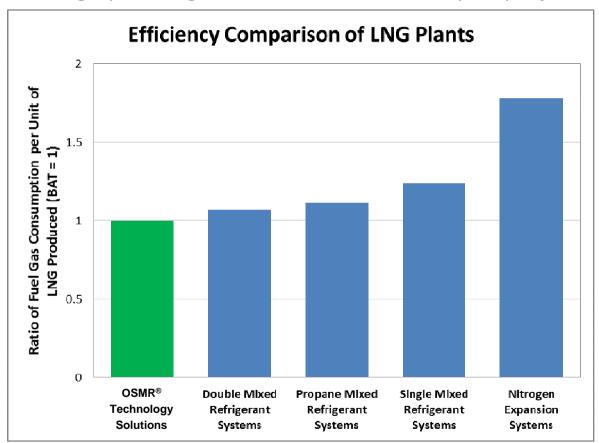




## **OPEX Trends Required of Future LNG Projects**



Optimizing operating costs drives lower full cycle project cost



Source: Liquefied Natural Gas Limited, LNG Technology Pty Ltd.

### **OSMR® OPEX Attributes**



### Less natural gas consumed as fuel (reduced feed gas retainage)

 Annual US\$28 million saving for an 8 mtpa plant (based on 2% retainage reduction from traditional designs, US\$3.00/mm Btu)

### Lower Greenhouse Gas (GHG) emissions

Annual reduction of 500,000 metric tons GHG for an 8 mtpa plant (based on 2% retainage reduction from traditional designs)

#### Lower overall emissions

 Reduced fuel consumption inherently reduces all emissions; very low NOx gas turbines further limit profile

### Minimal flaring

 Innovative plant design and procedures minimize flaring during start-up, cooldown, and other transient conditions

### High reliability / availability, dual-drive "2-in-1" configuration

Independent, parallel refrigerant circuits mitigate impact of planned / unplanned outages

## **DOE / FERC Status**



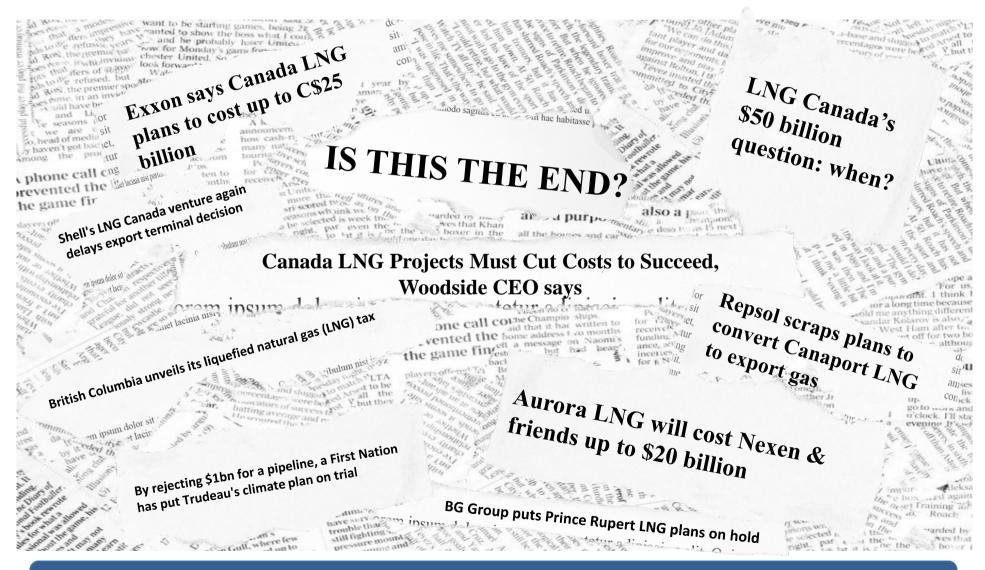
Pro	jects in construction	State	FERC Order	PISD	Pre File	FERC App	SER	DEIS	FEIS	Order	NFTA	
1	Sabine Pass (1-4 & 5-6)	LA	'12 & '15	'16 & '19								
2	Freeport LNG	TX	Jul 2014	'17/'20								
3	Cameron LNG	LA	Jun 2014	'18/'19								
4	Cove Point	MD	Sep 2014	2017								
5	Corpus Christi (1-3)	TX	Dec 2014	2017								
FER	C Order issued	State	FERC Order	PISD	Pre File	FERC App	SER	DEIS	FEIS	Order	NFTA	
1	Magnolia LNG	LA	Apr 2016	2019/22	Mar '13	Apr '14	Apr '15	Jul 15	Nov '15	Apr '16	Nov '16	
2	Trunkline LNG	LA	Dec 2015	TBD	Apr '12	Mar '14	Jan '15	Apr '15	Aug '15	Dec '15	DELAYED BY SHELL	
3	Southern LNG	GA	Jun 2016	TBD	Dec '12	Mar '14	Oct '15	n/a	n/a	Jun '16		
Oth	er projects	State	FERC Order	PISD	Pre File	FERC App	SER	DEIS	FEIS	Order	NFTA	
1	Jordan Cove LNG	OR	TBD	TBD		FER	RC application denied, rehearing requested					
2	Golden Pass LNG	TX	Pending	TBD	May '13	Jul '14	Jan '16	Mar '16	Precedent is ~ 4 quarters to NFTA			
3	Delfin LNG	LA	Pending	TBD	n/a	May '15	n/a	Jul '16	Frecedent is 4 quarters to NFTA			
4	Gulf LNG	MS	Pending	TBD	Dec '12	Jun '15	Precedent indicates ~ 9 to 12 quarters to issuance of NFTA for greenfield projects					
5	Venture Global	LA	Pending	TBD	Jul '15	Sep '15						
6	Texas LNG	TX	Pending	TBD	Dec '15	Mar '16						
7	Rio Grande LNG	LA	Pending	TBD	Mar '15	May '16						
9	Annova LNG	LA	Pending	TBD	Mar '15	Jul '16						
8	Corpus Christi (4 & 5)	TX	Pending	TBD	Jun ' 15	Prec	redent indicates ~ 14 to 17 quarters to issuance of NFTA					
10	SCT&E LNG	TX	Pending	TBD	Pending		for greenfield projects					

Source: FERC website and K&L Gates reporting

**Notes:** "PISD" – Planned in Service Date; "TBD" – To Be Determined; "SER" – Schedule of Environmental Review; "DEIS" – Draft Environmental Impact Statement; "FEIS" – Final Environmental Impact Statement; "Order" – FERC Order; "NFTA" – DOE Non-Free Trade Agreement approval

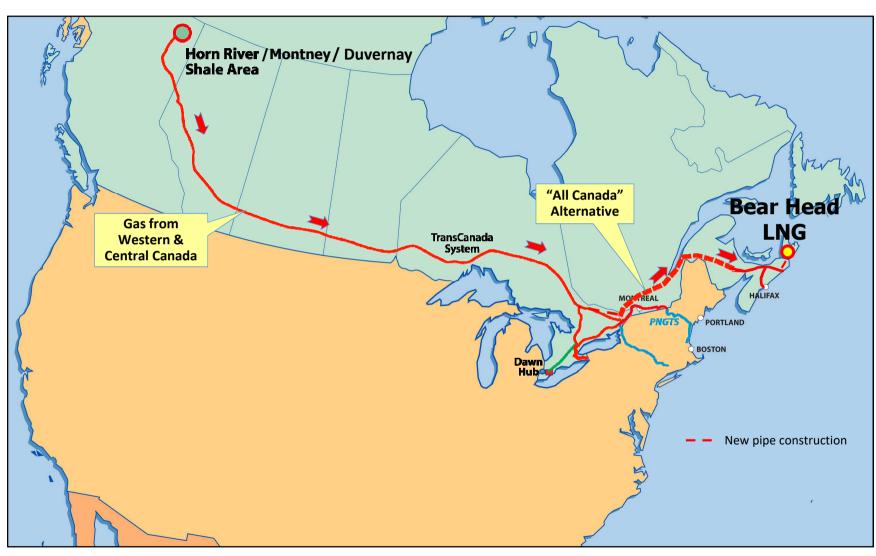
## Where Else in North America?





### East Coast LNG - "Plan B" For Western Shale Gas





### **Conclusions – What To Consider**



#### **Questions to Consider**

Can your potential supplier demonstrate:

- A competitive cost via an executed EPC contract not just a "Class 5" estimate?
- Regulatory Certainty?
- An O&M strategy and execution plan with 3<sup>rd</sup> party verified costs?
- Secure access to gas supply complete with pipeline development costs (if any) in the economics?
- Fully costed ancillary activities (e.g.):
  - Power supply, including cost of construction of power plant (if required), in the economics
  - Full civil works required to protect site from natural disasters (if required) in the economics
  - Reliability risk from overly complex designs
- Debt and equity commitment plans that confirm creditors receive required rates of return and overall project financeability?

### **Contacts**



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Managing Director &
Chief Executive Officer

Mr Michael Mott Chief Financial Officer

Mr John Baguley
Chief Technology Officer

Mr Anthony (AG) Gelotti Chief Development Officer

Mr Andrew Gould Joint Company Secretary

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