



FLNG Projects in the U.S.: Market and Regulatory Developments

Flame – The Global LNG Summit

Amsterdam, 8 May 2017

FLNG in the U.S.

- Where are we today?
- FLNG Market Developments
- U.S. Regulatory Context
- Current Issues

Recent U.S. LNG Market Developments

- Over 100 cargoes of LNG exported from Sabine Pass, to 18 countries on 5 continents
- 11 LNG export projects/expansions approved by the Federal Energy Regulatory Commission (FERC)
- U.S Department of Energy (DOE) has authorized a cumulative volume of 19.2 Bcf/d (or 146 mtpa) for export to non-Free Trade Agreement countries
- Trend towards U.S. project sponsors becoming listed companies
- Following March 2016 denial of FERC application, Jordan Cove project restarted
- Trump administration signals support for Jordan Cove, East Coast projects
- Alaska Gasline Development Corporation files FERC application for 20 mtpa Alaska LNG project
- Certain FERC/DOE-approved export projects have not taken FID
- “Second wave” export projects foreseeing longer development periods

Global Market Shift to U.S. LNG

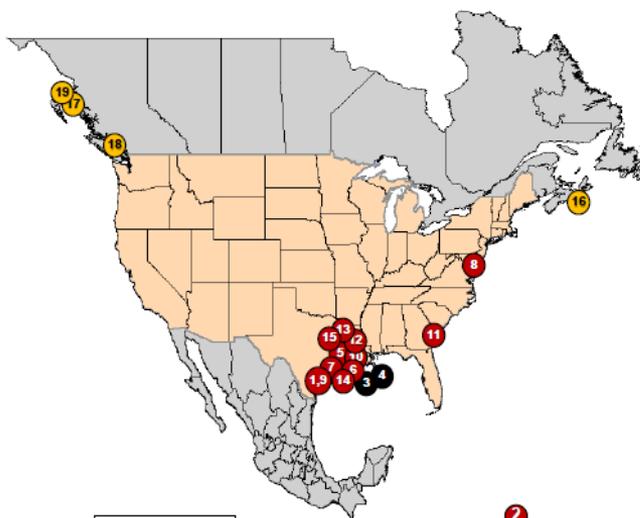
- 65 mtpa of new U.S. LNG by 2020.
- Primary source of global supply diversification.
- Security of supply, supported by a large, robust and liquid gas market.
- Low cost liquefaction.
- Relatively favorable and predictable legal environment.
- FOB contracts offer flexibility and are more amenable to spot market transactions (24/61 cargoes from Sabine Pass in 2016 were spot transactions).
- Destination flexibility; more than 30 countries importing LNG.

“The US is the sole winner in the changing LNG market.”

*Nobuo Tanaka,
Gastech 2017
consortium chairman*

U.S. LNG Export Projects – FERC Approved

North American LNG Import/Export Terminals *Approved*



US Jurisdiction
● FERC
● MARAD/USCG

As of January 5, 2017

Import Terminals

U.S.

APPROVED - UNDER CONSTRUCTION - FERC

1. Corpus Christi, TX: 0.4 Bcfd (Cheniere – Corpus Christi LNG) (CP12-507)

APPROVED – NOT UNDER CONSTRUCTION - FERC

2. Salinas, PR: 0.6 Bcfd (Aguirre Offshore GasPort, LLC) (CP13-193)

APPROVED - NOT UNDER CONSTRUCTION - MARAD/Coast Guard

3. Gulf of Mexico: 1.0 Bcfd (Main Pass McMoran Exp.)
4. Gulf of Mexico: 1.4 Bcfd (TORP Technology-Bienville LNG)

Export Terminals

U.S.

APPROVED - UNDER CONSTRUCTION - FERC

5. Sabine, LA: 1.4 Bcfd (Cheniere/Sabine Pass LNG) (CP11-72 & CP14-12)
6. Hackberry, LA: 2.1 Bcfd (Sempra – Cameron LNG) (CP13-25)
7. Freeport, TX: 2.14 Bcfd (Freeport LNG Dew/Freeport LNG Expansion/FLNG Liquefaction) (CP12-509) (CP15-518)
8. Cove Point, MD: 0.82 Bcfd (Dominion – Cove Point LNG) (CP13-113)
9. Corpus Christi, TX: 2.14 Bcfd (Cheniere – Corpus Christi LNG) (CP12-507)
10. Sabine Pass, LA: 1.40 Bcfd (Sabine Pass Liquefaction) (CP13-552) ★
11. Elba Island, GA: 0.35 Bcfd (Southern LNG Company) (CP14-103)

APPROVED – NOT UNDER CONSTRUCTION - FERC

12. Lake Charles, LA: 2.2 Bcfd (Southern Union – Lake Charles LNG) (CP14-120)
13. Lake Charles, LA: 1.08 Bcfd (Magnolia LNG) (CP14-347)
14. Hackberry, LA: 1.41 Bcfd (Sempra - Cameron LNG) (CP15-560)
15. Sabine Pass, TX: 2.1 Bcfd (ExxonMobil – Golden Pass) (CP14-517)

Canada

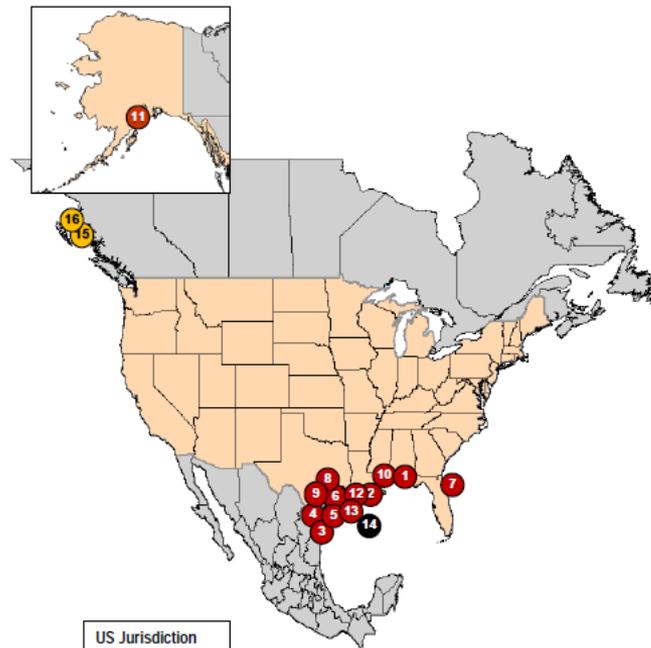
APPROVED – NOT UNDER CONSTRUCTION

16. Port Hawkesbury, NS: 0.5 Bcfd (Bear Head LNG)
17. Kitimat, BC: 3.23 Bcfd (LNG Canada)
18. Squamish, BC: 0.29 Bcfd (Woodfibre LNG Ltd)
19. Prince Rupert Island, BC: 2.74 Bcfd (Pacific Northwest LNG)

★ Trains 5 & 6 with Train 5 under construction

U.S. LNG Export Projects – FERC Proposed

North American LNG Export Terminals *Proposed*



US Jurisdiction

- FERC
- MARAD/USCG

As of January 5, 2017

PROPOSED TO FERC

Pending Applications:

1. Pascagoula, MS: 1.5 Bcfd (Gulf LNG Liquefaction) (CP15-521)
2. Cameron Parish, LA: 1.41 Bcfd (Venture Global Calcasieu Pass) (CP15-550)
3. Brownsville, TX: 0.55 Bcfd (Texas LNG Brownsville) (CP16-116)
4. Brownsville, TX: 3.6 Bcfd (Rio Grande LNG – NextDecade) (CP16-454)
5. Brownsville, TX: 0.9 Bcfd (Annova LNG Brownsville) (CP16-480)
6. Port Arthur, TX: 1.86 Bcfd (Port Arthur LNG) (CP17-20)

Projects in Pre-filing:

7. Jacksonville, FL: 0.075 Bcfd (Eagle LNG Partners) (PF15-7)
8. Freeport, TX: 0.72 Bcfd (Freeport LNG Dev) (PF15-25)
9. Corpus Christi, TX: 1.4 Bcfd (Cheniere – Corpus Christi LNG) (PF15-26)
10. Plaquemines Parish, LA: 2.80 Bcfd (Venture Global LNG) (PF15-27)
11. Nikiski, AK: 2.55 Bcfd (ExxonMobil, ConocoPhillips, BP, TransCanada and Alaska Gasline) (PF14-21)
12. Cameron Parish, LA: 1.84 Bcfd (G2 LNG) (PF16-2)
13. Calcasieu Parish, LA: 4.0 Bcfd (Driftwood LNG) (PF16-6)

PROPOSED TO U.S.-MARAD/COAST GUARD

14. Gulf of Mexico: 1.8 Bcfd (Delfin LNG)

PROPOSED CANADIAN SITES

15. Kitimat, BC: 1.28 Bcfd (Apache Canada Ltd.)
16. Douglas Island, BC: 0.23 Bcfd (BC LNG Export Cooperative)

Global Market Shift away from FLNG

Despite the milestone of first commercial production from an FLNG (Petronas *PFLNG Satu*):

- Commodity prices have refocused market participants on lowest cost liquefaction opportunities.
- Large, offshore integrated upstream and FLNG projects are not competitive and take longer to realize; not market responsive
- Shift from Australia to US LNG production undercuts demand for offshore FLNG
- Government preferences for onshore terminals impact demand
- Several FLNG project cancellations
- The notable exceptions are near shore FLNG in Africa and U.S. FLNG

***“It’s much cheaper
(than floating LNG)
and much quicker to
market.”***

Peter Coleman
CEO

Woodside Petroleum Ltd.

U.S. FLNG Project Structures

- U.S. FLNG is either near shore (within State waters) or offshore
 - State seaward boundaries: generally three marine leagues or 10.357 miles
 - Near shore licensed by FERC; offshore licensed by U.S. Maritime Administration (MARAD), in consultation with Coast Guard
 - Lead agency performs National Environmental Policy Act (NEPA) review
- Supported by “surplus” existing brownfield gas pipeline and processing infrastructure
- No major upstream component; access to liquid U.S. gas market
- Scalable through individual vessels; enables a targeted solution to fill a supply gap.
- FLNG can be low-cost liquefaction.

U.S. FLNG Projects

PROJECT	LOCATION	QUANTITY	LEAD AGENCY	STATUS
Delfin LNG	Offshore GOM	1.8 Bcf/d	MARAD	Approved 13 March 2017
Main Pass Energy Hub	Offshore GOM	3.5 Bcf/d	MARAD	Resumed MARAD permitting process
CE FLNG	Plaquemines Parish	1.07 Bcf/d	FERC	Pre-filing suspended; Application not yet submitted
Lloyds Energy Group	Point Comfort, TX	1.25 Bcf/d	FERC	Application not yet submitted
Eos LNG	Brownsville, TX	1.6 Bcf/d	FERC	Application not yet submitted
Barca LNG	Brownsville, TX	1.6 Bcf/d	FERC	Application not yet submitted
Avocet LNG	Offshore GOM	Undisclosed	MARAD	Application not yet submitted
ARGO LNG	Offshore GOM	Undisclosed	MARAD	Application not yet submitted
Pangea LNG	Corpus Christi Bay	1.09 Bcf/d	FERC	Cancelled
Excelerate	Lavaca Bay	1.38 Bcf/d	FERC	Cancelled

Deepwater Ports

- The Deepwater Port Act (33 U.S.C. 1501 et seq.) was enacted in 1974 to promote the construction and operation of deepwater ports (DWP) as a safe and effective means of importing oil into the U.S. and transporting oil from the OCS. The intent of the DWPA is to protect marine and coastal environments from the adverse effects of developing and operating such ports. In 2002, the Act was amended to add natural gas.
- A DWP is defined as: “...*any fixed or floating manmade structure... located beyond State seaward boundaries...used or intended for use as a port or terminal for the transportation, storage, or further handling of oil or natural gas...with respect to natural gas, includes...pipelines, pumping or compressor stations, service platforms, buoys, mooring lines, and similar facilities...to the extent that they are located seaward of the high watermark...*”
- Nine deepwater ports have been approved; three in operation. Only one FLNG export project has been approved.
- Applicant must be a “Citizen of the United States”
- Operators are entitled to an exclusion zone around a deepwater port under the Act
- Authorizations to construct and operate will contain many environmental and engineering conditions, and required emergency response plans
- Governor of Adjacent Coastal State has the right to object

FERC vs MARAD



ISSUE	FERC	MARAD
Expected duration	24-30 months	19-21 months (356 days)
EIS required?	Yes	Yes
NEPA lead agency	FERC	Coast Guard
Expected cost	\$30-50 million	\$10-15 million
Adjacent Coastal State review?	No	Yes
Air Permit Issued by	State government	EPA
Commence construction during appeal?	Yes	No

U.S. Regulatory Support for Offshore FLNG

- First Decision of the U.S. Department of Transportation for a deepwater port FLNG export project issued on 13 March 2017.
<https://www.regulations.gov/document?D=USCG-2015-0472-0120>
- Like FERC, MARAD will not consider the absence of offtake contracts in evaluating applications or seek to expand the scope of the NEPA review.
- Key excerpts from the Decision:
 - “The export of natural gas will serve U.S. national security interests by providing **greater diversification of global natural gas supplies . . .**”
 - “Exporting [LNG] will also give U.S. allies certainty that in the event natural gas supplies are interrupted, **the U.S. can provide a consistently reliable alternative source.**”
 - “. . . the offshore location of the Port **helps to increase security, reduce congestion and enhance safety** in ports throughout the Gulf Coast of Louisiana and Texas.”
 - “. . . the Port [is] a **more difficult target** for unscrupulous persons interested in disrupting our energy infrastructure or using the facility to harm the American public.”
 - “. . . the construction and operation of the Port is **in the national interest.**”

Current Regulatory Issues

- **FERC Quorum.** FERC currently has 2/5 commissioners, with one more leaving as of June 30; it needs 3 commissioners to be quorate and approve major orders. A major backlog is already developing.
- **Environmental review.** Sierra Club and other environmental groups have challenged FERC's orders on the basis that the NEPA analysis should expand to upstream natural gas production and other environmental impacts. While the U.S. Court of Appeals for the District of Columbia Circuit has upheld FERC's review, it is now considering cases challenging DOE export authorizations on the same grounds. An opinion from the D.C. Circuit is expected sometime between June and September 2017.
- **Water usage.** Water cooling of facilities creates fisheries issues (affects on fish stocks, etc.), which has resulted in previous import projects being blocked. Avoid high water consumption in your project design through air cooling.
- **Air emissions.** These are measured not just at the FLNG vessel but at the onshore pipeline, processing and compression facilities. Construction cannot commence until the air permit is issued.



Hogan
Lovells

Thank you