

Straight to the point

Status of North American LNG export terminals;
primer on project risk and commercial agreements

September 19, 2017

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NAPCO Fall 2017 Credit Conference



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Outline

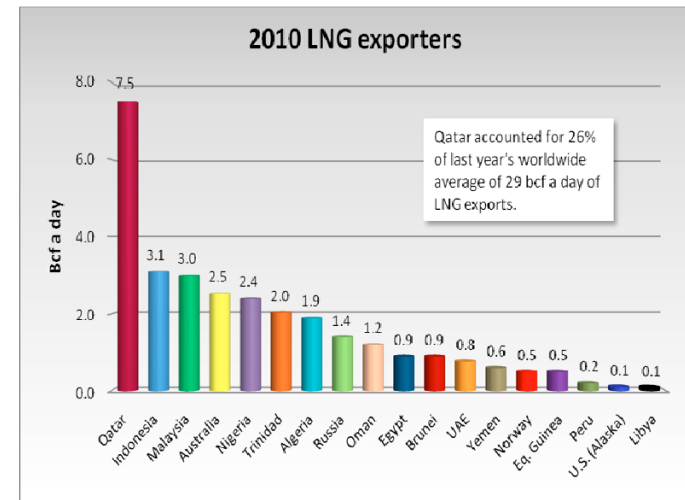
1. Evolving LNG market framework
 - Historic global market for LNG
 - Current state of global LNG market, new markets, users and buyers
 - Status of proposed North American LNG export developments
2. Developing a global LNG project
 - Typical project agreements
 - LNG project risk management
3. LNG commercial agreements
 - Terminal capacity tolling agreements
 - LNG sales and purchase agreements
4. Appendix
 - US LNG export terminal capacity

Evolving LNG market framework

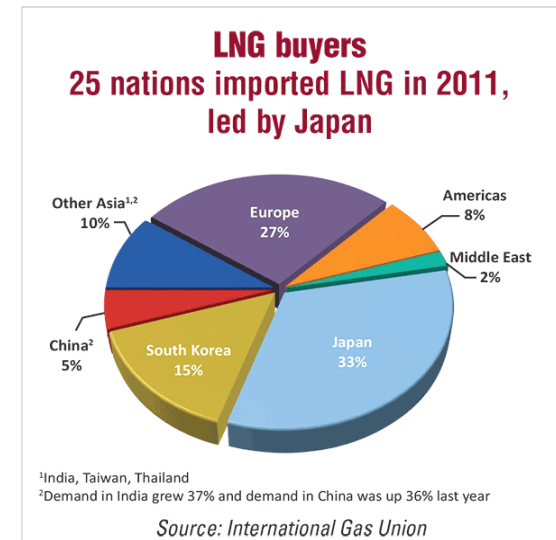
Underlying commercial matters

Historic global market for LNG

- Security of supply paramount
- High demand driven market, mainly in Japan and Korea
- Large liquefaction projects, with Qatar leading the way
- Few giant players on either side
- LNG price indexed to oil
- Long-term, take-or-pay contracts
- Buyer takes volume risk and seller takes price risk
- Point-to-point transport – no destination flexibility
- No spot market; no trading



Source: International Gas Union



Changing Global Market for LNG: The emergence of the short-term and spot markets and the introduction of gas price indexation

World LNG Estimated March 2014 Landed Prices



Estimated prices in US\$ per MMBtu

Source: Waterborne Energy, Inc. Data in \$/USMMBtu

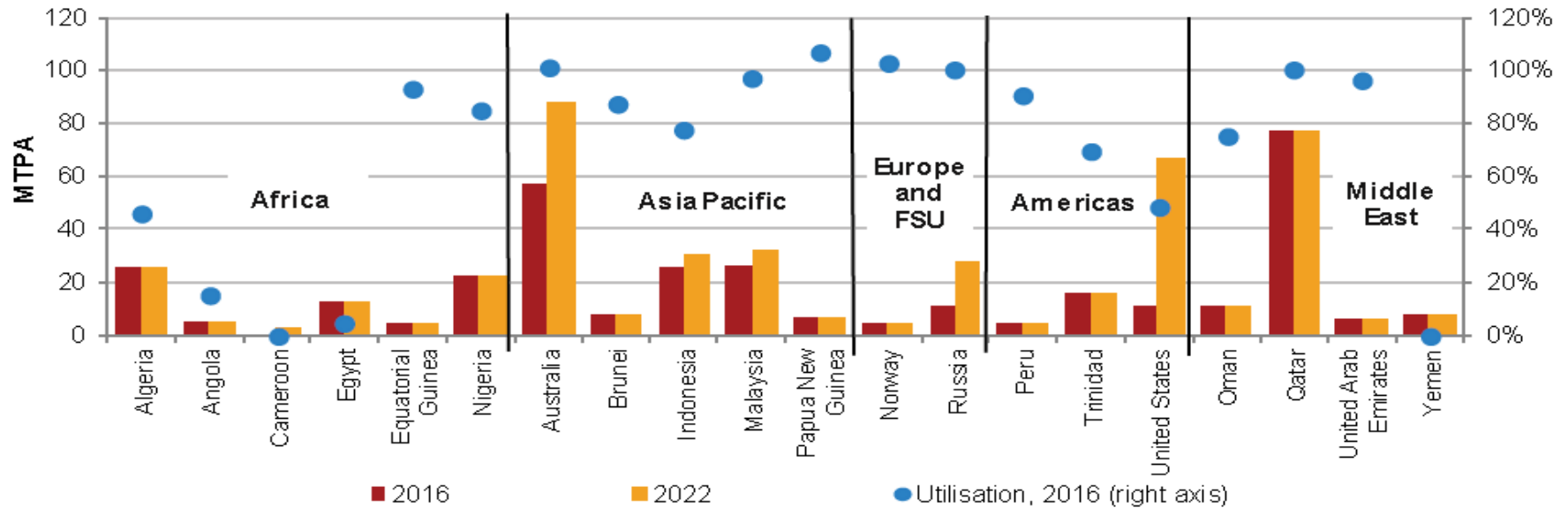
World LNG Estimated Landed Prices: Feb-17



Source: Waterborne Energy, Inc. Data in \$/USMMBtu. Landed prices are based on a netback calculation. Note: Includes information and Data supplied by IHS Global Inc. and its affiliates ("IHS"). Copyright (publication year) all rights reserved. Prices are the monthly average of the weekly landed prices for the listed month.

Updated: iMar-17

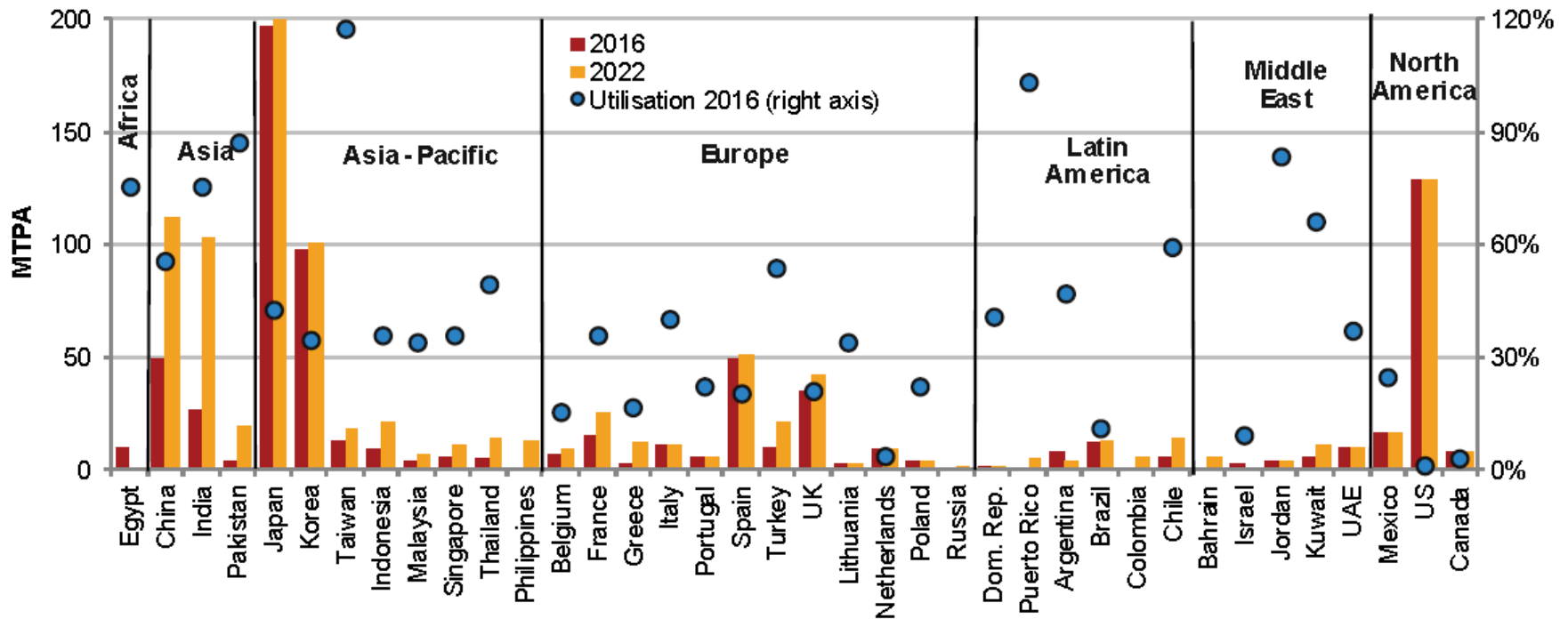
Current State of LNG Market: LNG oversupply: growth in liquefaction capacity



Liquefaction capacity by country in 2016 and 2022 (projected)

Source: International Gas Union World LNG Report – 2017 edition, citing to IHS, IGU and company announcements

Current State of LNG Market: New markets, user and buyers: LNG oversupply: growth in regasification capacity

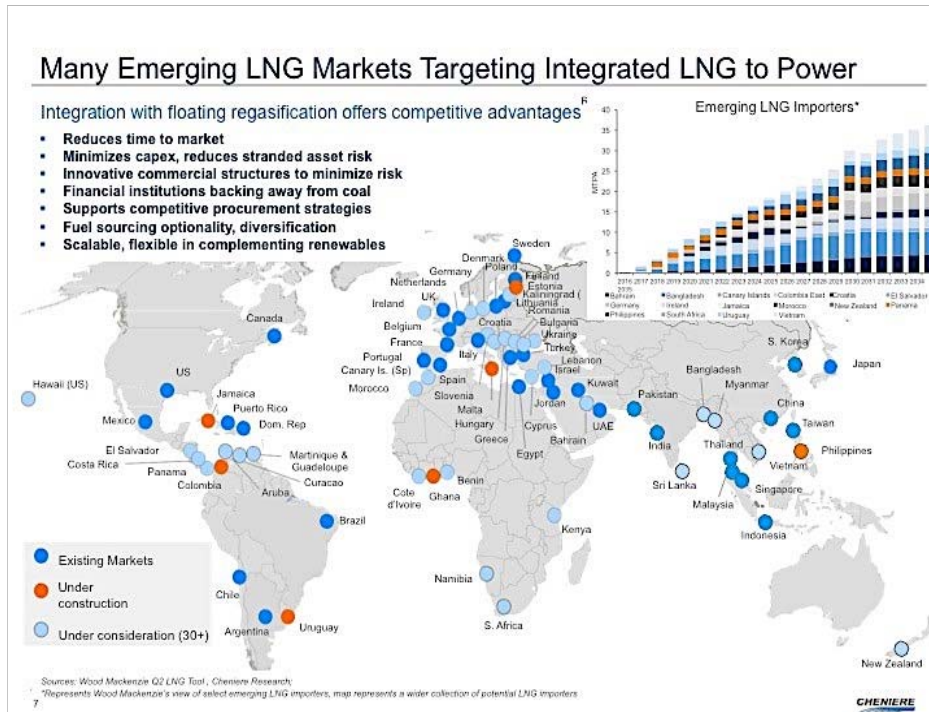


Receiving terminal import capacity by country in 2016 and 2022 (projected)

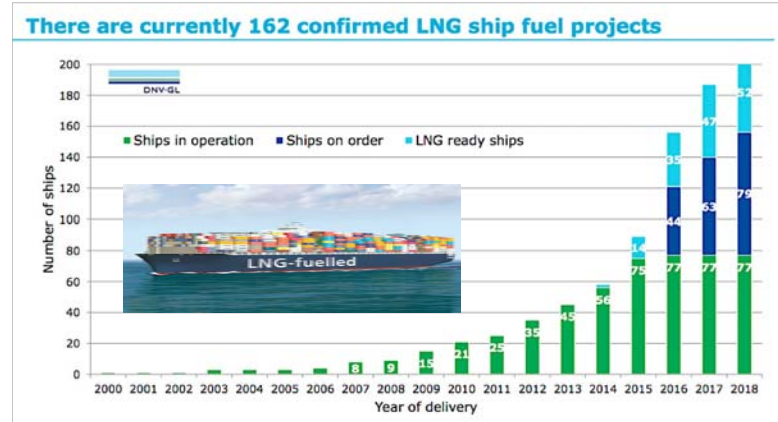
Source: International Gas Union World LNG Report – 2017 edition, citing to IHS, IGU and company announcements

Current State of LNG Market: New markets, user and buyers

LNG to power plants

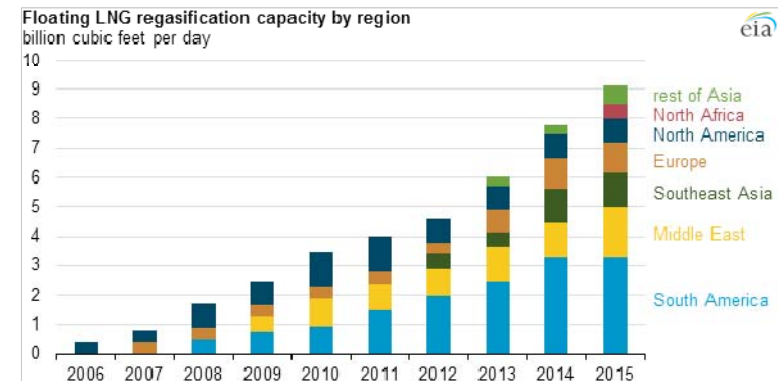


LNG as bunker fuel



Source: website or news article as edited by Eversheds Sutherland

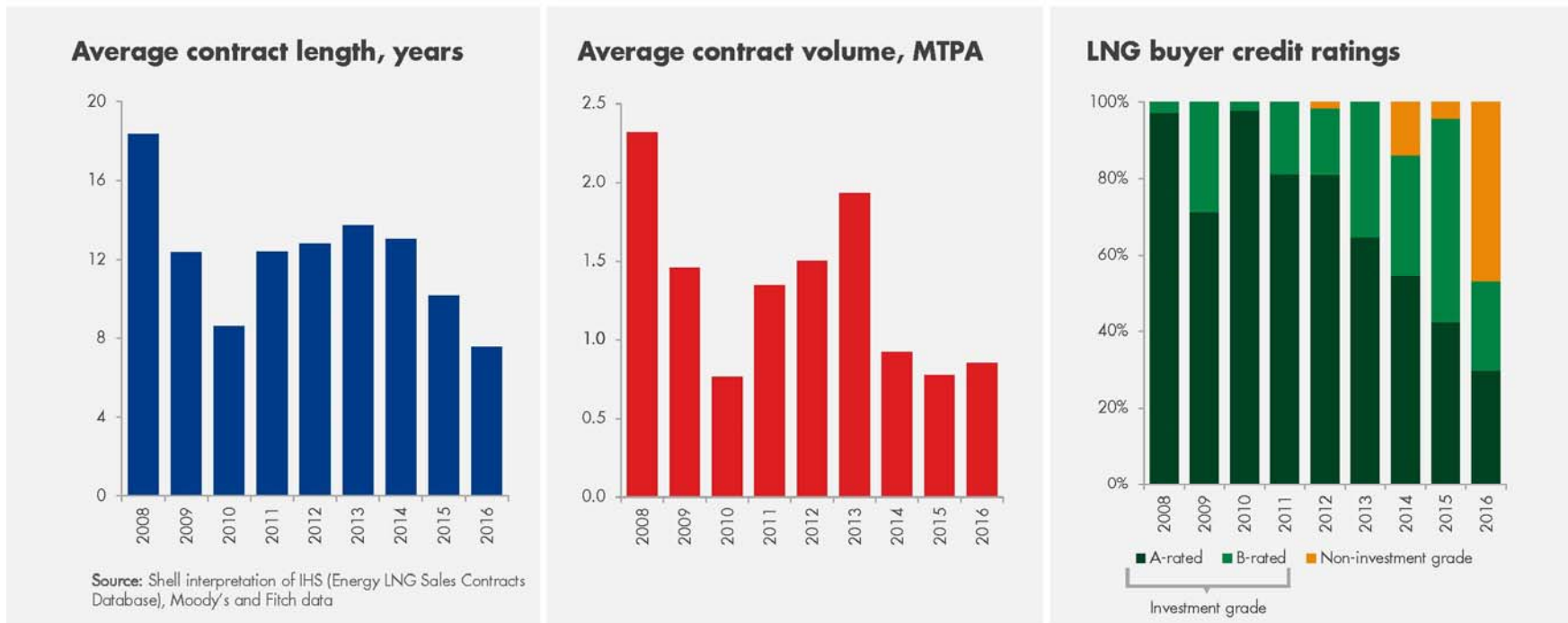
Increased use of floating regas



Source: website or news article as edited by Eversheds Sutherland

Current State of LNG Market: Short-term contracts for lower volumes with new buyers

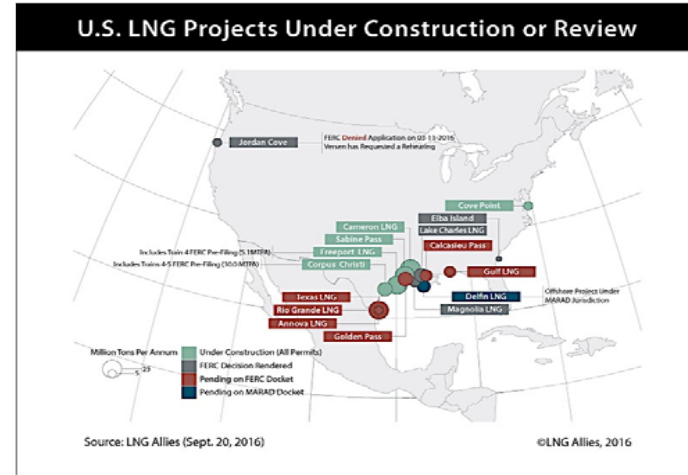
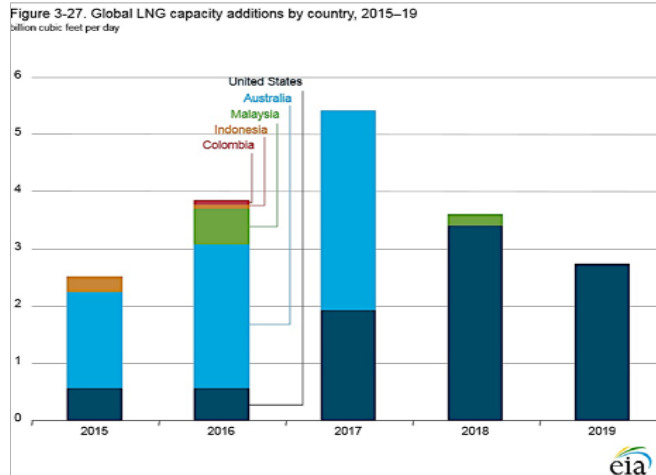
Trend to shorter and smaller contracts with emerging buyers



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Current State of LNG Market: The emergence of the US as a major LNG exporter



U.S. L48 LNG Liquefaction Capacity In-Service Schedule For Trains Currently Under Construction as of 12/23/16

Facility	1Q17	2Q17	3Q17	4Q17	1Q18	2Q18	3Q18	4Q18	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	4Q20
Sabine Pass		Train 3		Train 4		Train 1	Train 2			Train 3	Train 5					
Cameron LNG							Train 1		Train 2							
Freeport LNG							Train 1		Train 2							
Cove Point				Train 1												
Corpus Christi								Trains 1&2								
Elba Island									Train 1							
Cumulative In-Service L48 Liquefaction Capacity (Mtpa)																
Sabine Pass	9.0	13.5	13.5	18.0	18.0	18.0	18.0	18.0	18.0	18.0	22.5	22.5	22.5	22.5	22.5	22.5
Cameron LNG	0.0	0.0	0.0	0.0	0.0	4.5	4.5	9.0	9.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5
Freeport LNG	0.0	0.0	0.0	0.0	0.0	4.6	4.6	9.3	9.3	13.9	13.9	13.9	13.9	13.9	13.9	13.9
Cove Point	0.0	0.0	0.0	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
Corpus Christi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Elba Island	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TOTAL Mtpa	9.0	13.5	13.5	23.3	23.3	32.4	32.4	50.5	53.0	62.2	66.7	66.7	66.7	66.7	66.7	66.7
TOTAL Bcf/d*	1.2	1.8	1.8	3.1	3.1	4.3	4.3	6.7	7.1	8.3	8.9	8.9	8.9	8.9	8.9	8.9

*Assumes 7.5 Mtpa = 1.0 Bcf/d
Source: Company documents, FERC, NGL calculations

Current State of LNG Market: LNG regasification and liquefaction terminals map (2016)



■ Key LNG Liquefaction Terminals

▲ Key LNG Gasification Terminals

Source: website or news article as edited by Eversheds Sutherland

Status of the Proposed North American LNG Export Developments: Alaska



Source: website or news article as edited by Eversheds Sutherland

Status of the Proposed North American LNG Export Developments: Canadian planned terminals



Source: FERC as edited by Eversheds Sutherland

Import/Export Terminals

1. Kitimat, BC: 1.28 Bcfd (Apached Canada Ltd.)
2. Douglas Island, BC: 0.23 Bcfd (BC LNG Export Cooperative)
3. **Kitimat, Ca BC: 3.23 Bcfd (LNGnada)**

Export Terminals

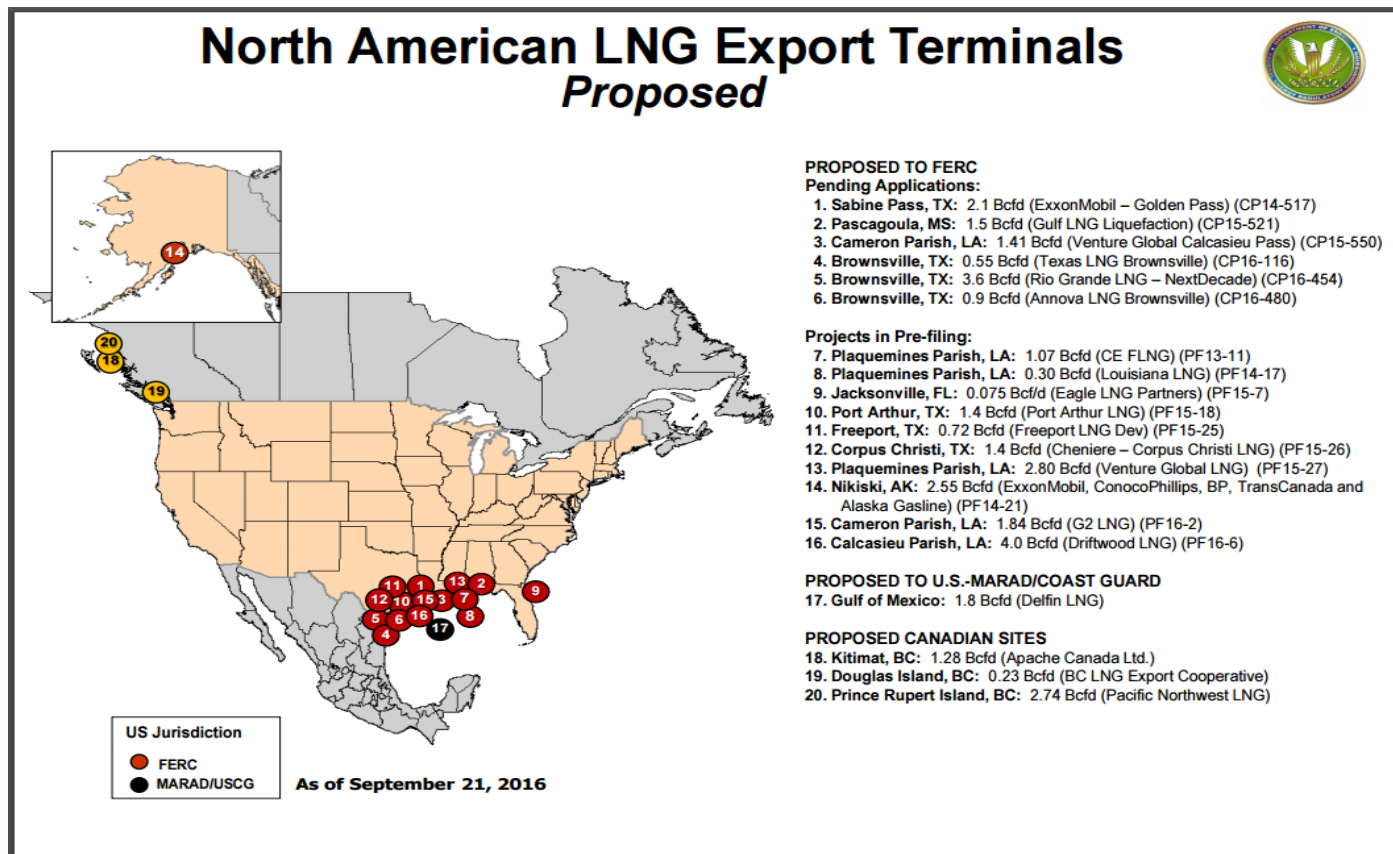
4. Goldboro, NS: 1.4 Bcfd (Pieridae Energy Canada)
5. Prince Rupert Island, BC: 2/91 Bcfd (BG Group)
6. Melford, NS: 1.8 Bcfd (H-Energy)
7. Prince Rupert Island, BC: 2.74 Bcfd (Pacific Northwest LNG)
8. Prince Rupert Island, BC: 4.0 Bcfd (ExxonMobil – Imperial)
9. Squamish, BC: 0.29 Bcfd (Woodfibre LNG Export)
10. Kitimat/Prince Rupert, BC: 0.32 Bcfd (Triton LNG)
11. Prince Rupert, BC: 3.12 Bcfd (Aurora LNG)
12. Kitsault, BC: 2.7 Bcfd (Kitsault Energy)
13. Stewart, BC: 4.1 Bcfd (Canada Stewart Energy Group)
14. Delta, BC: 0.4 Bcfd (WesPac Midstream Vancouver)
15. Vancouver Island, BC: 0.11 Bcfd (Steelhead LNG)

Status of the Proposed North American LNG Export Developments: Reality of the Canadian projects in the short term?

- Concerns raised by potential users and buyers:
 - High costs of pipeline from Alberta to British Columbia
 - Lack of treaties with first nations
 - Insistence on using oil-based pricing as opposed to Canadian gas pricing
- Concerns raised by developers:
 - High costs of pipeline from Alberta to British Columbia
 - Lack of treaties with first nations
 - Lack of clear governmental policy and taxes

Status of the Proposed North American LNG Export Developments: Planned US export terminals

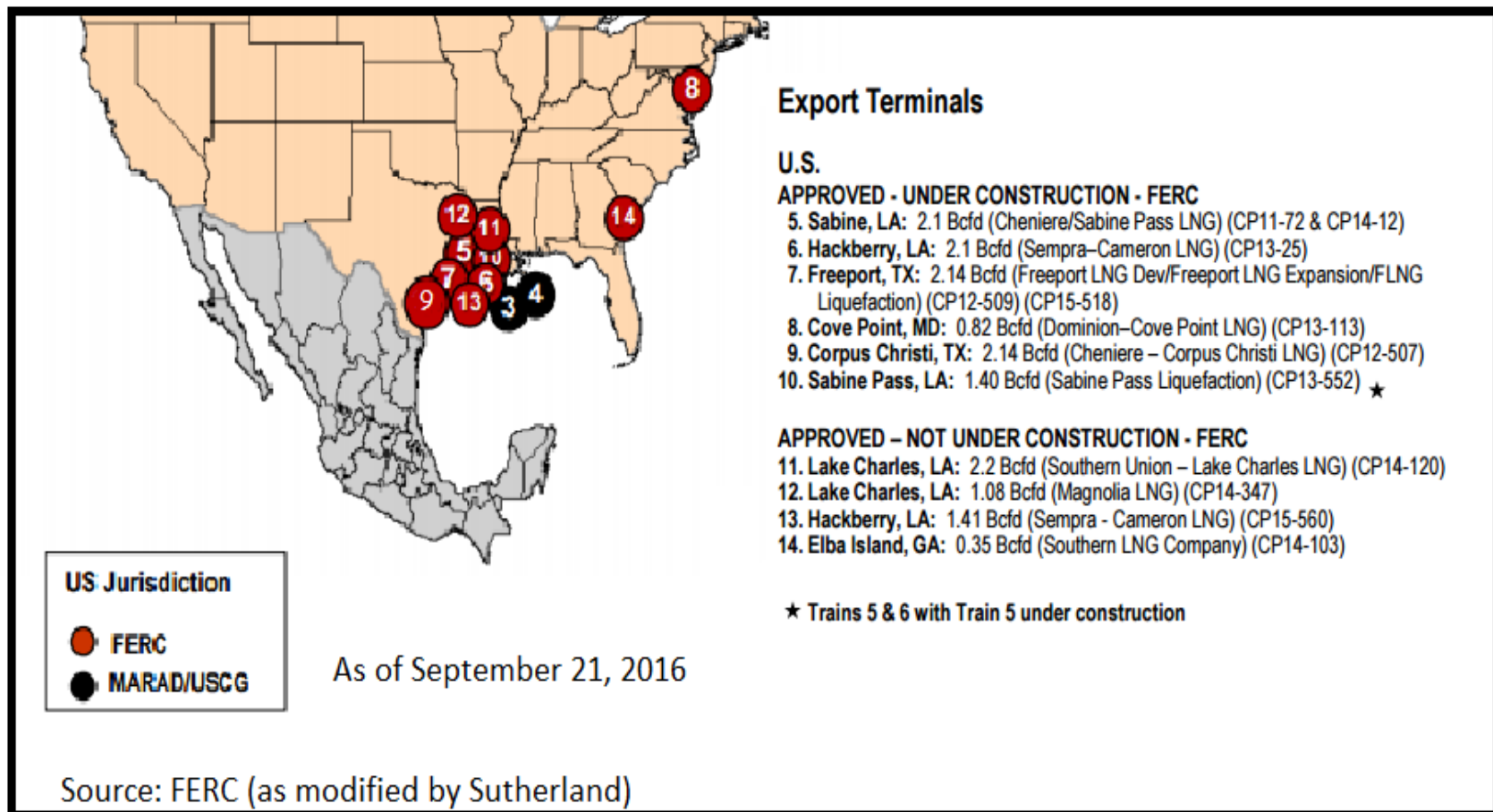
See Appendix for updated LNG Terminal capacity



Source: FERC as edited by Eversheds Sutherland

Status of the Proposed North American LNG Export Developments: Operating, under construction and approved US LNG export projects

See Appendix for updated LNG Terminal Capacity



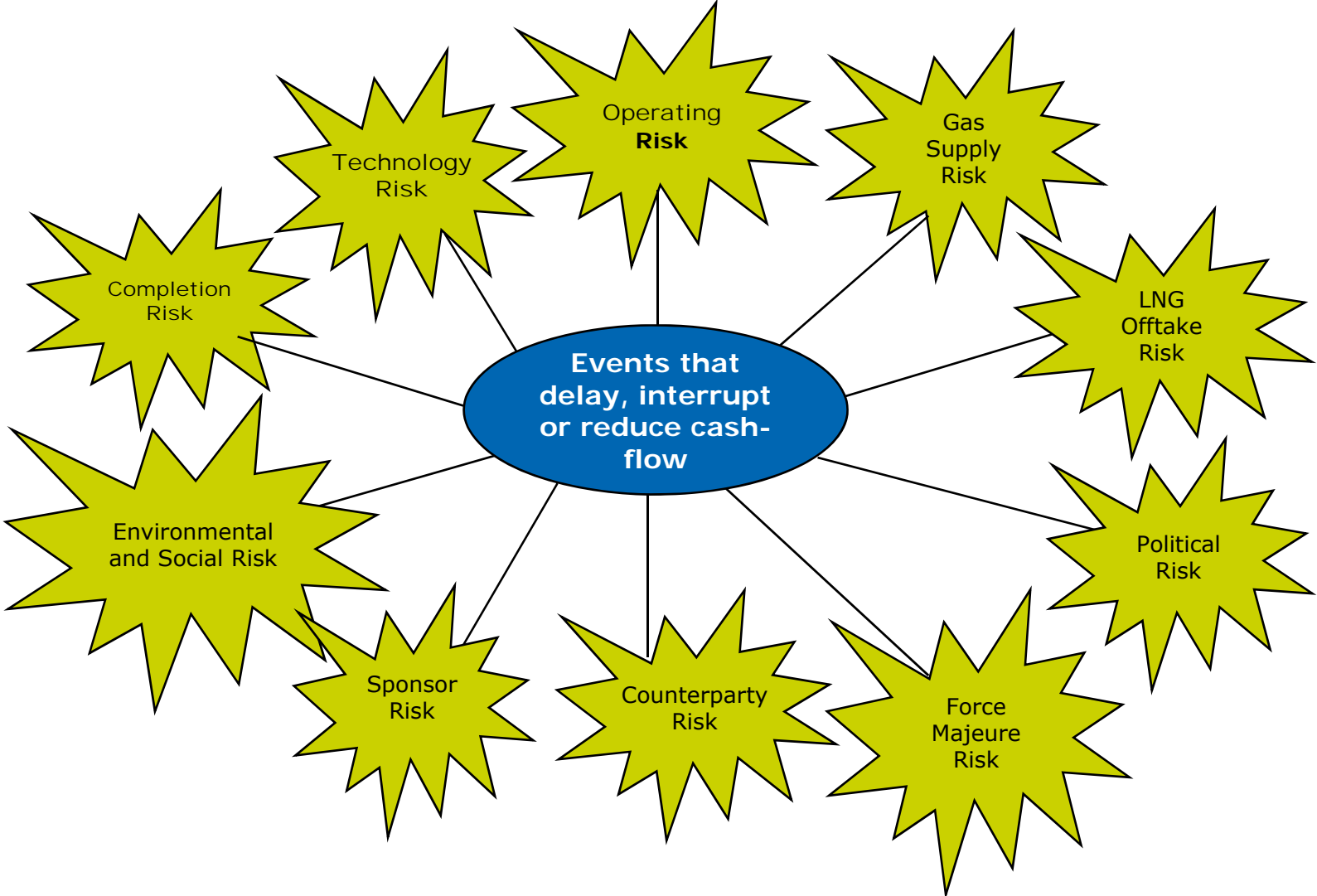
Developing a global LNG project

Developing a Global LNG Project: Typical LNG project agreements

- Development agreements
 - Joint operating agreements
 - LNG facilities shareholders/LLC agreements
 - Common facilities sharing agreement
 - Multiple terminal user coordination agreements
 - Ship shore liability agreement
 - LNG project financing agreement
- Gas supply agreement
- Gas transportation agreement
- LNG facilities construction agreements
- Commercial agreements
 - Tolling agreements
 - LNG sales and purchase agreements



Developing a Global LNG Project: LNG project risks



LNG commercial agreements

LNG Commercial Agreements: Terminal capacity tolling and LNG sales and purchase agreements

Key Risk Similarities

Limitations on liability across LTAs, SPAs and master SPAs

Commercial LNG agreements will typically limit the liability of a party due to:

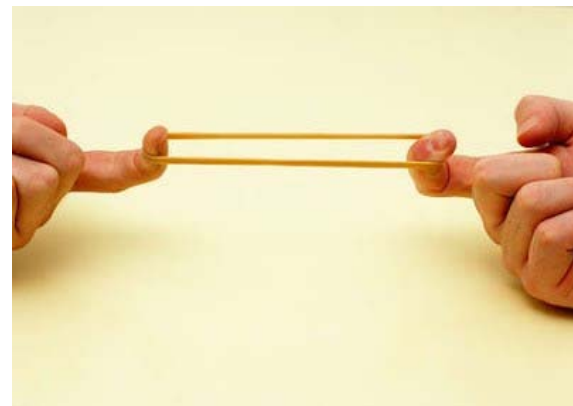
- Seller's/owner's failure to deliver or perform
- Buyer's/terminal user's failure to take or perform
- Delivery of off spec LNG
- Berth and/or harbor time and demurrage
- Casualty of person and/or property. This could be addressed in separate ship shore/port liability agreement

In accepting limitations, parties forego other rights to make claims for specific harms under tort, contract or regulatory causes of action

Often, LNG agreements will cap seller's/owner's liability per incident and overall

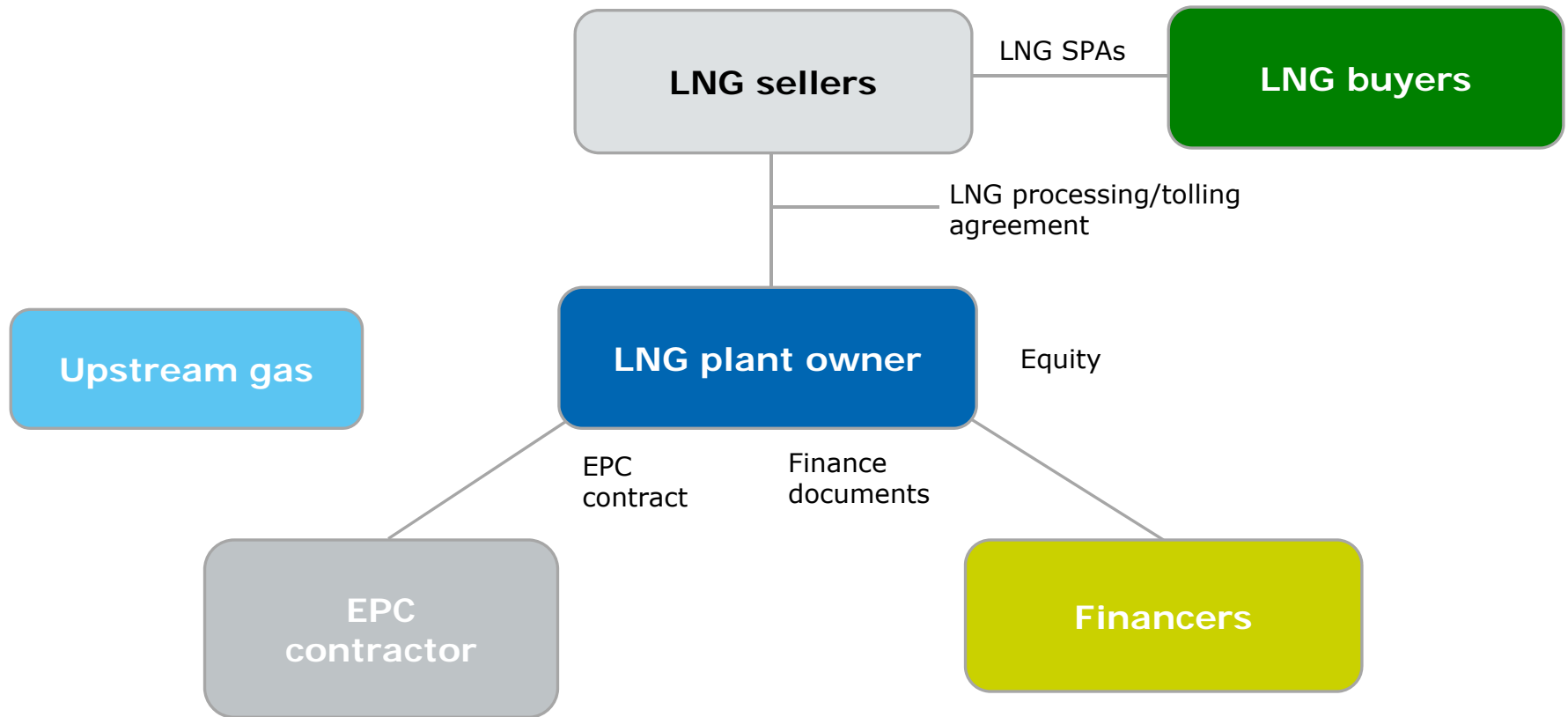
LNG Commercial Agreements: Key terms in negotiating both terminal capacity tolling and sales and purchase agreements

- Who will pay for modifications needed to facilities and/or to ships to comply with marine laws, etc.?
- Risk of changes in law
- Cap on seller's/terminal owner's liability
 - Subject to commercial arbitrage (efficient breach)
- Cap on demurrage liability
- Cap on off spec delivery liability
- Force majeure
 - Both sides will want to claim respective government/regulator actions
- Contract quantity (SPAs)
 - What is excluded from ToP quantity?
 - Calculation of mitigation sales



LNG Commercial Agreements: Terminal capacity tolling structure

Most North American LNG export terminals under development



LNG Commercial Agreements: Terminal tolling structure, basic concept

- Project company
 - Provides a liquefaction processing service to suppliers of natural gas for a fee;
 - It could (but not necessarily) be owned by and partially controlled by the tolling customers;
 - May assume a negotiated and capped amount of liability commensurate with reasonable business risk;
 - Requires security from the tolling customers to protect its interests in the facilities and satisfy the lenders regarding the credit risk of the tolling customers;
 - Does not take title to, or risk of loss of, the natural gas, LNG or by-products; and
 - Does not take any commodity risk.



LNG Commercial Agreements: Terminal tolling structure – pros and cons

— Advantages

- Encourages hub concept with fewer upstream players (such as independent oil companies) developing their own individual plants, and it involves less environmental footprint.
- Independent owners, whose revenue comes from tolling, may be able to finance separately without having to own upstream gas or without even having LNG SPAs in place, since their revenue comes from the tolling, not the commodity.
- Separate operator encourages separate profit center.

— Disadvantages

- Since LNG owners will not own the plant, it could be more difficult to finance until it has signed up terminal users that will pay the tolling fee.
- Unlike the international LNG plant where the plant owners own the gas, an equity investor or a capacity holder will need to locate its own gas upstream.
- Since the owner has no upstream investment, once the terminal is built, there may be little use but the capacity payments must still be paid.
- The payment is like a commercial building lease in that the foundation (anchor) users must pay even if they never use the facility, but subsequent users may be required to pay a different tolling fee.



LNG Commercial Agreements: LNG sales and purchase agreements, currently negotiated issues

- Pricing: oil linked vs. gas vs. spot LNG prices
- Destination restrictions
- Diversion rights
- Portfolio sales

LNG Commercial Agreements: LNG sales and purchase agreements: LNG pricing

- LNG markets geographically segmented with significant regional price differentials (unlike crude)
- Europe
 - Gas-on-gas competition and transparent reference prices (e.g., UK National Balancing Point (NBP) or Dutch Title Transfer Facility (TTF)).
- US
 - Henry hub
- Pacific basin
 - Oil-linked price markets, with LNG prices set by reference to crude owing to lack of competing sources of natural gas (e.g., Japan, South Korea, Taiwan, China)



Commercial Agreements: LNG sales and purchase agreements: LNG contract price: arguments for oil linked pricing

- JCC oil price is historic benchmark fuel
- High cost of development originally in Southeast Asia and the Middle East
- The political risk of the initial LNG sources required assured higher/verifiable prices
- No liquid gas market to use as a comparison
- Seller and source state oil company only knew oil as a fair comparison
- Equity upside opportunities for Asian buyers
- Security of supply – assurance of non-diversion if highest price is paid

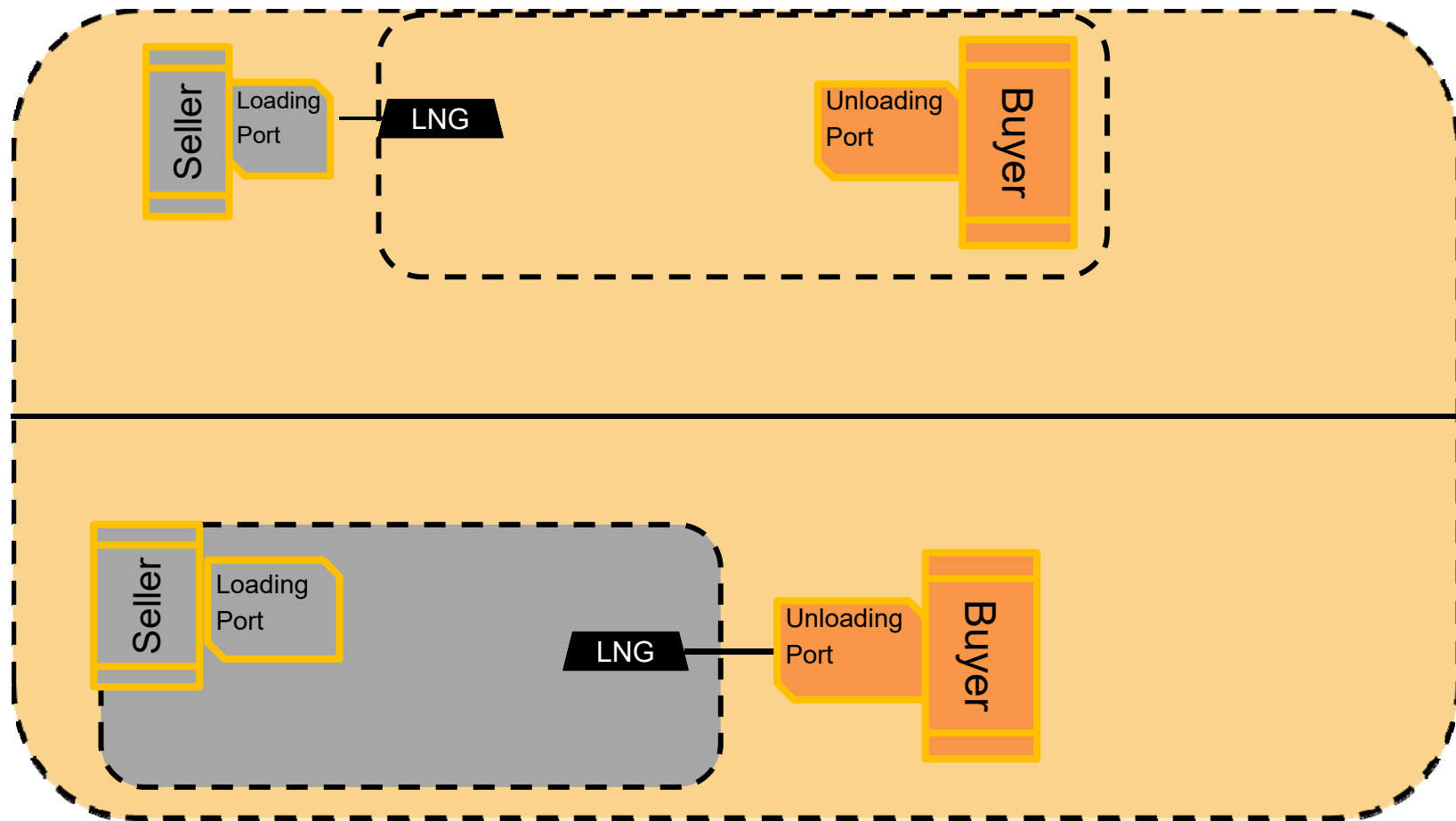


Commercial Agreements: LNG sales and purchase agreements: LNG contract price: arguments against oil linked pricing

- Liquid markets from North America are now becoming global
- Political risk of new market in North America and Australia is no longer a major concern
- Liquid market prices are no longer controlled by state oil companies
- Portfolio sourcing from trading companies
- Buyers now have opportunity for larger share of upstream gas sources

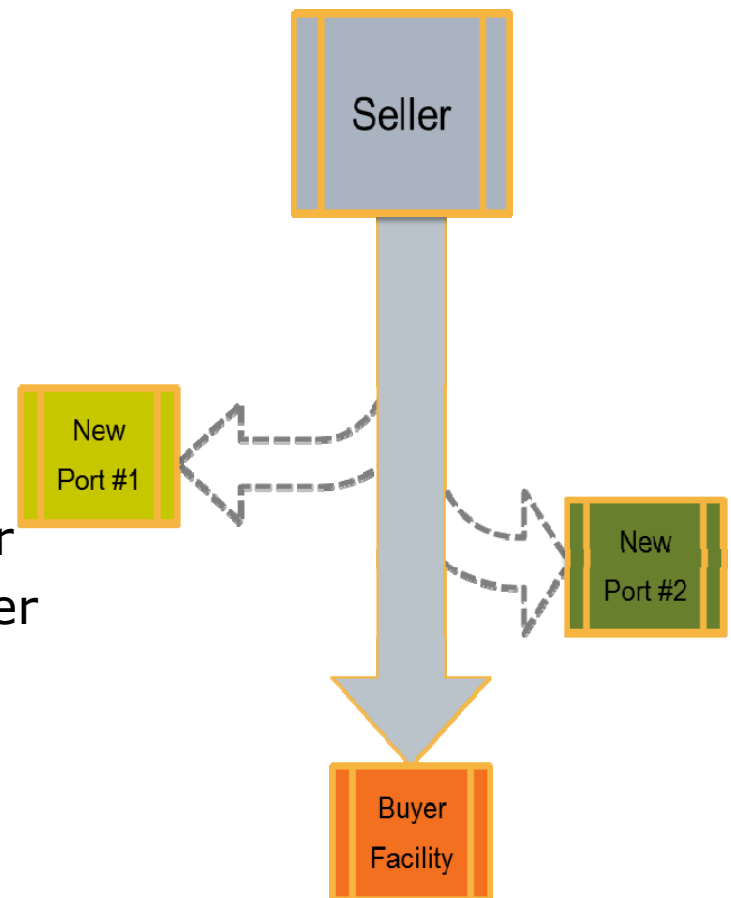


Commercial Agreements: LNG sales and purchase agreements: buyer delivery sales [FOB] vs. seller delivery sales [DES]



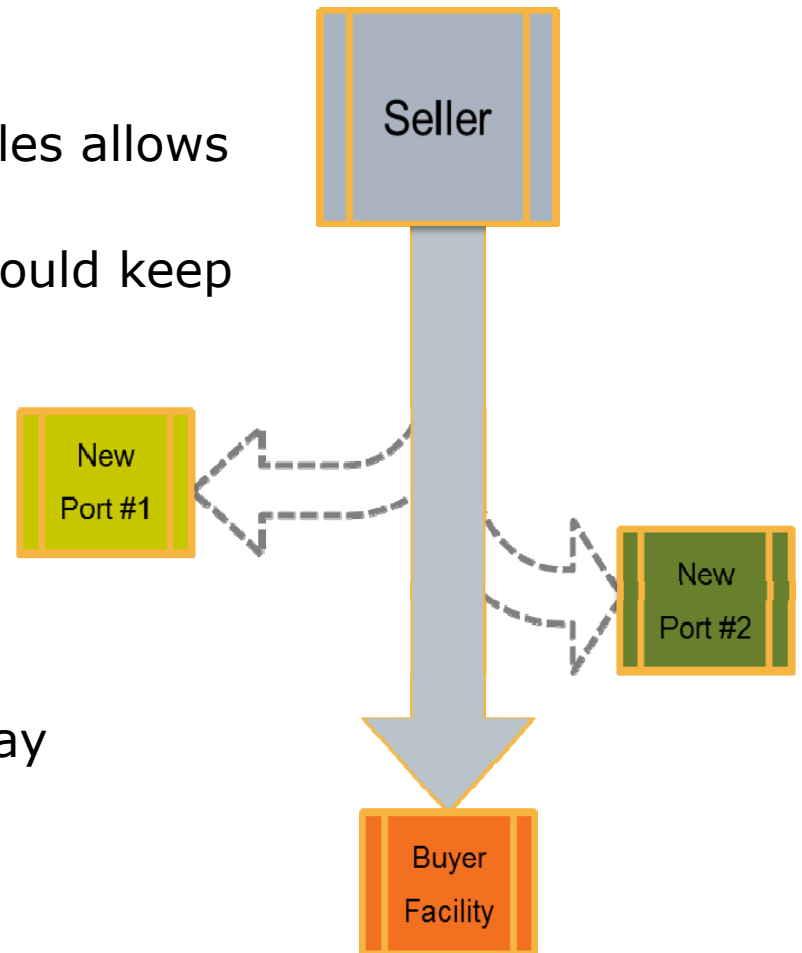
Commercial Agreements: LNG sales and purchase agreements: destination restrictions

- Destination restrictions common in Asia-Pacific SPAs
- Rationale
 - Transportation limitations
 - Location-specific pricing provisions
 - Control of marketing of LNG
 - Political/lender restrictions
- Competition law issues in Europe
- US DOE authorizations
 - To be included “in any agreement or other contract for the sale or transfer of LNG exported pursuant to this Order . . .”



Commercial Agreements: LNG sales and purchase agreements: diversion rights

- Rationale
 - Flexibility
 - Diversion rights for seller in DES sales allows maximization of revenues
 - Diversion rights for seller in DES should keep buyer whole on costs
 - Destination flexibility to buyer in FOB sales allows maximization of revenues
- Difficulties
 - Operational constraints
 - Impact on take-or-pay/deliver-or-pay



Commercial Agreements: LNG sales and purchase agreements: portfolio sales

— What are they?

- Sales by trading companies that acquire LNG or have liquefaction rights from various sources
- Historically spot or short-term sales, but now trading companies are offering portfolio sales on a long-term and short-term basis?

— Benefits to buyers

- Variety of sources can help mitigate price and source risks
- Alleviates some issues with force majeure risk of seller
- Flexibility and permits maximum use of Master SPA

— Tensions with buyers

- Buyers concerned about “black box” pricing and often try to obtain some of seller’s upside benefits
- Buyer may seek specific sourcing, prohibit sourcing from certain countries, or require specific types of vessels, thereby limiting flexibility
- Buyer’s risk tolerance and limited flexibility may not permit flexibility as to scheduling
- Seller may seek all source force majeure, but buyer will want to limit by specific sources or the one set in the SDS

Commercial Agreements: LNG sales and purchase agreements: portfolio sales

- The typical short or mid-term or spot **seller** could be:
 - Those that have excess LNG from long-term SPAs source locations.
 - An aggregate seller that has various options to acquire LNG from various LNG sources.
 - In either case, having LNG MSAs in place allow for quick sales once opportunities of excess LNG or price differentials occur.
- The typical short or mid-term **buyer** could be:
 - Those that need to access excess LNG beyond their long-term commitments due to unanticipated power needs or downtime due to maintenance or due to seller shortfalls, winter needs, etc.
- The aggregator/buyer that is, in turn, the short or mid-term aggregated LNG seller.
 - In either case, having LNG MSAs in place allow for quick purchases once the need or the opportunity presents itself.
 - Helpful for LNG “aggregators” and players with significant LNG portfolios to maximize the profitability of a particular LNG spot cargo according to the market circumstances nearer the time of delivery and/or optimize the operational efficiency of their portfolio.





Appendix

Appendix: US LNG export terminal capacity

Completed and operational

1. **Sabine Pass, LA.** Trains 1-3 have reached completion and are operational. LNG sold to third parties as follows:

a. BG	5.50 MTPA
b. Gas Natural Fenosa	3.50 MTPA
c. KOGAS	3.50 MTPA
d. GAIL	3.50 MTPA
e. Total	2.00 MTPA
f. Centrica	1.75 MTPA

Total capacity committed from trains 1-3 and 4 & 5 under construction: **19.75 MTPA**

Any excess capacity not sold under long-term SPAs to foundation customers is available for Cheniere Marketing to market.

Total capacity after completion of 5 trains: **22.50 MTPA**

Source: website or news article as edited by Eversheds Sutherland

Appendix: US LNG export terminal capacity

Federally approved and under construction

1. Cameron/Hackberry, LA. Trains 1-3 Sempra
Cameron LNG contracted to third parties as follows:

- a. GDF SUEZ S.A. 16.60%
- b. Mitsubishi Corporation 16.60%
- c. Mitsui & Co., Ltd. 16.60%
- d. Affiliate of Sempra retains 50.20%
 - i. Tokyo Gas has contracts to buy a total 0.72 million MTPA of LNG from the US Cameron Project

Cameron LNG Trains 1-3 are slated to open in 2018.

Total capacity after completion of 3 trains: **13.50 MTPA**

Source: website or news article as edited by Eversheds Sutherland

Appendix: US LNG export terminal capacity

Federally approved and under construction

2. Freeport, TX. Freeport LNG Development – 3 trains Capacity contracted to third parties as follows:

- | | |
|-------------------------|--|
| a. Toshiba Corporation | 2.20 MTPA, plus excess volumes (Toshiba has onward buyers for only about half) |
| b. SK E&S LNG, LLC | 2.20 MTPA |
| c. BP Energy Company | 4.40 MTPA |
| d. Osaka Gas Co., Ltd. | 2.20 MTPA |
| e. Chubu Electric Power | 2.20 MTPA |

Freeport LNG's Texas facility is slated to open in 2018.

Total capacity after completion of 3 trains: **13.20 MTPA**

Source: website or news article as edited by Eversheds Sutherland

Appendix: US LNG export terminal capacity

Federally approved and under construction

3. Cove Point, MD. (Dominion-Cove Point LNG) Capacity contracted to third parties as follows:

- | | |
|--------------------------|-----------|
| a. GAIL | 2.30 MTPA |
| b. Sumitomo affiliate | |
| c. Pacific Summit Energy | 2.30 MTPA |
| Sumitomo LNG sold to: | |
| i. Tokyo Gas | 1.40 MTPA |
| ii. Kansai Electric | .80 MTPA |

Cove Point, MD terminal is scheduled to open late 2017.

Total after completion: **5.50 MTPA**

Source: website or news article as edited by Eversheds Sutherland

Appendix: US LNG export terminal capacity

Federally approved and under construction

4. Corpus Christi, TX (Cheniere-Corpus Christi LNG)

LNG sold to third parties as follows:

a. PERTAMINA	1.42 MTPA
b. Endesa	2.25 MTPA
c. Ibedrola	.76 MTPA
d. Gas Natural Fenosa LNG	1.50 MTPA
e. Woodside	.85 MTPA
f. EDF	.77 MTPA
g. EDP	.87 MTPA

Total committed: 8.42 MTPA for Trains 1 & 2

Any excess capacity not sold under long-term SPAs to foundation customers is available for Cheniere Marketing.

Trains 1 & 2 will likely open in 2019.

Total after completion of 2 trains: **9.00 MTPA**

Source: website or news article as edited by Eversheds Sutherland

Appendix: US LNG export terminal capacity

Federally approved and under construction

- 5. Elba Island.** FERC issued order authorizing construction and DOE has authorize exports to non-FTA countries.

Shell has 100% of the liquefaction capacity.

Construction underway start up mid-2018.

Total after completion: **2.50 MTPA**

Source: website or news article as edited by Eversheds Sutherland

Appendix: US LNG export terminal capacity

Full FERC and DOE (non-FTA) approval but not yet under construction and have not yet received FID

- 1. Lake Charles LNG** – Shell has full capacity to import.
(Energy Transfer, Kogas and Shell have signed an MOU to study joint participation in export project)

Start-up date: 2022

Total after completion: **15.00 MTPA**

Source: website or news article as edited by Eversheds Sutherland

Appendix: US LNG export terminal capacity

Full FERC and DOE (non-FTA) approval but not yet under construction and have not yet received FID

2. Magnolia LNG

Four trains, each with a normal capacity of 2.0 MTPA

Non-binding Heads of Agreement (HOA) with Vessel Gasification Solutions, Inc. (VGS), for a 20-year free-on-board sale and purchase agreement of up to 4.00 MTPA. With all major permits in place, the project now awaits an FID.

Start-up date: 2022

Total capacity after completion: **8.00 MTPA**

Source: website or news article as edited by Eversheds Sutherland

Appendix: US LNG export terminal capacity

Full FERC and DOE (non-FTA) approval but not yet under construction and have not yet received FID

3. Golden Pass Products

Full capacity expected to be allocated to Qatargas and Ras Gas.

Start-up date: 2022

Total capacity after completion: **15.60 MTPA**

Source: website or news article as edited by Eversheds Sutherland

Appendix: US LNG export terminal capacity

Full FERC and DOE (non-FTA) approval but not yet under construction and have not yet received FID

4. Cheniere's Sabine Pass expansion Train 6

All regulatory approvals have been received to construct and operate but FID is on hold. Capacity not committed.

Total added capacity after completion: **4.5 MTPA**

Source: website or news article as edited by Eversheds Sutherland

Appendix: US LNG export terminal capacity

Full FERC and DOE (non-FTA) approval but not yet under construction and have not yet received FID

5. Cameron LNG expansion Trains 4 & 5 have FERC approval; FID on hold

Capacity added to Cameron LNG terminal after completion: **9.97 MTPA**

Source: website or news article as edited by Eversheds Sutherland

Appendix: US LNG export terminal capacity

Full FERC and DOE (non-FTA) approval but not yet under construction and have not yet received FID

- 6. Delfin** floating LNG terminal in the Gulf of Mexico. Delfin LNG is owned by the India and Singapore-based Fairwood Group and the US-based Peninsula group. They will partner with Golar LNG Ltd. The project has received MARAD and DOE approval (including NFTA).

Start-up date: 2020

Total capacity after completion: **13.00 MTPA**

Source: website or news article as edited by Eversheds Sutherland

Appendix: US LNG export terminal capacity Projects seeking FERC/DOE approval

Project	Developers	MTPA	Progress??	Location	Status	Start up Date
1. Added capacity to Corpus Christi as terminals 4 and 5	Cheniere	9	NEPAct pre-filing request with FERC and the FTA and non-FTA approval requests with the DOE	Texas	Regulatory approval expected soon, but FID on hold	2021
2. Gulf Coast LNG Brownsville	Gulf Coast LNG	20.60	This project may be on hold	Texas	Pending	2018-2020
3. Gulf LNG, Pascagoula, Mississippi	Kinder Morgan	11.50		Mississippi	Pending	2022
4. Freeport LNG, Train 4	Freeport LNG	5.00	This project is on hold	Texas	Pending	2022
5. Texas LNG, Brownsville		2.00		Texas	Pending	2023
6. Calcasieu Pass LNG, Cameron Parish	Venture Global	10.00	Shell signed SPA to purchase one MTPA from Venture Global	Louisiana	Pending	2023
7. Driftwood LNG, Calcasieu River Pass	Tellurian	26.00		Louisiana	Pending	2022
8. Rio Grande LNG, Brownsville	Next Decade LLC	27.00		Texas	Pending	2022
9. Live Oak LNG	Live Oak/Parallax Energy	5.20		Louisiana	Pending	
10. Commonwealth LNG, Cameron Parish	Commonwealth LNG	1.50		Louisiana	Pending	2022
11. Port Author LNG	Sempra and Woodside	13.5	MOU with KOGAS development cooperation and joint discussion regarding key aspects of the project	Texas	Pending	2023
12. Jordan Cove	Pembina and Veresen	7.8	Half of the LNG terminal's capacity MOU with JERA and Itochu	Oregon	Refiled	2024
13. Port Fourchon	Energy World USA's	2.0	Phase 1	Louisiana	Pre-filed	2024
Totals:		138.60				