

Global LNG Market Implications for Alaska

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Agenda Topics to be covered

- Evolution of the LNG Industry
- Supply and Demand
- LNG project evolution
- LNG Economics
- Enabling legislation
- Selected LNG Case Studies



Evolution of the LNG Industry

Historical Growth in LNG Trade



Source: Statista/GaffneyCline Analysis

1970'S - 2000'S PIONEER PHASE OF THE LNG INDUSTRY

2000 – 2015

INCREASE IN LNG FACILITIES WORLDWIDE DRIVEN BY LNG MARKET DEMAND

2016 – 2020 IMPACT OF UNCONVENTIONAL SHALE AND COAL GAS BOOM

2020 to Date RUSSIAN/UKRAINE CRISIS AND GROWTH IN LOW CARBON LNG

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Global Trade Routes (snapshot from Monday 3rd March)



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Supply and Demand

Market Turbulence 2022-23

- Demand slump and oversupply in 2018-2020
- Rapid reversal into undersupply and unprecedented prices
- LNG market proved to be resilient and flexible
- Security of supply and supply diversity now key elements in procurement strategy



Source: GaffneyCline analysis, ICIS

LNG Demand Uncertainty

- Forecasts range from a doubling in demand to a 75% reduction by 2050
- Lower demand forecasts based on rapid decarbonization, electrification, and switch to renewables/hydrogen
- Market signals suggest growth in LNG continues to be the core assumption
- Many IECs are basing their future growth plans on major LNG focus





Source: GaffneyCline analysis of a sample of ten demand forecasts in 2024

Supply Outlook

- Significant new capacity under construction in US Gulf Coast
- However, regulatory delays and legal challenges appear to be growing.
- Qatar is undergoing major expansion later this decade
 - Very low-cost LNG due to oil/condensate revenues



Source: GaffneyCline analysis, ICIS

Majority of new capacity comes from US and Qatar

Demand / Supply

- Competition for 2035 supply will come largely from announced US Gulf Coast projects
- Reaching FID is a key milestone
- Alaska could benefit from existing permits

Potential for new demand by 2035 LNG Demand Range and S



Source: GaffneyCline analysis, ICIS

LNG Project Evolution

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Project Commercial Structure Choices (integrated model)

- Equity participation from wellhead to vessel loading
- Creates strong alignment between parties
- Transfer pricing largely driven by fiscal arrangements
- Examples in Qatar, Sakhalin, Northwest Shelf, Darwin and Tangguh
- Model followed by AK LNG in 2014/15 timeframe (assuming state exercised TAG and RIK)



Project Commercial Structure Choices (merchant model)

- Equity participation can differ along the LNG value chain
- Often used where upstream partners do not all participate in midstream and downstream
- Transfer price into LNG facility typically heavily negotiated
- Examples in Trinidad (1-3), Angola, Nigeria, Equatorial Guinea and Malaysia



• Potential use for AK LNG

Project Commercial Structure Choices (tolling model)

- Fee for service model
- LNG plant returns can be isolated from commodity price fluctuations
- Akin to a toll road, airport, or other infrastructure based on long term revenue from service contracts
- Examples include many of the US Gulf Coast projects, Trinidad 4, Damietta and Bontang.
- Potential use for AK LNG



Contracting model evolution

- The LNG trading profit center has become significant for many players
- Using an LNG marketing affiliate to purchase offtake (fob) moves economic rent to LNG marketing, but provides credit for financing
- Equity marketing has become a popular model where large LNG buyers or portfolio players are also project investors.

Pre-2000 model (destination clauses)



Portfolio based model (equity marketing no destination restrictions)



Evolution of Cost Estimates

- Cost estimates for AK LNG are currently in the Class 5 range
- FEED would bring cost uncertainty into a range of -20% to +25%
- Following bid negotiations with EPC contractors cost uncertainty will improve
- Given scale of project, limited scope for cost guarantees from EPC contractor.



>>> Increasing Level of Project Scope Definition >>>

Comparison of cost performance

(select LNG mega projects that achieved between 2007 and 2020)

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- In general, costs have been higher than budgeted
- Actual capacity is higher than performance guarantee
- De-bottlenecking can add another 10-15%



	Sum of Cost at Sanction (US \$\$ Bn)						Sum of Estimated Overrun (US \$\$ Bn)					
Trains	1.0	1.0	1.0	1.0	2.0	2.0	2.0	3.0	2.0	1.0	2.0	3.0
otal Mtpa – Planned	4.2	7.8	4.3	5.2	6.9	7.8	8.5	15.6	8.6	3.6	8.9	12.0
otal Mtpa –Actual	4.2	7.8	4.9	5.2	8.3	7.8	8.5	15.6	8.9	3.6	8.9	13.5

Comparison of schedule (FID to Start Up)

(select LNG mega projects that achieved start up between 2007 and 2020) 90 –

- Construction schedule has typically slipped
- Delayed startup and cashflow have a disproportionate impact on NPV
- Use of prefabricated modules appears to have mitigated this risk
- Some Gulf Coast projects have achieved accelerated construction times



Sum of Project Schedule at Saction (Months)						Sum of Actual Project Schedule to Start-Up (Months						
#Trains	1.0	1.0	1.0	1.0	2.0	2.0	2.0	3.0	2.0	1.0	2.0	3.0
Total Mtpa – Planned	4.2	7.8	4.3	5.2	6.9	7.8	8.5	15.6	8.6	3.6	8.9	12.0
Total Mtpa –Actual	4.2	7.8	4.9	5.2	8.3	7.8	8.5	15.6	8.9	3.6	8.9	13.5

*USGC – US Gulf Coast <u>Sources:</u> SPE-180134-MS

Various

LNG Economics

Sources of Economic Return

Upstream Gas production

- Smallest element of LNG value chain
- A facilitator for LNG
- Important for host country

Investment in Infrastructure

- Very large capital investment drives large cashflow
- Returns at risk

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• Longer term cashflows are attractive.

 Alaska: 25% Royalty and Tax on upstream circa. \$250m annually • **Alaska**: 25% participation in project circa. \$2-\$3 bn free cashflow, once plant fully amortized. Upside potential.



LNG Trading

- LNG trading profits are very material
- **ExxonMobil**:. "By 2030, we anticipate the cash flow out of the LNG business will be around about \$8 billion per year."
- **ConocoPhillips** is looking to sign more LNG offtake deals and to secure additional regasification capacities, as it continues to expand its LNG portfolio.
- **Alaska**: Participation in global LNG trades not available.

Delivered Cost Scenarios (note: for illustrative purposes only)

USCG Vulnerable to Henry Hub

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			WM			W٢	1+30%
	Gulf	Coast	Alaska	Gulf (Coast	Ala	ska
Feedstock	\$ '	3.00	\$ 1.15	\$ *	4.30	\$	1.50
Fuel charge	\$	0.45		\$	0.65		
Processing tariff			\$ 1.16			\$	1.62
Pipeline tariff			\$ 1.40	►		\$	<mark>1.82</mark>
Liquefaction*	\$	2.40	\$ 2.24	\$	2.40	\$	2.91
Freight cost	\$	2.00	\$ 0.76	\$	2.00	\$	0.76
Total delivered	\$	7.85	\$6.71	\$	9.35	\$	8.61

Sources: WM 2022 report, ICIS and GaffneyCline analysis

Alaska Vulnerable to Capital inflation

- Alaska LNG has very high pre-productive capital needs
 - In addition to liquefaction circa. \$22bn of additional investment
 - GTP
 - Pipeline
- However, project has potential benefit of low cost feedstock and low freight charges
- If forecast Henry Hub increases materialise, and capital cost controls are achieved Alaska could become very competitive



Value Enhancement from Low Carbon LNG Options

Lower carbon intensity natural gas production

 Control of fugitive emissions Use of lower emissions technology for liquefaction and marine transportation/

> Potential for CO2 Imports and Sequestration

Incorporation of carbon capture and sequestration (CCS)

- Gas pre-treatment
- Post-combustion

Use of Alaskan credits to offset LNG

Nature-based solutions and voluntary carbon market

Renewable Natural
Gas (RNG)



Enabling Legislation

Features of Enabling Legislation

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Fiscal Stability Clause

- LNG requires upfront major capital investment
- Subsequent tax changes are a major risk for investors
- Long term nature of fiscal stability guarantees can be complex
- Constitutional implications

Scale usually requires tailormade legislation

- Can include upstream fiscal changes.
- Features can include:
 - Special income tax provisions
 - Mechanisms to provide "minimum return" for investors
 - Accelerated depreciation
 - Tax holidays

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Host country provisions

- May include sliding scale of upside/downside risk sharing.
- Can involve a "carry" for host government, supported by major investors
- Sometimes features in government to government trade deals or treaties.

Selected Case Studies

Project Case Studies

Project	Risk	Outcome	Comment
Eastern Australia	Reserves inadequacy	Gas feedstock challenge from coal seam gas (early in project)	Created upward cost pressures for AU economy
Ichthys (Aus) and Angola LNG	Hostile environment	Technical cost and potential suspension	Design spec and choice of contractor
Mozambique LNG	Host nation security	Force Majeure declared, construction halted.	Rovuma LNG has pursued floating LNG AK concept
Algeria US Exports	Regulatory change	Take or Pay contracts dissolved	Focus on credit and default
Trinidad	Reserves	Insufficient feedstock to extend LNG exports at capacity	Regional sources of gas being examined AK
Egypt	Priority given to domestic supply over LNG	LNG exports suspended and curtailed	Need for clearly defined domestic supply rules