Changes are Coming: The Emergence of U.S. LNG Exports

34th USAEE/IAEE North American Conference
Tulsa, Oklahoma
Where Are We Today?

1. The Global LNG Market & Emergence of US Volumes

2. LNG Market Fundamentals
   - Market rebalance in [2021-2023]
   - Is LNG demand understated?

3. US LNG Exports are Poised to Be Most Competitive Globally
   - Access to vast amount of cheap reserves
   - Lower capital costs
   - US LNG economics advantaged over other exporters

4. NextDecade & Rio Grande LNG Overview
The current LNG oversupply has caused several project deferrals and cancellations in the US, overshadowing many US LNG milestones. While certainly a setback, new solutions to project development could allow for continued US LNG FID’s while also providing new markets for US gas producers.

2016

- **Jan** Shell gains approval for BG acquisition
- **Feb** First exports from Sabine Pass
- **Mar** FERC denies application for Jordan Cove
- **Apr** First Gulf Coast LNG into Europe
  - Oregon LNG abandoned
- **Jul** Shell defers FID on Lake Charles and LNG Canada
  - First shipment of LNG via expanded Panama Canal
- **Aug** FERC terminates Downeast LNG application
  - XOM backs out of Alaska LNG
- **Sep** First Gulf Coast LNG into Asia
### US LNG Landscape

<table>
<thead>
<tr>
<th>Location</th>
<th>Project</th>
<th>Capacity (mtpa)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texas</td>
<td>Freeport</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Freeport LNG T1-3</td>
<td>13.2</td>
<td>Under Construction</td>
</tr>
<tr>
<td></td>
<td>Freeport LNG T4</td>
<td>5</td>
<td>Pre-Filing</td>
</tr>
<tr>
<td></td>
<td>Corpus Christi</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Corpus Christi LNG T1-2</td>
<td>9</td>
<td>Under Construction</td>
</tr>
<tr>
<td></td>
<td>Corpus Christi LNG T3</td>
<td>4.5</td>
<td>Approved, not UC</td>
</tr>
<tr>
<td></td>
<td>Corpus Christi LNG T4-5</td>
<td>9</td>
<td>Pre-Filing</td>
</tr>
<tr>
<td></td>
<td>Port of Brownsville</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rio Grande LNG</td>
<td>27</td>
<td>Application Pending</td>
</tr>
<tr>
<td></td>
<td>Annova LNG</td>
<td>6</td>
<td>Application Pending</td>
</tr>
<tr>
<td></td>
<td>Texas LNG</td>
<td>4</td>
<td>Application Pending</td>
</tr>
<tr>
<td></td>
<td>Sabine Pass</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sabine Pass LNG T1-2</td>
<td>9</td>
<td>Operating</td>
</tr>
<tr>
<td></td>
<td>Sabine Pass LNG T3-4</td>
<td>9</td>
<td>Under Construction</td>
</tr>
<tr>
<td></td>
<td>Sabine Pass LNG T5</td>
<td>4.5</td>
<td>Under Construction</td>
</tr>
<tr>
<td></td>
<td>Sabine Pass LNG T6</td>
<td>4.5</td>
<td>Approved, not UC</td>
</tr>
<tr>
<td></td>
<td>Golden Pass LNG</td>
<td>15.6</td>
<td>Application Pending</td>
</tr>
<tr>
<td></td>
<td>Port Arthur LNG</td>
<td>12</td>
<td>Pre-Filing</td>
</tr>
<tr>
<td></td>
<td>Plaquemines Parish</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CE FLNG</td>
<td>8</td>
<td>Pre-Filing</td>
</tr>
<tr>
<td></td>
<td>Venture Global Plaquemines</td>
<td>20</td>
<td>Pre-Filing</td>
</tr>
<tr>
<td></td>
<td>Louisiana LNG</td>
<td>6</td>
<td>Pre-Filing</td>
</tr>
<tr>
<td></td>
<td>Cameron Parish, Lake Charles, Calcasieu Lake</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cameron LNG T1-3</td>
<td>12</td>
<td>Under Construction</td>
</tr>
<tr>
<td></td>
<td>Cameron LNG T4-5</td>
<td>10</td>
<td>Approved, not UC</td>
</tr>
<tr>
<td></td>
<td>Lake Charles LNG</td>
<td>4.5</td>
<td>Approved, not UC</td>
</tr>
<tr>
<td></td>
<td>Magnolia LNG</td>
<td>8.8</td>
<td>Approved, not UC</td>
</tr>
<tr>
<td></td>
<td>Venture Global LNG</td>
<td>10</td>
<td>Application Pending</td>
</tr>
<tr>
<td></td>
<td>G2 LNG</td>
<td>14</td>
<td>Pre-Filing</td>
</tr>
<tr>
<td></td>
<td>Driftwood LNG</td>
<td>26</td>
<td>Pre-Filing</td>
</tr>
<tr>
<td></td>
<td>Other notable projects</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cove Point LNG</td>
<td>5.25 mtpa</td>
<td>Under construction</td>
</tr>
<tr>
<td></td>
<td>Southern LNG</td>
<td>2.5 mtpa</td>
<td>Approved but not under construction</td>
</tr>
</tbody>
</table>

*Other notable projects include Cove Point LNG (5.25 mtpa, under construction) and Southern LNG include (2.5 mtpa, approved but not under construction).*
The History of LNG Export Developments

Historically, most international LNG projects have been built upon the necessity to move stranded gas (“supply push”) to large demand markets such as Asia and Europe. Recently, US LNG capacity expansions have been driven by a “demand pull” and a price arbitrage opportunity.

Global LNG FIDs

Mtpa

Source: Wood Mackenzie
1. Overly-bullish expectations for Asian demand do not materialize in the wake of mild winters and nuclear restarts. At the same time, several projects are sanctioned as a result of newly economical reserves from the U.S. and Australia.

2. As the new wave of LNG projects come online, the market becomes flooded with excess gas that increasingly is sent to spot markets.

3. Structural demand drivers, such as expiring contracted volumes, increasingly-depleted domestic gas supplies, and geopolitical considerations eventually overtake supply before 2025.

Source: NextDecade interpretation of Wood Mackenzie data
Macro Highlights

Strong Secular Forces Underpin Growth of LNG Demand

- LNG demand is expected to rise over the coming years, driven by a desire for a cleaner-burning, higher-yielding fuel, increased coal plant retirements, broad-reaching geopolitical considerations, and easier market access for new importers.
- Since 2014, ten countries have constructed almost 50 mtpa of regasification capacity, with a further 60 mtpa already under construction and expected to be operational by the end of 2017\(^1\).

U.S. Gulf Coast Projects Emerging as Most Cost-Competitive

- As traditional buyers seek to diversify away from oil-linked contracts and increase destination flexibility, U.S. LNG is poised to capture significant market share, supported by abundant gas supply, existing pipeline infrastructure, geopolitical considerations, and a competitive project execution environment.

Map Source: EIA
Powerful Demand Forces Support LNG Growth

LNG demand is projected to rise for the foreseeable future, driven by a number of factors. While currently oversupplied, the LNG market is expected to enter a prolonged period of shortage in the early 2020s.

1. **Environmental and Political Drivers.** Many countries have implemented clean energy policies, aimed at lowering the level of greenhouse gas (GHG) emissions. LNG can has a higher energy yield and lower greenhouse gas emissions than conventional hydrocarbons such as coal or oil.

2. **Renewable Energy Shortfalls.** Renewables continue to rise in popularity and market penetration, but several hurdles still remain.
   - Renewable energy sources can be unpredictable
   - Require back-up and grid stabilization
   - Natural gas is an ideal solution for these and other reasons

3. **Greater Technologies Drive Market Access.** Emerging countries seeking new sources of power generation have had difficulty developing large-scale, multi-billion dollar, conventional onshore projects. New technologies, namely Floating, Storage, and Regasification Units, offer smaller players the ability to import marginal volumes of LNG for minimal capital costs.

4. **Broad Market Applications.** LNG can be used for multiple applications, but LNG as a transport fuel has yet to achieve significant market presence.
The global over-supply is expected to last until [2021-2023]. This is expected to foster low LNG prices and bring new entrants to the LNG market seeking a cleaner burning fuel than conventional petroleum.

25% of LNG demand growth through 2025 is expected to come from countries which currently do not import LNG today.

Upside emerging demand represents the maximum potential demand for LNG, assuming near complete power conversion (coal- and oil-fired plants to gas-fired) and mitigated credit risks.

FSRUs are expected to bring LNG to new markets more quickly and efficiently.

Source: NextDecade interpretation of Wood Mackenzie data
Ideally Placed to Capitalize on FSRU Growth

Floating, Storage, and Regasification Units (FSRUs) present a valuable opportunity for NextDecade to access currently underserved or nonexistent LNG markets. Management’s experience with FSRUs is not replicated in other competing projects.

FSRU Offers Several Advantages:

- Lower capital requirements
- Shorter lead times
- Less risk to developers

Easier market entry for new participants and non-traditional customers

NextDecade’s Management Poised To Capture FSRU Growth:

- FSRUs are expected to be a major component of demand growth. In 2015, three new countries began importing LNG utilizing FSRUs: Egypt, Jordan, and Pakistan, with an additional projects expected in near future (Russia, Colombia, Uruguay, Dominican Republic, Malta, Bangladesh, 2nd Abu Dhabi, 2nd Pakistan)
- Management has been involved with over twelve FSRU projects on four continents, and intends to use their expertise to create demand through its marketing arm, NextDecade Global Solution (NDGS)
- NDGS is the consulting arm of NextDecade, advising clients on all facets of its LNG needs, including FSRU procurement and development

NextDecade’s involvement in FSRU development, along with credit support from its sovereign partner, represents a major opportunity to influence demand in ways which our competitors cannot.

Source: Wood Mackenzie, company management
1. **The US can compete favorably with any other natural gas supply source worldwide**
   - Vast quantities of natural gas have been proven as reserves in the US
   - US independent shale manufacturers have created extraordinary value improvements and efficiencies
   - Shale oil production is increasingly important to North American natural gas production and pricing
   - No longer “E&P” but rather “manufacturing” or “mining”

2. **There will, however, be increasing pressure domestically for US E&P producers to access global markets.**
Gulf Coast Exports Benefit From Key Production Trends

The South Texas gas market is poised to benefit from several distinct trends. Many reserve basins proximate to NextDecade have drilled economically even under current oil prices, and the emergence of the Marcellus and Utica plays increasingly pushes gas flows southward.

- Remarkable production from the Marcellus and Utica shale gas plays have not only satisfied northeastern demand but has also reversed the typical south-to-north gas flow.
- Production from key Texas basins, namely Permian and Eagle Ford, is expected to exceed production levels in the Northeast region, creating more gas supply than available demand.
- Westward flow towards California continues to combat weakening demand and limited storage capacity, while southern flows to Mexico are highly seasonal and likely to encounter greater domestic production.
- As gas producers are unable to flare excess gas, they are likely to find stable customers, like NextDecade, more attractive than other more seasonal or volatile options.
- Thus, NextDecade’s Rio Bravo pipeline, projected to have eight interconnects with a combined 6.7 Bcf/d of capacity, is expected to have excellent supply flexibility and price competitiveness.

Source: Ponderosa Energy
Apache recently confirmed the discovery of a significant new resource play, the “Alpine High,” in the southern portion of the Delaware Basin (Reeves County, Texas) with 75 Tcf of rich gas in place.

- The September 7 announcement confirms that $2.50 gas and $40 oil supports 30%+ IRR (including infrastructure to access to the market).
- Even at moderate oil prices, production from these two basins is projected to rise dramatically.
- In the Permian, an increase in WTI to $70 per barrel is forecasted to drive an additional 2.8 Bcfd of supply.
- Furthermore, even with WTI at $30 per barrel, Eagle Ford production would only experience modest declines.

Sources: Ponderosa Energy, Apache Corporation
U.S. LNG Enjoys Significant Cost Advantages

U.S. LNG has emerged as a new source of low-cost supply by bringing new technologies to market and lowering capital requirements, breaking industry orthodoxy of oil-linked contracts, and utilizing its well-established regulatory process. Shown below, U.S. Gulf Coast LNG is among the most competitively priced in the world.

Source: Wood Mackenzie
Key Assumptions: Henry Hub = $3 / MMBtu, unlevered after-tax returns of 12%
“SE Asia” refers to 28 mtpa in Papua New Guinea, Philippines, and Indonesia
The Economics:
Henry Hub- and Brent-Linked FOB Price Comparison

$/MMBTU

Assumptions:
• Brent-linked sensitivity range between 12-14%
• Gas pricing based on 115% of Henry Hub plus $3.00 tolling fee, shipping, and regasification costs

Key Takeaways:
• Recent oil price collapse has temporarily reduced the attractiveness of Henry Hub pricing, but structural advantages remain
• Henry Hub plus a fixed component is expected to be less volatile than oil-linked contracts, making gas-linked pricing more attractive to buyers
**Rio Grande LNG Project Summary**

*NextDecade is an energy development company, working to design, build, and operate LNG facilities in North America. The Company is currently focused on developing its low-risk, low-cost Rio Grande LNG terminal and associated Rio Bravo pipeline.*

<table>
<thead>
<tr>
<th>Project Overview</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• 984-acre site located in the Port of Brownsville, Texas</td>
<td></td>
</tr>
<tr>
<td>• 30 mtpa (6 trains x 5.0 mtpa each)</td>
<td></td>
</tr>
<tr>
<td>• 4.5 BCF/d from key Texas hub via planned Rio Bravo pipeline</td>
<td></td>
</tr>
<tr>
<td>• FERC EIS expected 1Q 2017</td>
<td></td>
</tr>
<tr>
<td>• Commercial operations in 2021</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Competitive Advantages</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Superior team with global relationships</td>
<td></td>
</tr>
<tr>
<td>• Optimal site</td>
<td></td>
</tr>
<tr>
<td>• Competitive costs</td>
<td></td>
</tr>
<tr>
<td>• Minimal technology risk</td>
<td></td>
</tr>
<tr>
<td>• Exceptional technical and commercial partners</td>
<td></td>
</tr>
<tr>
<td>• Attractive feedgas</td>
<td></td>
</tr>
<tr>
<td>• Flexible offtake models (toll, FOB, and DES)</td>
<td></td>
</tr>
</tbody>
</table>
Company Commercial Highlights

- NextDecade has engaged a variety of counterparties to begin offtake negotiations for the Project’s LNG, and has signed heads of agreements (HOAs) for 30 mtpa.
- Additionally, the Company is in discussions with additional customers wishing to proceed directly to binding sale and purchase agreement (SPA) negotiations.
- The Company has signed a Strategic Alliance Agreement with an European Utility Company (a gas transmission operator) to facilitate investment into NextDecade as well as offtake marketing arrangements and support through development and operations phases.
- NextDecade has also formed a close partnership with a Middle Eastern Sovereign, who is poised to become an importer in the face of declining reserves and heightened domestic demand; the entity has negotiated a proprietary memorandum of understanding to jointly market NextDecade’s LNG exclusively (execution pending).
Ideal Location for Gas Supply and Shipping

Rio Grande LNG is ideally located in a region that has yet to materially benefit from the oil and gas economy. The terminal’s location offers several distinct advantages.

- Unlike many other projects, Rio Grande LNG will be able to capture associated gas from Eagle Ford and Permian production. This gas cannot be flared, and as a result is likely to reach markets economically.

- The project is located six miles inland within the Brownsville Ship Channel (BSC), presenting minimal ship congestion, 42-foot depths with permits to dredge up to 52 feet, and no endangered or sensitive flora and fauna.

- The project is expected to benefit from favorable workforce dynamics, including low-cost labor, due to above-average unemployment rates and lower levels of unionization.

- The land surrounding the proposed pipeline is largely rural, sparsely populated, with landowners familiar with the pipeline process.
Competitive Advantages

Among the approximately 300 million tons of LNG capacity either under construction or in the FERC filing process, NextDecade expects to retain several advantages over surrounding projects.

- **Minimal Project Congestion.** There are no other large-scale facilities located in the Port of Brownsville, and only two other projects on the central Texas coast (Freeport, Corpus Christi)
- **Competitor’s Limited Access to Supply.** Eastern Texas and Western Louisiana play host to approximately twelve projects, all of which must compete for gas supply and pipeline supply
- **Liquid, Discounted Supply Hub.** NextDecade enjoys closer proximity to key reserve basins and access to an entirely separate pipeline network gas hub (Agua Dulce as opposed to Henry Hub) than other projects, which is projected to become increasingly liquid (see “Gas Supply” section)
- **Vessel Restrictions.** Many Louisiana projects also face vessel restrictions and other channel capacity constraints
- **More Favorable Entry Market Dynamics.** NextDecade expects to be in the “second wave” (post-2020) of US LNG exports which stand to benefit from a more competitive project execution environment, potentially easing construction costs

---

*Source: Internal company research; project websites*
THANK YOU

- Experienced team
- Extensive commercial relationships
- Strategic partners
- Expertise along the value chain
- Proven technology
- Significant de-risking accomplished
- Favorable site
- Key development milestones completed
- Strong regional political support