

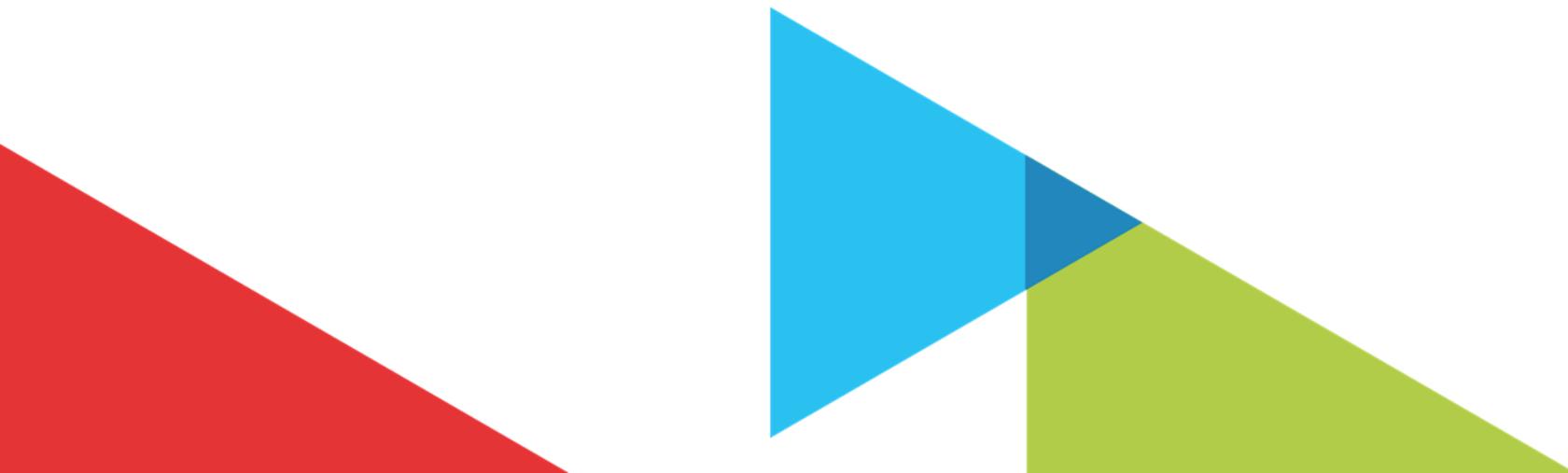
JAX LNG: Bunkering Infrastructure

February 20, 2020

Robert Butts, Pivotal LNG

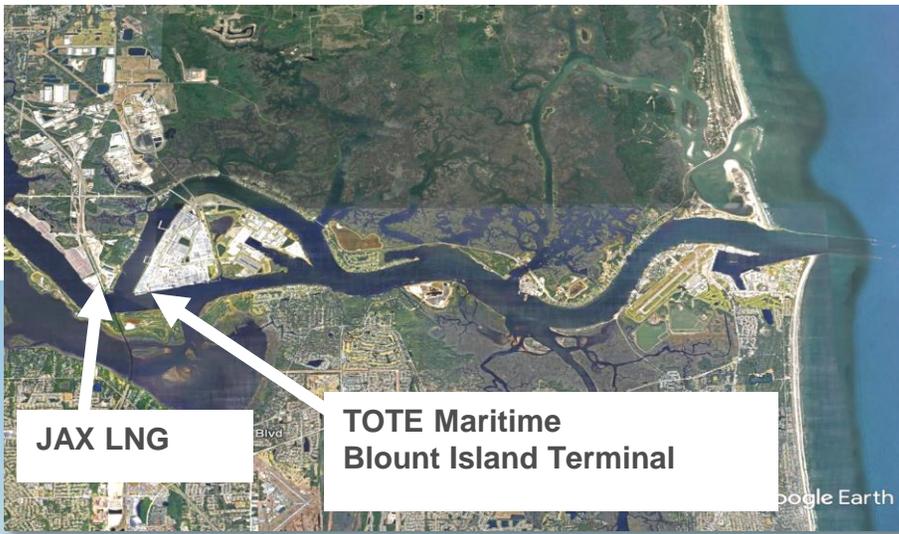
Chris Palo, CP Marine Consulting

Tim Casey, NorthStar Midstream



JAX LNG, Jacksonville, Florida, USA





JAX LNG



JAX LNG - Capabilities



- Initial liquefaction capacity – 120,000 gpd (450 m³/d)
- On-site LNG storage – 2.0 million gallons (7,500 m³)
- Expandable to 5x (600,000 gpd / 4.0 million gallons storage)
- 38 acre brownfield site at Dames Point in Jacksonville
- Dock with marine loading arms
- Two truck loading/unloading racks with scales
- Firm natural gas supply and transportation to plant
- 10 MW on-site generation powers all plant equipment
- Facility manned 24 x 7 x 365
- Control systems integrated with seven other Southern Company plants for redundant monitoring and backup control when necessary



JAX LNG: Strategic Partnership & Sourcing



JAX LNG

A partnership
established to bring
Liquefied Natural Gas
to Florida

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- Pivotal LNG is a subsidiary of Southern Company Gas, one of the largest U.S. natural gas utilities who owns and operates 6 LNG facilities in the U.S..
- Southern Company Gas is a subsidiary of Southern Company, which has over \$50B in Market Cap. (NYSE:SO) and operates in 17 States in the U.S..
- NorthStar Midstream is a responsive midstream energy transportation company led by a customer-focused and experienced team. NorthStar has a total of four terminals with marine access at two locations in the US. Owns Polaris New Energy building new bunkering vessels.
- NorthStar is partnered with Oaktree Capital. Oaktree is a leader among global investment managers with approximately \$124 Billion in assets under management.

Collaborative Partners Leading the U.S. LNG Bunker Industry



- 1st to earn USCG acceptance to conduct SIMOPS LNG bunker operation - twice



- 1st LNG container ship(s) in operation



FOSS

- 1st Container ship bunkering

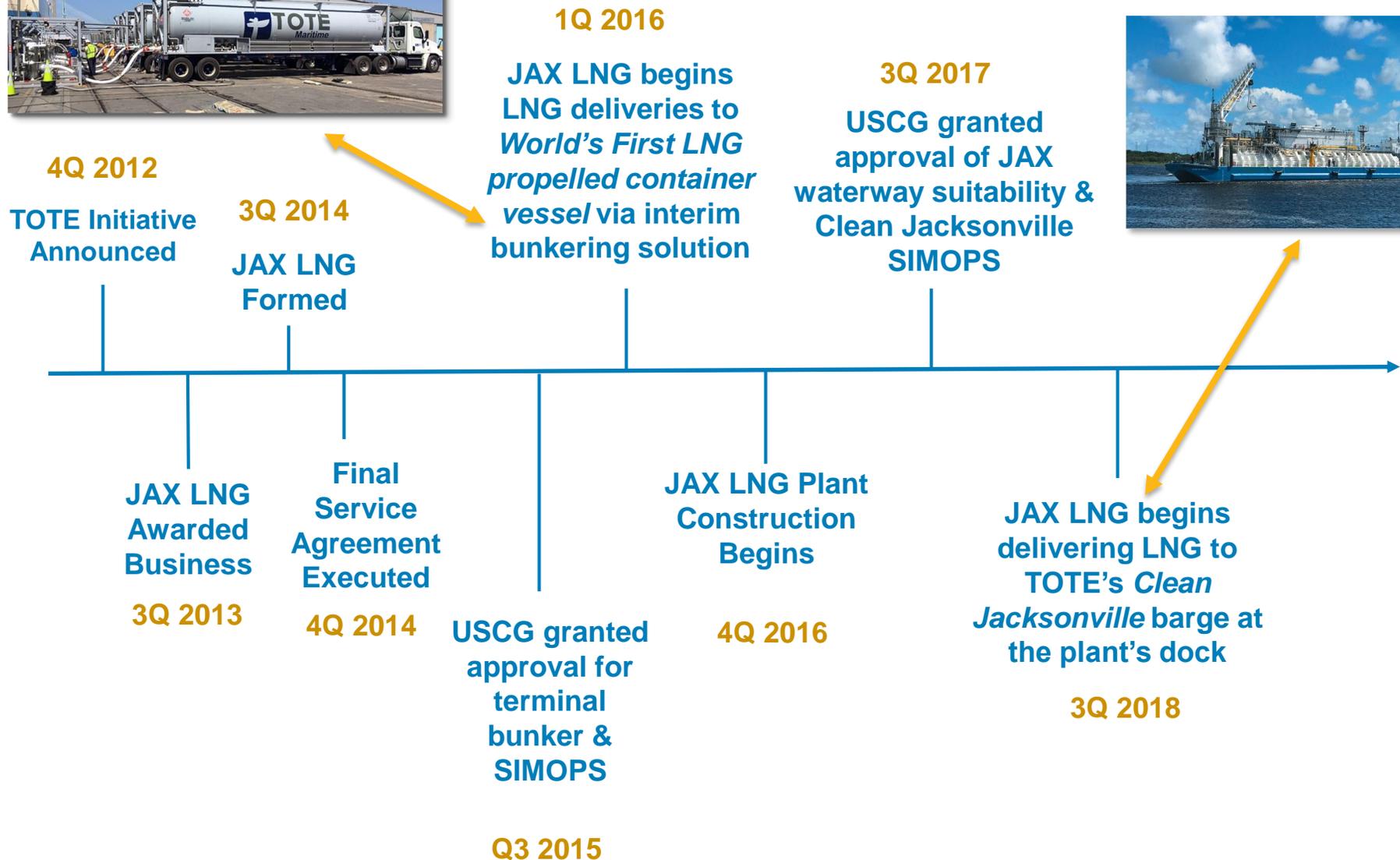
- 1st U.S. LNG Bunker barge in operation

- 1st USCG approved small scale waterfront liquefaction facility



- Only U.S. LNG supplier with a network of LNG facilities in Southeast U.S. capable to provide uninterrupted supply

JAX LNG – Development Timeline to Serve TOTE



Fueling of the Marlin Class Ships: Dockside - Since 2016



Bunkering Marlin Class Ships: Waterside - *Currently*



- The 2,200 cubic meter (580,800 gallons) barge is the first LNG bunker barge operating in North America
- Constructed by Conrad Shipyard, Inc., Orange, Texas
- Bristol Harbor Group, Inc. design w/ GTT Mark III membrane technology.
- Dimensions: 232' x 49' x 34', Draft Laden 8.5'
- Barge will transfer fuel at a rate 500 cbm/hr
- Two offloading options: GTT Reach4 and traditional manifold w/ dry-break away couplings.
- Outfitted with 6 cryocoolers



JAX LNG – Project Headwinds



- Experience can work against you in a bidding environment
- Balancing long term vision for dock with design and construction schedule
- Compact site had to accommodate vapor dispersion and thermal radiation zones
- Vapor dispersion modeling techniques are time consuming and are challenged to keep up with the faster pace of small scale plant development
- Uncertain quality and price of commercial power available to site
- PHMSA's approach to overseeing small scale LNG plants is evolving
- Atlantic Hurricane Season

JAX LNG – Project Tailwinds



- We are working with a focused and dedicated customer
- Tremendous collaboration with USCG and First Responders
 - Rigorous and thorough; committed to best practices & developing U.S. policy
- Progressive and supportive Port Authority
- Pragmatic community and political culture in Jacksonville appreciated the project's environmental and economic benefits
- Brownfield site reduced permitting lead time
- Pivotal LNG's Trussville plant offered a firm supply source years before a new plant could be built in Jacksonville
- IMO decision to implement emissions cap in 2020

Commercializing Small Scale LNG Opportunities



Distributing LNG to Small-Scale Users Across Multiple Industries

Current Customer Segments

Cruise Lines



- Cruise Lines are a source of significant demand, as the number of planned LNG vessels expands



Cargo Vessels



- Orders for LNG fueled ships have increased significantly
- Recent international emissions regulations (IMO 2020) have created a paradigm shift in the marine fuel market



Expanding Customer Segments

Aerospace



- Significant demand expected to come online by 2025, with test launches starting in 2020
- Launches take place in Cape Canaveral, in close proximity to JAX LNG hub
- Demand for high-quality methane



Trucking



- Low LNG fuel prices and cleaner emissions standards are encouraging uptake
- Federal and state tax incentives offered to trucking firms for using LNG
- UPS bringing over 800 18-wheel LNG-fueled trucks online



Commercial



- Increasing share of businesses are looking to LNG as a fuel source
- Supply economics and clean energy initiatives encouraging rapid LNG uptake
- 191 major multinationals have committed to sourcing 100% renewable fuel



Small Scale Power



- NorthStar is uniquely suitable to supply local facilities
- NorthStar has the flexibility, transportation infrastructure and capacity to serve small scale power customers



Peak Shaving



- NorthStar has ability to meet peak shaving demand through available spot capacity
- Peak shaving allows power suppliers to bring on additional capacity during periods of peak demand by expanding power generation capabilities and charging higher prices



LNG Supply and Distribution Model can be Replicated throughout the United States



1 Mid-Atlantic Coast

- Proximity to some of the largest ports in the nation, but lack of existing distribution network, provides new sources of demand for LNG
- Strategic location to service Mid-Atlantic ports including Baltimore & Delaware Bay
- Proximity to cheap “stranded” natural gas from the Marcellus and Utica

2 West Coast

- Potential customers in Oakland, San Diego, Los Angeles – Long Beach, Oregon, Washington and British Columbia
- Limited LNG supply sources on the West Coast provides opportunity for LNG distribution systems to enable LNG bunkering

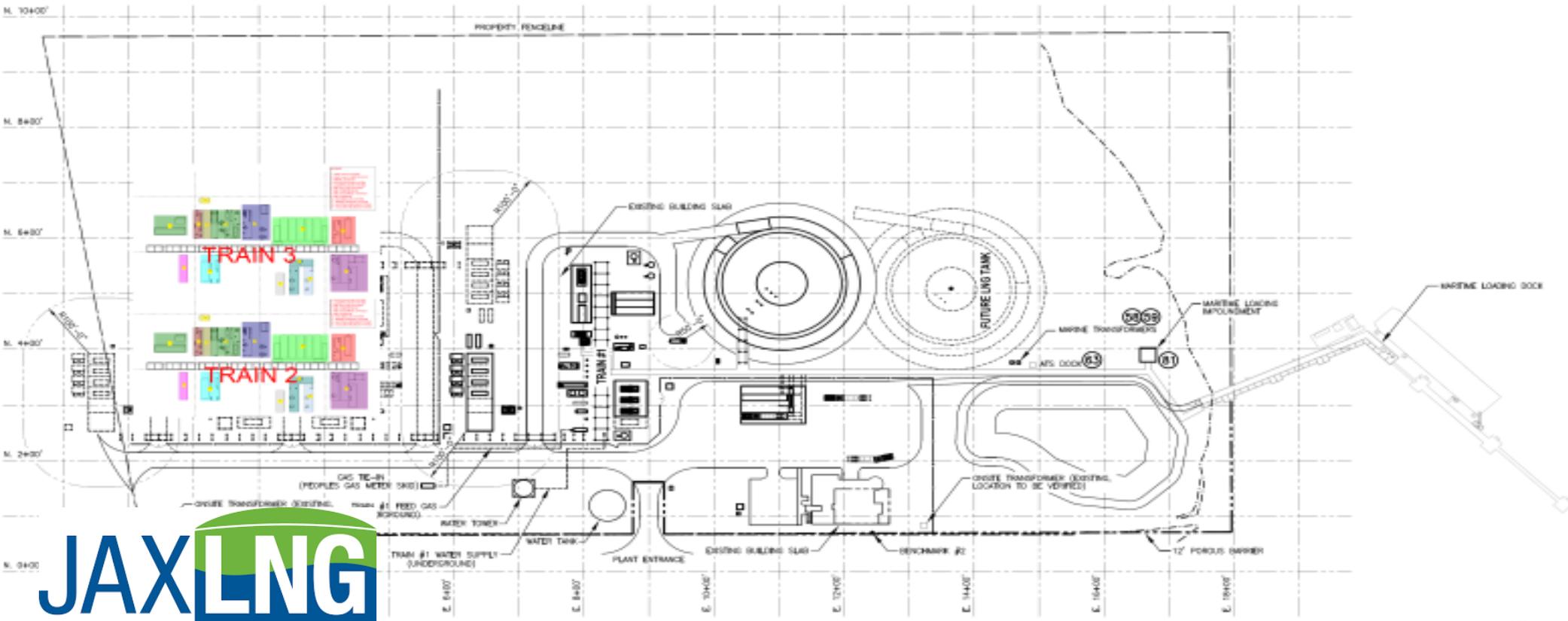
3 Gulf Coast

- Major maritime fueling centers currently in operation in the Gulf Coast
- Large supply facilities create small-scale LNG distribution opportunities
- Leverage supply with underserved small-scale markets and customer demand through opportunistic barging and transportation

2020: Expanding Capacity & *Confidence*



- Offered Letter of Intent to Expand
 - + 240k gal/day
 - + 2M gal tank
 - + 2450 gpm
- Will update Waterway Suitability Study
 - Increased maritime traffic
 - No change to dock footprint



NorthStar Midstream to Form LNG Marine Transportation Company
Fincantieri Bay Shipbuilding to build 5,400 cubic meter LNG barge for East Coast route

The Woodlands, Texas – AUGUST 22, 2019: NorthStar Midstream, a portfolio company of funds managed by Oaktree Capital Management, L.P., is pleased to announce the formation of Polaris New Energy (“PNE”), a marine transportation company focused on the transportation and distribution of liquefied natural gas (LNG) along the coastal and inland waterways of the United States.

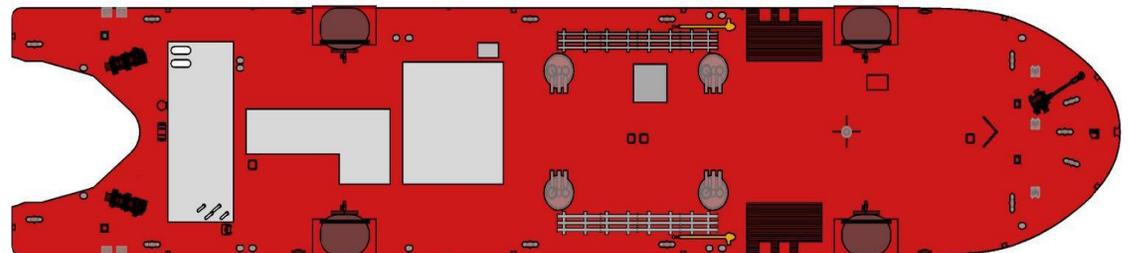
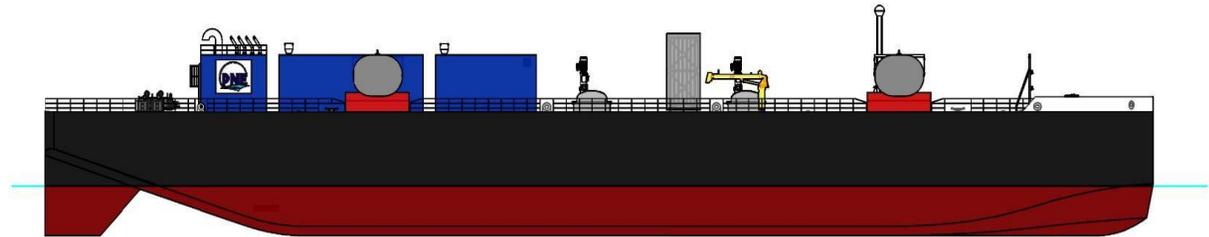
NorthStar has executed an agreement with Fincantieri Bay Shipbuilding to build a 5,400 cubic meter (CBM), with the ability to potentially construct two sister barges, for coastwise transportation of LNG. Utilizing a suitable tugboat, the barge will operate as an articulated tug and barge unit that will initially run along the East Coast of the United States providing LNG bunkering solutions to NorthStar’s customers. PNE will be sourcing LNG from JAX LNG, a new state-of-the-art LNG production facility in Jacksonville, Florida created through a partnership between NorthStar and Pivotal LNG.

The 5,400 cubic meter ATB will be fitted with four 1,350 CBM IMO Type C tanks. It will utilize a cargo handling system designed and developed by Wartsila. Dimensions of the vessel will be 340’ overall length, 66’ beam, and a depth of 32’-10”. The ATB will be an ABS Classed barge.

Tim Casey, Executive President of LNG for NorthStar Midstream, said: “The construction of this barge will expand our ability to solve the logistics behind delivering LNG to our customers in both an economical and safe manner. As domestic natural gas continues to rise, LNG has quickly become both a clean and competitively priced fuel alternative. We see increased domestic industries looking to LNG as their future fuel source, and we are extremely excited to be on the forefront of LNG domestic marine transportation. This is a first step in Oaktree and NorthStar’s strategy to create a complete platform of LNG logistical solutions for U.S. customers.”

Todd Thyse, Vice President and General Manager of Fincantieri Bay Shipbuilding, said: “Entry into the U.S. LNG transportation vessel market has been a strategic interest of our organization. Partnering with NorthStar and its affiliate companies on this project gives us the opportunity to be part of this exciting emerging industry and related market growth. As we put this project into place, we will bring the expertise of Fincantieri and our own designs to the LNG market. The hard working women and men of Fincantieri Bay Shipbuilding are well prepared and eager to begin, providing the eventual on-time delivery and quality the maritime industry has come to know and expect from our shipyards.”

- A1, Unmanned, Liquefied Gas Tank Barge, Ocean Service, ATB, US Flagged
- The 5,400m3 will transport 1.4M gallons of LNG.
- Constructed by Fincantieri Bay Shipbuilding, Sturgeon Bay, Wisconsin.
- Dimensions: 340’ x 66 x 32’-10” depth.
- Barge will transfer fuel up to 1,000m3/hr
- Four - 1,350m3 IMO Type C tank.



5400m3 – Timeline

- USCG/HQ Come Early Mtg:
January 2019
- Awarded: March 29, 2019
- Draft DBL: July 2019
- PNE: August 22, 2019
- Kickoff Mtg: September 2019
- DBL: October 2019
- Approval: November 2019
- Keel: March 2020
- Contract Delivery: November
2021

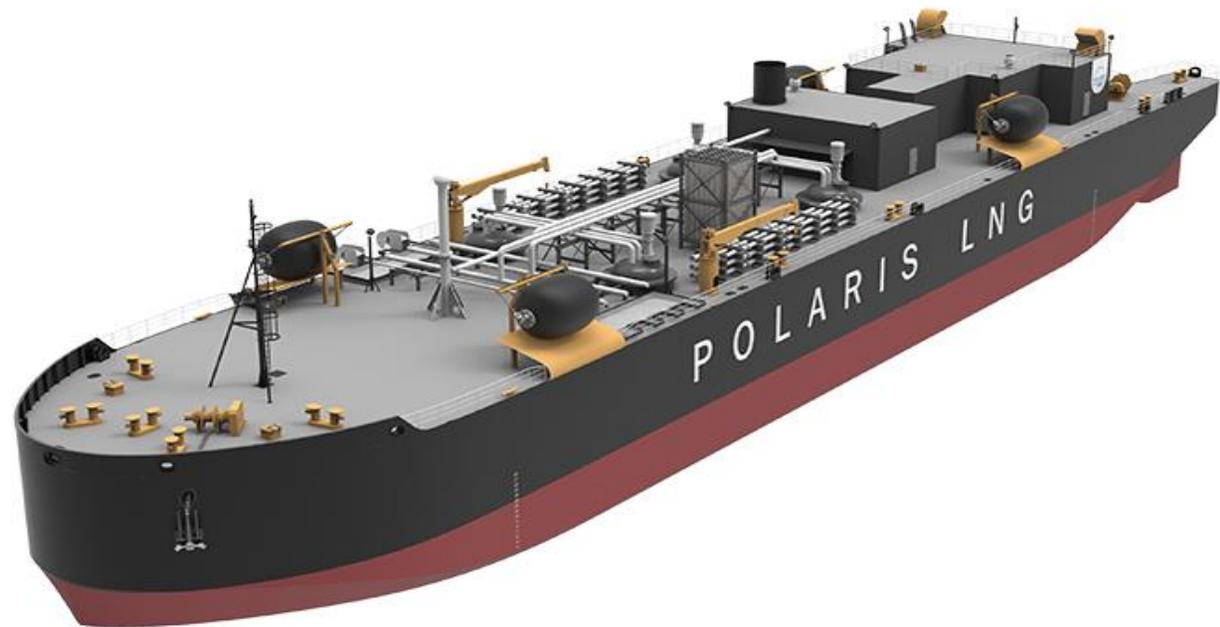


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JAX LNG: Lessons Learned



JAX LNG Project – Lessons Learned



- **It all starts with the customer**
 - LNG initiatives in Jacksonville began when TOTE led the way
- **Customer / supplier collaboration is key**
 - Working together to solve unique challenges related to lack of standardization as industry evolves
- **Each Customer & Ports will have different solutions**
 - Availability of a feasible site
 - Gas supply availability
 - Public and political environment
- **Many informal partnerships were forged to drive success**
(Education= Regulatory, First Responders, Port Stakeholders, Seafarers, Academia)

LNG Supply – Connecting Trade Lanes

