



TOTE

AAPA Environment

September 12, 2018



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TOTE's LNG Program



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The TOTE LNG Program

Encompassing every aspect of Maritime LNG

- New Builds – Marlin Class - Puerto Rico Service
- Re-engine – Orca Class – Alaska Service
- Long Term LNG fuel procurement
- Development of Liquefaction plants with our partners in Jacksonville and Tacoma
- LNG transfer to vessels
 - Multiple and mobile truck transfer to vessel
 - Barge to vessel transfer
 - Plant to vessel via cryogenic pipeline

Addressing IMO Emissions Standards

- **Do nothing:** Cost, stability and compatibility of compliant fuel is a major concern after January 2020.
- **Install exhaust gas cleaning system:** Scrubbers use existing fuel with added costs, transfer an air quality problem to the water, do not address PM or the core issue
- **Convert to Natural Gas:** Meet all current and future emissions requirements, cleanest of all options and available NOW

Interim Bunker Operations in Jacksonville

- Requirement is to load about 250,000 LNG gallons from trucks in 5 hours while simultaneously discharging and loading cargo
- Applied Cryogenic Technologies (ACT) developed skid and built tanks
- Safety is JOB #1 – procedures and checklist in place for all aspects of operations

Excellent option for Ports prior to investing in full scale bunker barges or vessels



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Bunker Barge *Clean Jacksonville*

- Our partner JAX LNG developed plant at Dames Point about ½ mile from our terminal and vessel berth
- *Clean Jacksonville*, world's first membrane technology barge built at CONRAD Shipyard in Orange, TX delivered August 2018
- Barge currently in final training phase and should be operational in Jacksonville by mid September 2018



Orca Conversion Program

- *North Star* received her tanks 1st Qtr 2018. *Midnight Sun* will receive her tanks and above deck work early 2020.
- MAN has a test engine operating in Augsburg, Germany. Parts are being fabricated now.
- *North Star* conversion scheduled for early 2021. Sister ship one year later, early 2022



Tacoma Liquefaction plant

- Commissioning anticipated late 2020
- Both a merchant and “peak shaving” facility
- Initial capacity of 250,000 LNG gallons per day with 8 million gallons of storage
- Vessels serviced with a cryogenic pipeline



Lessons Learned

- Environmental issues and doing what is right is important and sells!!
- Vessel technology is not THE major issue but LNG integration requires significant attention
- Long term commitments are essential. Must be **ALL IN!!**
- **Partners are the key to success**
 - Regulators are an integral part of the process
 - Need to have passion, expertise and look ahead
 - Leading edge does NOT have to be bleeding edge



Thank you



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