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US Shipbuilding and LNG
JECKU TEM

Tom Wetherald

US Coastwise Fleet Distribution

Oceangoing Vessels

Product Tanker

- 31 vessels in service
- Average age 8 years

Crude Carrier

- 11 vessels in service
- Average age 14 years

Containership

- 27 vessels in service
- Average age 30 years

Ro/Ro

- 8 vessels in service
- Average age 28 years

Orders in the last year for 10 Product Tankers and two Containerships

Oceangoing Dry Bulk

- 2 vessels in service
- Average age 31 years

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Regulatory Environment

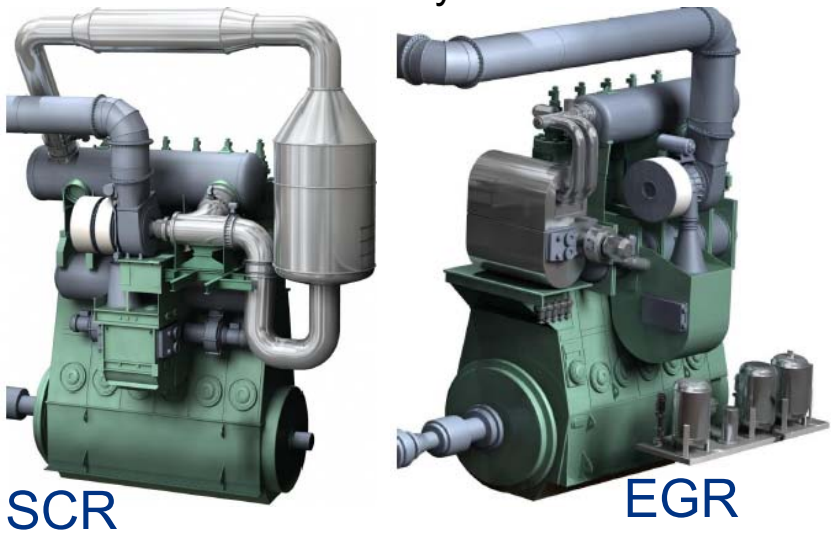
Important Regulatory Deadlines Facing Commercial Owners

Emission Control Area (ECA):

- Mandates low sulfur fuel or an alternative means of reducing sulfur oxide (SOx) within 200nm of the coast
- Enforcement begins 8/1/2012
- US domestic steamships exempt until 2020 from ECA requirements

Tier III NOx Emissions Criteria:

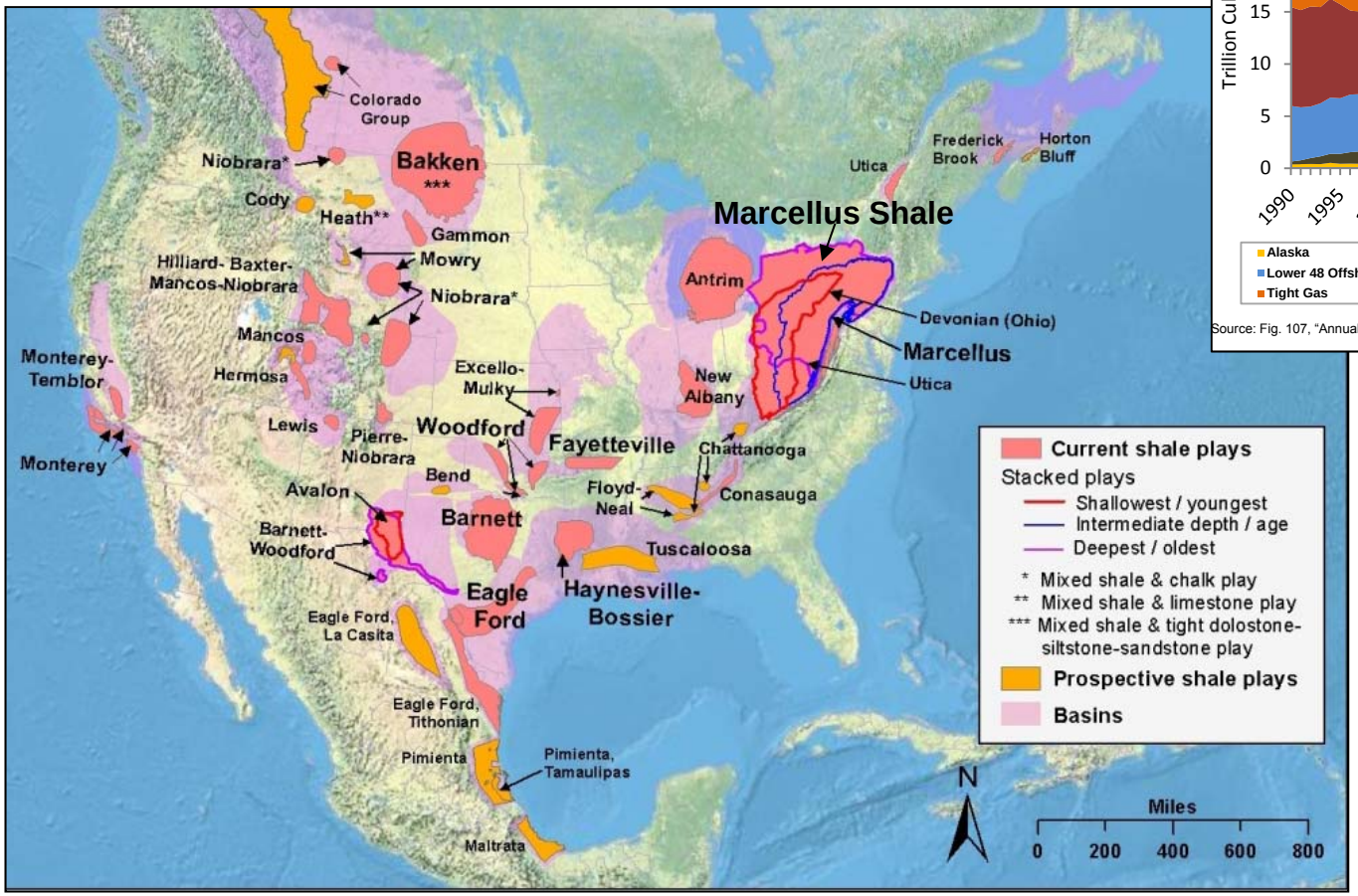
- New emissions restrictions related to nitrous oxides (NOx) come into effect in January 2016
- New limits represent a 75% reduction from current Tier II limits
- Vessels built in advance of Jan 2016 (keel) will not require large NOx emission treatment systems

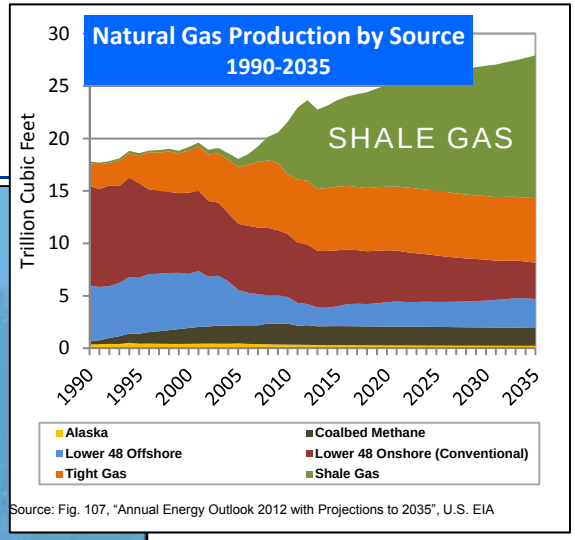


NOTE: Silver equipment denotes additional NOx-reduction equipment

Natural Gas (NG) Market

North America





Source: Fig. 107, "Annual Energy Outlook 2012 with Projections to 2035", U.S. EIA

Significant Natural Gas reserves will encourage a shift towards U.S. export, break dependency on Middle East oil, drive the need for marine transportation, and offer opportunities for shipbuilding

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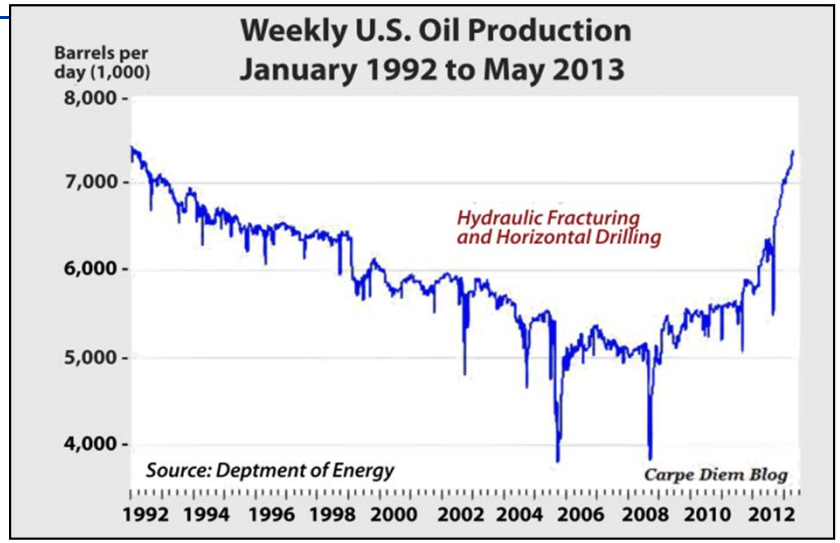
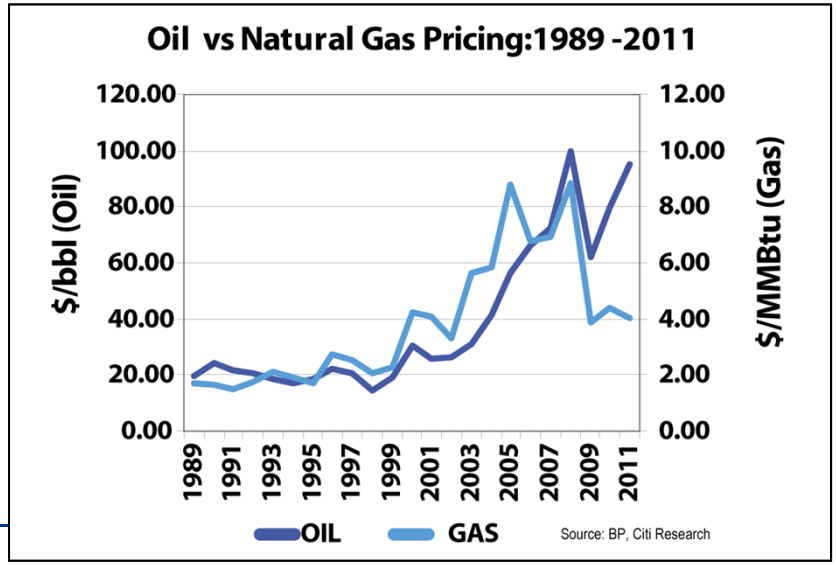
Source: U.S. EIA (based on data from various published studies, 09MAY11)*
Source: CIA World Factbook, https://www.cia.gov/library/publications/the-world-factbook/rankorder/2179rank.html
Source: NERA Consulting, "Macroeconomic Impacts of LNG Exports from the United States" +

Major Commercial Market Forces

Domestic Oil Production, and LNG

- **Domestic Oil Production**
  - Oil at 22-year high
  - Product Tanker Charter Rates have increased over 50% in 2 years
- **Domestic LNG Pricing**
  - Price of natural gas ~80% less than crude oil
    - By product of fracking and no US export of natural gas (to-date)
  - Ship owners attracted to LNG as a fuel due to its cost and environmental benefits





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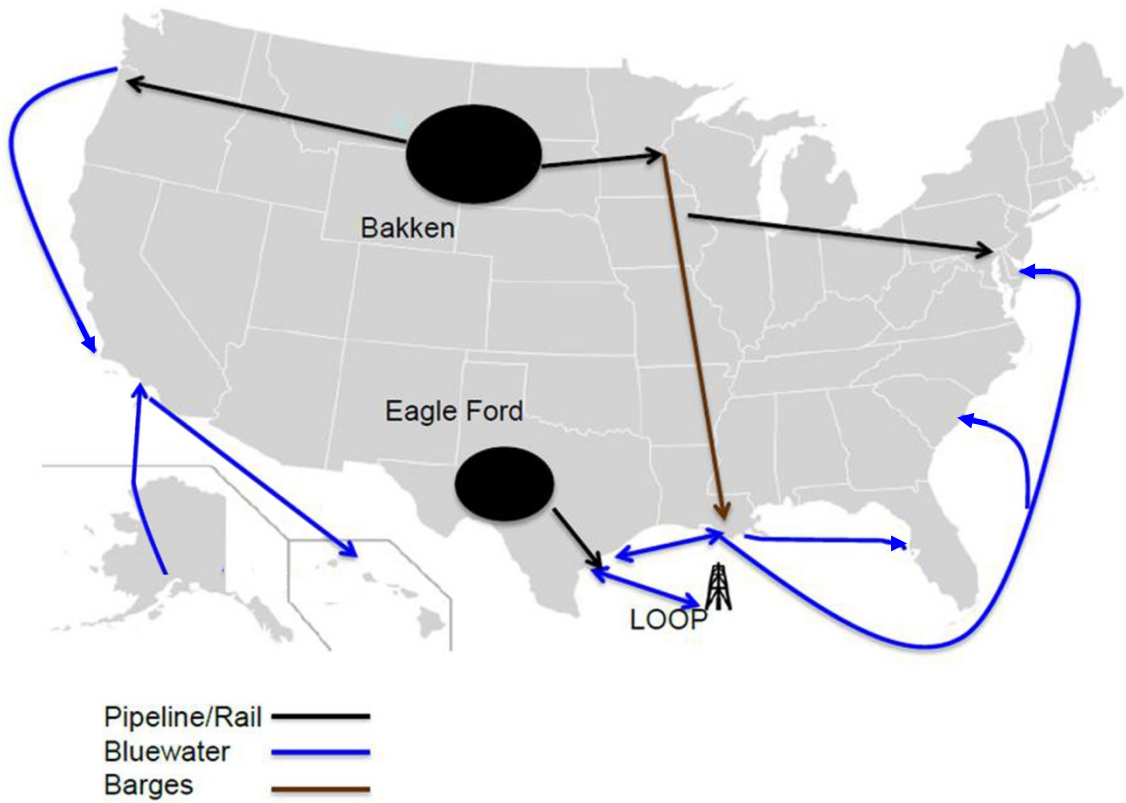
US Coastwise (Jones Act) Tankers

Domestic Crude Oil and Product Movements



Year	Daily MR Tanker Charter Rates
2009	~$50,000
2010	~$52,000
2011	~$48,000
2012	~$50,000 to $65,000
2013	~$70,000 to $75,000 (1 at ~$105,000)

Source: MJLF Associates

Due to Vessel Supply Constraints and an Increased Demand to move Crude Oil, Vessel Charter Rates have Risen Steadily since 2011

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NASSCO 50k DWT LNG Ready ECO Product Tankers

Contract for Six Ships for Two Different Owners

Vessel Deliveries 4Q 2015 through early 2017

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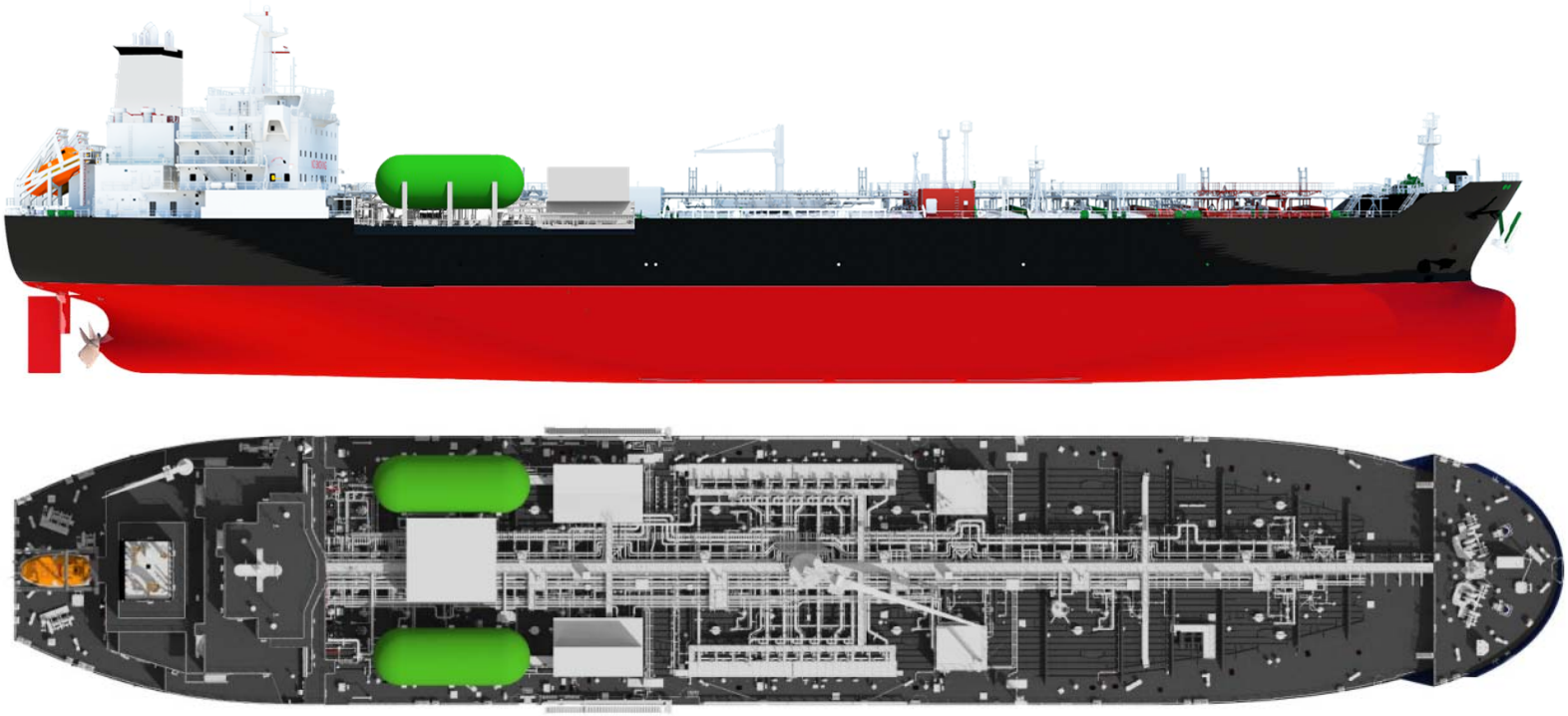
LNG Powered ECO Product Tanker Design

Key Vessel Characteristics



- Length (LOA): 186.0 m
- Breadth: 32.2 m
- Speed: 14.5 knots
- Range: 15,800 nm
- Cargo Tank Capacity: 337,000 barrels
- Main Engine: MAN 6G50ME-B9.3-GI

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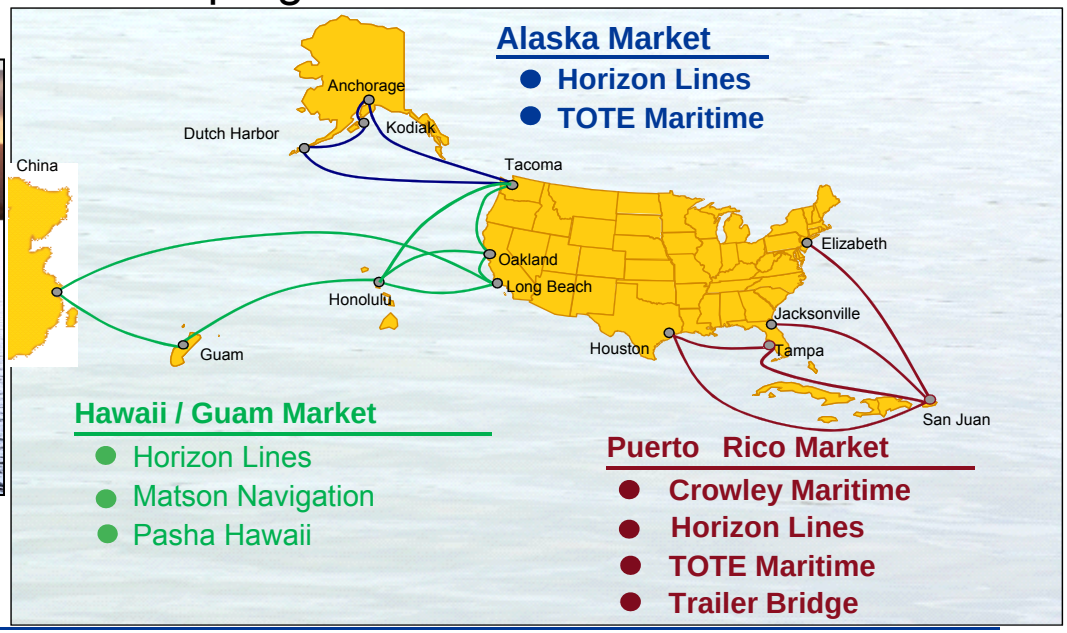
US Coastwise Dry Cargo Market

Aging Fleet

- Over the next 5 to 7 years, dry cargo owners may need to replace up to 15 vessels
  - Average vessel age in Jones Act dry cargo market is 30 years
  - Steamships must comply with ECA regulations by 2020, one owner considering converting existing aging vessels to burn LNG
- Emission regulations are driving owners new building investment decisions from an operating and capital cost perspective
- LNG as a ships fuel is playing and will continue to play a major role in new Jones Act dry cargo vessel replacement programs



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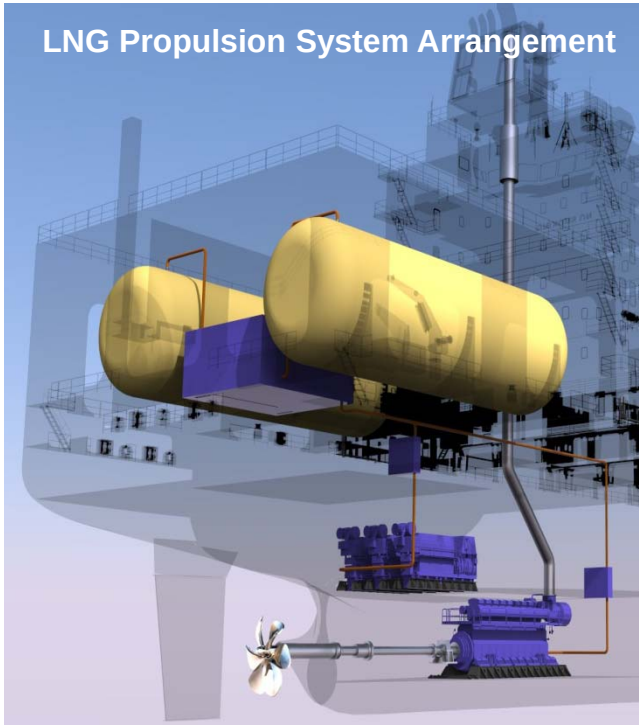
NASSCO / TOTE Containership Project

3100 TEU LNG Power Containership – 2 Ships



- **Clean and Efficient**
  - Meets all current and future emission requirements
  - Burns more efficiently than liquid petroleum fuels
- **Lower Costs and Abundant**
  - Potential LNG market pricing below crude oil pricing
  - Large domestic shale gas reserves
- **DSME Partnership**
  - Experience delivering over 80 LNG carriers
  - Leader in LNG propulsion technology

First Vessel to Deliver by 4Q 2015, Second Vessel 1Q 2016

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NASSCO / TOTE LNG Conversion Project

Overview

- **Design Contract Awarded:** January 2, 2013
- **Vessel Type:** Orca Class Trailerships
- **Quantity:** 2 vessels
- **Original ships designed and built by NASSCO (delivered in 2003)**
- **Vessels operate from Tacoma, Washington to Anchorage, Alaska**
- **Reasons for Conversion:**
  - A strong belief that LNG will be the main fuel for marine transportation in the future
  - Decision based on the significant environmental benefits related to operating on LNG

**Note: TOTE received a provisional waiver from current ECA fuel sulfur content requirements of MARPOL Annex VI while it pursues its alternative fuel conversion.*

Key Drivers for LNG-Powered Ships

Emissions & Economics

- **Emission Regulations**
  - Emission Control Areas (ECAs) are in place and will expand in the future
  - NOx, SOx, and particulate matter (PM) regulations will continue to tighten
  - LNG as a ship's fuel meets most current and future emission regulations

- **Fuel & Gas Prices**
  - Domestic natural gas is trading significantly cheaper than fuel oil
  - Owners are expected to lock-in LNG bunker pricing differentials to fuel oil

- **Fuel Efficiency of LNG**
  - LNG provides a 20-25% better calorific value than liquid fuel leading to significantly lower fuel consumption rates
  - Owners have stated that fuel costs represent 60-70% of OPEX

Despite a lack of a bunkering infrastructure, the emission and operational cost benefits are driving operators toward LNG-propulsion