

Regulation of Vessels and Infrastructure to Support LNG Fueling Operations in the U.S.



LNG Bunkering North America
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Outline

- USCG/LNG Marine Activity Past and Present
- Driving Factors
- LNG Interests
- Delivery Options
- Regulation and Standards
- Gaps
- Industry Partners
- Moving Forward

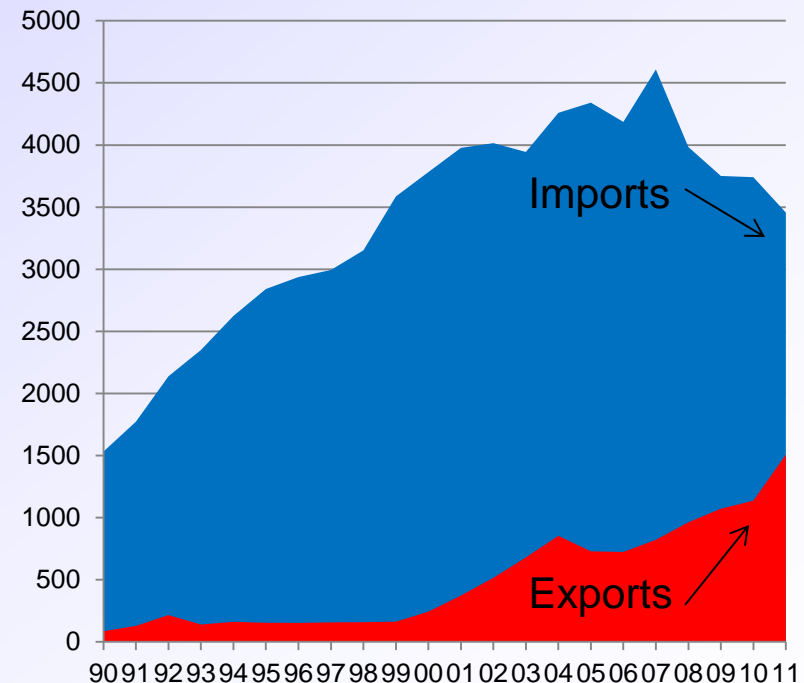
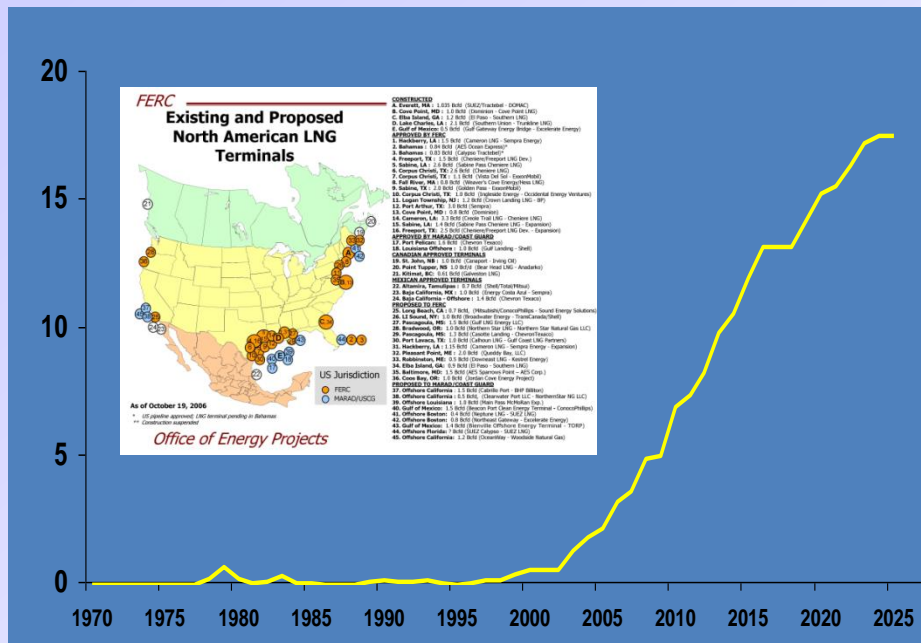


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Past and Present Market Activity

2005 - EIA forecasts U.S. demand for LNG through 2025 – Drives LNG import project initiatives

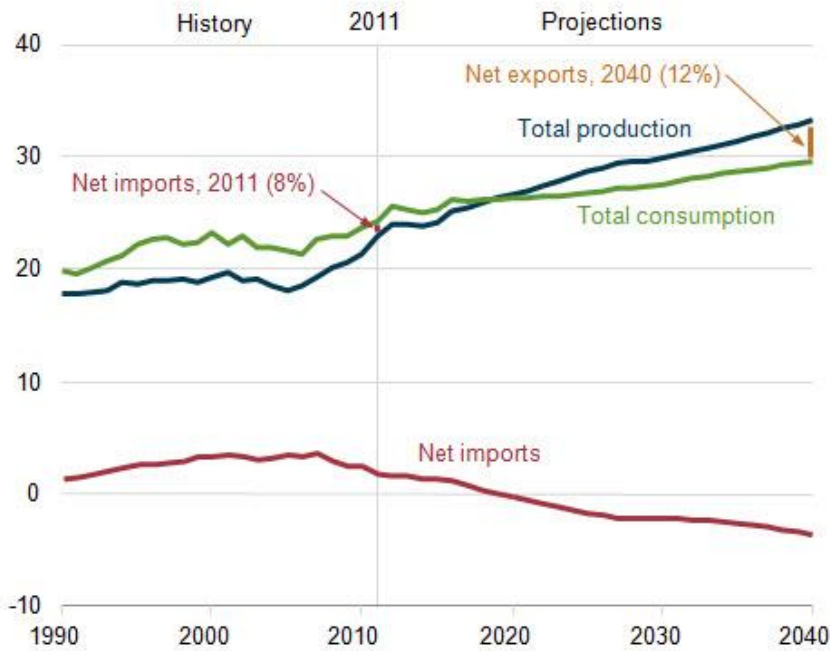
2007 to Present – LNG Imports going down - LNG exports going up



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EIA Annual Energy Outlook Data

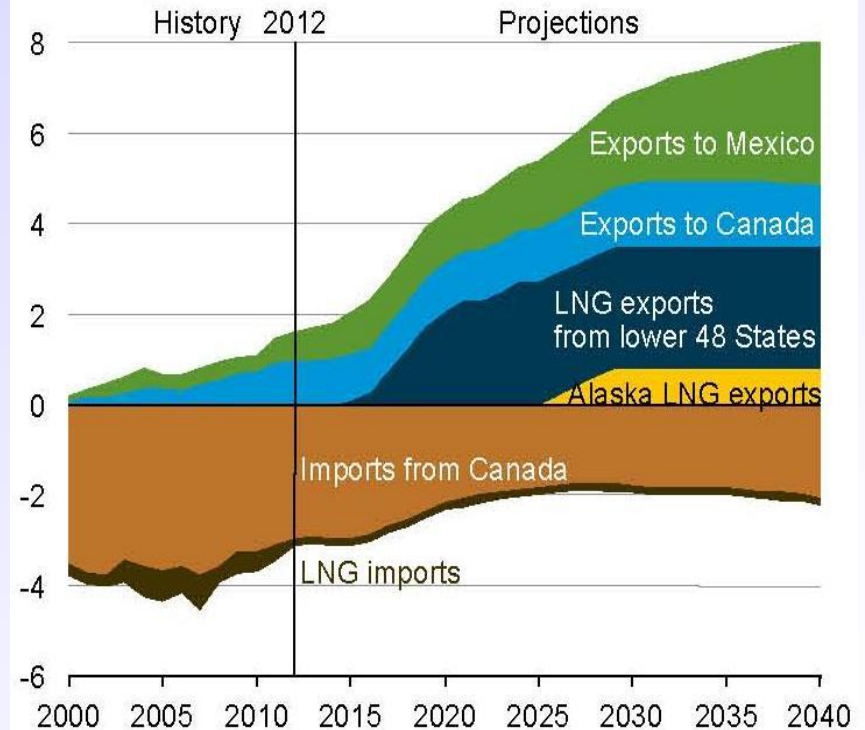
Figure 2. Total U.S. natural gas production, consumption, and net imports in the Reference case, 1990-2040 (trillion cubic feet)



(2013 Data)



Figure 4. U.S. natural gas imports and exports, 2000-40 (trillion cubic feet)



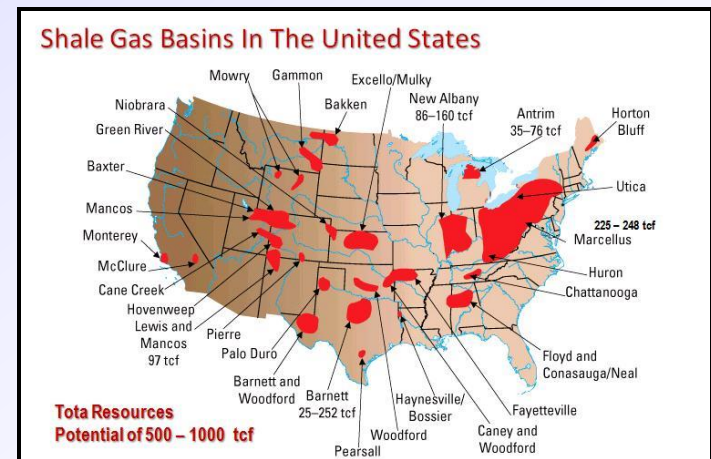
(2014 Data)



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Driving Factors for Use of LNG in the U.S

- U.S. shale gas bringing gas abundance
- Tighter diesel fuel sulfur limits driving price increase
- Gas fuel complies with U.S. ECA
- Net effect: major fuel savings and environmental compliance



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LNG Fueled Vessel Interest in the U.S.

TOTE LNG-Fueled Containership



Harvey Gulf LNG-Fueled OSV



**LNG as a Ferry Fuel – Concept for
Washington State Ferries**



By: Sean Caughlan, PE, Senior Marine Engineer, The Glosien Associates
Endicott (Cotty) Fay, MSE, PE, Chief Naval Architect/Mgr. Design, Washington State Ferries

9 November 2010

**TOTE RO/RO Containership
LNG Retrofit**



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U.S. Locations of LNG Interest



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LNG Fueled Vessel Supply Options

- Shore to Ship



- Tank Truck to Ship



- Ship to Ship



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U.S. Federal Regulations

- LNG Supply by Shore (Fixed)
- LNG Supply by Shore (Mobile)
- LNG Supply by Sea (Ship/Barge)
- Ship's Using LNG as Fuel (Other than Boil-off)
- 33 CFR Part 127¹
- 33 CFR Part 127, 49 CFR Parts 172, 177, and 178
- 46 CFR Subchapter D, 46 CFR Parts 11, 12, 15, and 154, 33 CFR Parts 155 and 156.
- Applicable Subchapters Used for Certification

Note 1: Regulations of DOT and/or FERC may apply depending on actual design.



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Gaps in Existing Regulations

The Current Regulations Do Not:

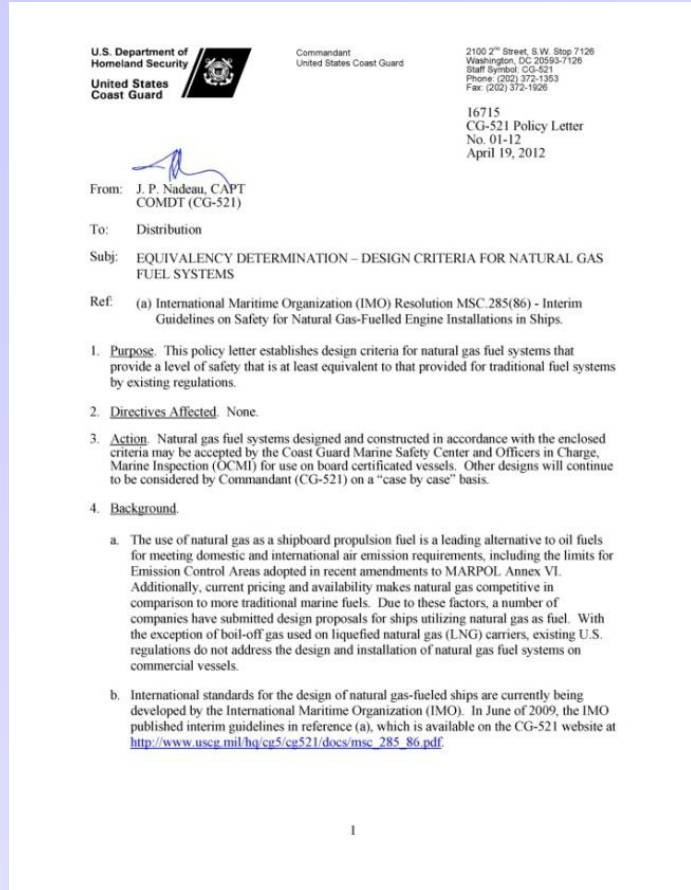
- 1. Outline requirements for design and construction of LNG fuel systems.
- 2. Outline requirements for operations, training, and general safety for personnel on vessels where LNG fuel systems are installed.
- 3. Outline requirements specific to LNG transfer operations (Current procedures viewed in light of oil transfers).
- 4. Outline requirements for small scale LNG (e.g. bunkering) operations conducted from vessels and shoreside facilities (Currently viewed in context of large scale cargo transfer).
- 5. Provide adequate requirements for barges transporting LNG in bulk.



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Short Term Solution

Policy Letters to Bridge Gaps:



- Policy letters drafted to bridge gaps in regulations until regulations can be developed.
- Policy letters based on existing regulations applicable to LNG cargo operations scaling down to fit needs and accomplish safety mission.
- Aligned with ongoing work of leading international organizations (e.g. IMO, ISO, SIGTTO, etc.).
- Utilize existing USCG OCMI/COTP authorities to implement existing regs & evaluate safe alternatives.



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Long Term Solution

Issue Regulations to Close Gaps

- 1. Initiate rulemaking project.
- 2. Use implemented policy to help identify additional areas needed to be addressed in regulation.
- 3. Incorporate standards and guidance developed by the international community and LNG industry where appropriate.



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U.S. Coast Guard LNG Industry Partners

Standards Development

- IMO - International Code of Safety for Ships Using Gases or Other Low-Flashpoint Fuels (IGF Code)
- IMO - International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code)
- ISO - International Guidelines for Bunkering LNG as a Marine Fuel (TC67 WG10)
- NFPA 52 - Vehicular Gaseous Fuel Systems Code (updates to Chapter on Marine Vessels)
- NFPA 59A - Production, Storage, and Handling of Liquefied Natural Gas (LNG)

Advisory Committees / Interagency & Industry Workgroups

- CGHQ Internal Natural Gas Workgroup
- Federal LNG Interagency Roundtable (Washington, DC)
- CTAC, MERPAC, TSAC Subcommittees (Federal Advisory Committee)
- SIGTTO – LNG Fuel Safety Advisory Group (London, UK)
- LNG Fuel Advisory Council (chaired by DNV, Houston)

Other Industry Contacts

- Great Lakes Maritime Research Institute
- Center for LNG



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Moving Forward

- Early engagement
 - a. Concept phase
 - b. Planning and Proposal stage
 - c. Construction and Implementation stage



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Questions?

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