Methanol - An Ultra Clean Marine Fuel Solution for North America

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Methanex
The world’s largest producer and supplier of methanol to major international markets
Waterfront Shipping

28 vessels, including 7 methanol dual-fuel vessels

Medium Range Fleet
45,000 - 50,000 DWT Class
- Cabo Negro II
- Caribbean Spirit
- Global Spirit
- Magellan Endeavour
- Patagonian Mystic
- Falkanger
- Finnanger

Medium Range Fleet
50,000 DWT Methanol Dual Fuel Engine Class
- Fjellanger
- Sabrewing
- Scarlet Ibis
- Tamiat Navigator
- World Navigator
- Taranger

Handy Size Fleet
20,000 to 30,000 DWT Class
- Lindanger
- Taranaki Sun
- Mari Jone
- Leikanger
- Mari Boyle
- Manchac Sun
- Cajun Sun

Coastal Fleet
1,000 to 10,000 DWT Class
- Mariline
- Marinex
- Medalta Adventurer
- SCT Matterhorn
- Sakhara Lotus
- Marit

Yelena
Argo Chemist
IMO Regulations Leading to Adoption of Cleaner-Burning Marine Fuels in North America

- **Rationale**
  - Emissions reduction: SOx, NOx, Particulate Matters
  - U.S. EPA – Significant air quality & resulting health benefits/cost savings
- Methanol offers significant emissions reductions compared to main compliance option MGO (0.1% diesel)...
...and Methanol is Cost Competitive versus Diesel (MGO)

Methanol is an economically viable alternative marine fuel over the cycle

Chart source: Platts and IHS Chemical

- MGO NA GC Average of Houston and New Orleans; MGO NA EC average of New York, Philadelphia, Norfolk, Montreal and Charleston; NA WC average of LA, San Francisco, Portland, Seattle and Vancouver.
- Methanol: USGC spot price; adjusted to energy equivalent of MGO (2.16 factor)
U.S. Domestic Methanol Production Growth

U.S. Production has grown including Methanex relocation of two plants from southern Chile to Louisiana

- Domestic Resource Use
- Job Creation
- Energy Security
- Environmental & Health Cost Benefits

Geismar, Louisiana
Methanol is Widely Available

*Methanol infrastructure already in place to reliably supply the North American marine industry*

Red flags/circles represent existing methanol supply locations; lines represent rail networks

Source: Methanex
Methanol is a clear, colourless liquid that quickly and naturally biodegrades

• More environmentally benign than conventional marine fuels (i.e. HFO and MGO)

• Long history of methanol safe handling

• Industry standards established for the safe handling of methanol and other low flashpoint fuels
Innovative Clean Technology

Methanol has minor modification requirements and modest incremental cost
Methanol in Use as a Marine Fuel Today: Waterfront Shipping

The world’s first methanol-fuelled tankers

- Commercial-ready technology
- In 2016, Waterfront Shipping launched seven vessels with methanol dual-fuel MAN ME-LGI 2-stroke engines
- Vessels have been operating safely and reliably across the globe

Medium Range Fleet 50,000 DWT
Methanol Duel Fuel Engine Class
Methanol Research & Development Projects

Several other initiatives are underway to support further commercialization

Large Engine Market (i.e. cruise ships and ferries)
- Funded by German government to support further commercialization work for new methanol cruise ships and ro-pax ferries

Small Engine Market (i.e. tug and barge)
- LeanShips: Sponsored by the EU to support commercialization of the smaller engine market
- GreenPilot: Co-funded by Swedish Maritime & Transport Administrations & Methanol Institute to support commercialization of the smaller engine market

China Market
- China Classification Society (CCS) methanol for marine fuel guidelines under development
- Ministry of Agriculture methanol marine fuel pilot project
Thank you!

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