

# Operation of LNG Powered Vessels in the Canadian Arctic



# Petro-Nav

- Commercial Operator of Desgagnés Tankers
- Operate 9 ice class 1A tankers
- 5 newest vessels in Fleet are Dual Fuel (LNG)
- 4 of these vessels built to our specifications in Turkey
- One purchased from Furetank



# Petro-Nav

- Largest independent transporter of refined petroleum products in Canadian Great Lakes/St. Lawrence River/Maritimes
- Exclusive Long-term contracts with Canadian oil majors: Valero Energy, Suncor, Shell.
- Deliver 4 million m<sup>3</sup> ( 25 million bbls) of liquid bulk cargo per year

# LNG Fuel Tankers

- Damia Desgagnés 15,000 DWT
  - Mia Desgagnés 15,000 DWT
  - Paul A. Desgagnés 15,000 DWT
  - Rossi A. Desgagnés 15,000 DWT
  - Gaia Desgagnés 18,000 DWT
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- The 4 sister ships are 135m LOA, 23.5m beam, 7.9m draft-
  - These 5 ships are the only LNG powered vessels in Eastern Canada with the exception of ferries
  - Two of these vessels worked in the Arctic in 2021



# Why select LNG for fuel in 2013

- Almost 100% of operations in ECA
- Alternatives were to operate on MDO or use scrubbers
  - But MDO/Scrubbers does do not help GHG
- The only Low Carbon Solution
- New ships were to have Tier 3 Engines
- 38% Reduction in Greenhouse Gases
- 90% Reduction in Nox
- 99% Reduction of Particulates
- 0% SOx emissions

# Anticipated Challenges

- New fuel and new technology –the learning curve
- Regulators – Not ready with a certification scheme
- No bunkering logistics
- Crew training – No Curriculum
- We knew we would be the first and the logistics of bunkering would be problematic
- Bunkering logistics is now the greatest challenge due to truck transfer



# Bunkering LNG





# Operation

- First choice is always to operate on LNG rather than MDO
- There have been significant costs savings in 2021 LNG vs MDO
- Operate on MDO only when we have had issues with logistics in arranging bunkering or if there are gas trips in bad weather. Then stay on mdo until weather improves
- We carry additional MDO in the arctic in event of automation failure of gas system or if bad weather extends voyage time by several weeks
- We have not experienced problems consuming only BOG when tanks are low with North American Gas



# Arctic Sealift 2021

- Discharge locations in Hudson Bay, Hudson Strait, Ungava Bay, Baffin Island
- Approximately 330 ship days per year engaged in Arctic Operations by 3 ships
- Total volume delivered: 140,000 m<sup>3</sup>
- Two Tankers operated on LNG in the Arctic



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# LNG Fuel Tankers in the Arctic

## Mia Desgagnés- Worked in Nunavik for 3 Arctic Seasons





# Arctic Sealift 2021

- Typical Cargo Equipment:
- 9000-10,000 feet of floating hose per vessel mounted on reels
- Typical port requires 5000-6000 feet of hose
- At some ports can deploy up to 7500 of hose
- Workboats
- Anchors and gear to secure hoses
- Pollution response equipment
- Shore manifold equipment



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# LNG Fuel Tankers in the Arctic

## Mia Desgagnés- Worked in Nunavik for 3 Arctic Seasons







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# LNG Fuel Tankers in the Arctic

## Mia Desgagnés- Worked in Nunavik For 3 Arctic Seasons



# Sealift 2021

- Gaia Desgagnes
- one voyage to Ungava Bay
- 2<sup>nd</sup> Voyage from Montreal to Roberts Bay & back on LNG
- First voyage of an LNG powered tanker through North-West Passage
- 70% of Transit on LNG



# LNG Fuel Tankers in the Arctic

## Gaia Desgagnés-STX Ungava Bay



# LNG Fuel Tankers in the Arctic

## Gaia Desgagnés- Transit Northwest Passage





# LNG Fuel Tankers in the Arctic

## Gaia Desgagnés- Transit Northwest Passage



# Sealift 2021

- Plant Operation
- Did Not use Gas when operating in ice due to varying load conditions
- Varying load conditions could be due to manoeuvring in ice or operating behind an icebreaker
- Carry sufficient diesel to allow completion of voyage if failure of gas valve or automation or if circumstances extends voyage beyond LNG limit of operation



# LNG Powered Tankers in the Arctic

## Gaia Desgagnes- Transit North-West Passage







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## Thank-You

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