
Operational Learnings from World's First LPG Dual-Fuel Propulsion Retrofitting Project

Pontus Berg, EVP (Technical and Operations)



Agenda

01 Highlights of LPG propulsion

02 Operational learnings

03 What's next?

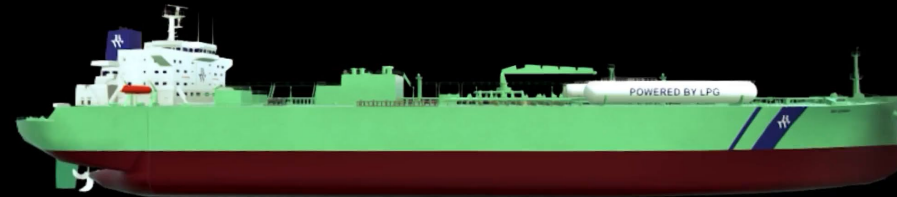


Liquefied Gas Injection (Propane) Technology

Pioneering technology, now tested at scale with 15 VLGCs and >30,000 hours in operation

How it Works

- LPG is drawn into fuel gas supply system & piped to engine
- A small amount of compliant pilot fuel such as VLSFO or MGO is injected into the engine as the piston nears the top
- It sparks under pressure, and LPG burns cleanly to create propulsive force
- Reduce emissions:
 - Sulphur Oxides (~97%)
 - Particulate Matter (~90%)
 - Carbon Dioxide (~20%)
 - Nitrous Oxides (~20%)
- Increase efficiency on many fronts



Ambitious project completed ahead of schedule and within budget

Safety of crew a priority while minimising logistical impact from Covid-19



Collaboration is key to success

- Experienced, dedicated site team is critical to project success
- Had to manage quality concerns from main and sub-suppliers, but overall good experience
- Special thanks to Yiu Lian dockyard for their flexibility and patience
- Special thanks to Wärtsilä and MAN ES for partnering us in this pioneering project



Impact from Covid-19 on project progress

- Over 14,000 hours spent in quarantine
Colleagues spend 2 weeks in hotels upon arrival in China/ back home (Singapore/ Norway)
- Crew confined to vessel and yard with no shore leave
- Shipping delays for critical parts / lack of spare parts from suppliers

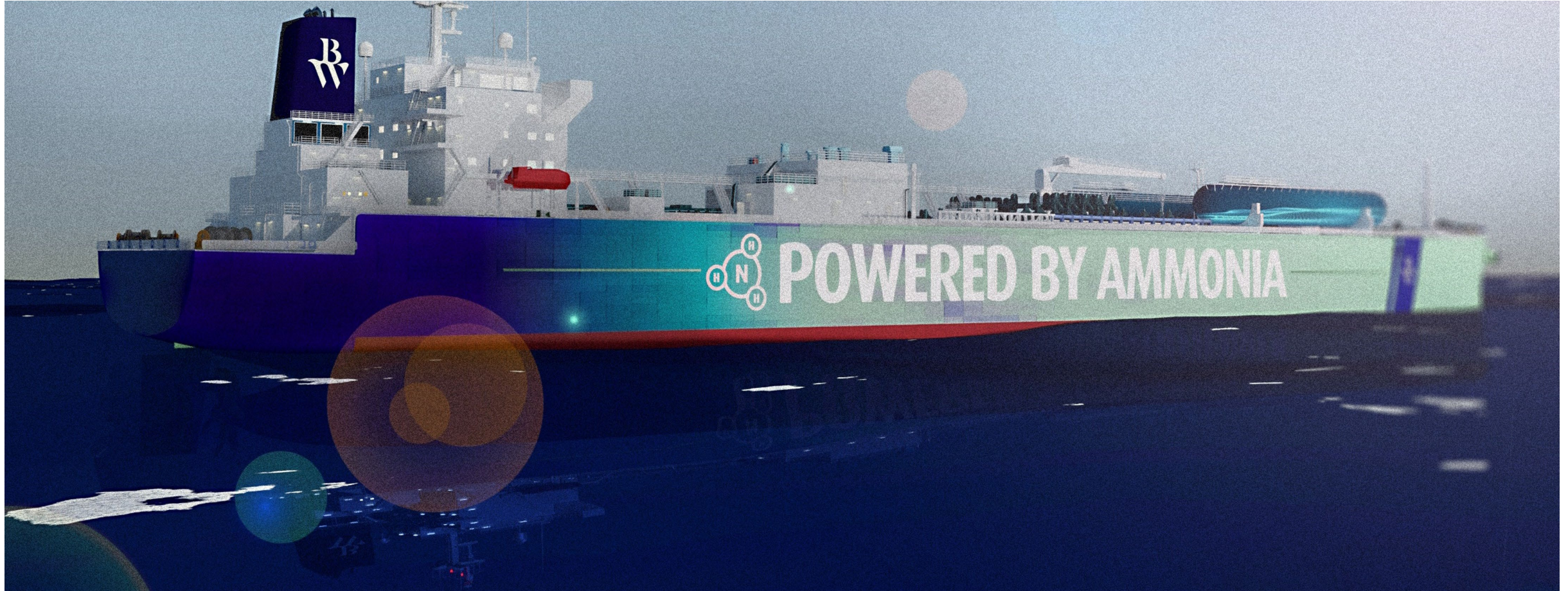


Some teething issues from new technology

- No major surprises during retrofitting; ambitious 15-VLGC project completed ahead of schedule and within budget
- Importance of filters to manage organic materials in LPG
- Possible design reconsiderations to manage clogging of Fuel Booster Injection Valve (FBIV) nozzles; vibrating hydraulic pipes; and some programming glitches

Delivering energy today while finding solutions for tomorrow

Exercising caution in the near-term to better strategise for the long-term



We will explore all options – we will watch developments in alternative fuels; invest in R&D in ship design and propulsion; keep an open mind on all possibilities such as ammonia and carbon capture; and lead the way in advancing technology towards a zero-carbon future.

Thank You

Investor Relations

investor.relations@bwlpg.com

Ticker

BWLPG

LinkedIn

linkedin.com/company/bwlpg

Telephone

+65 6705 5588

Address

10 Pasir Panjang Road
Mapletree Business City #17-02
Singapore 117438