“Experience from investing in and running next generation vessel designs”

Lloyds List Informa Executive Meeting
Gothenburg 16 January 2020

Lars Höglund, CEO Furetank
Furetank Group

• Furetank is focused on product & chemical tankers below 20,000 dwt and has been active in the North European petroleum products trade since the early 1950’s

• Integrated ship owning company that provide technical, safety, crewing and commercial management services to external partners

• Operating MS SIGRID for Swedish “Nuclear fuel Administration” SKB, to transporting all waste from Swedish Nuclear power industry

• Owned by the Höglund family, which has been involved in shipping business since the 17th century

• Offices on Donsö, Gothenburg, Holbaek (Denmark) and Torshavn (Faroe Islands)

• Have invested in five dual fuel powered low emission 18,000 dwt new buildings from Avic Dingheng Shipyard in China. Together with partners Älvtank and Thun Tankers, the series will comprise a total of eight sister vessels

• Founding partner of commercial joint venture Gothia Tankers Alliance, covering 46 vessels in sizes of 6,000-37,000 dwt
Gothia Tanker Alliance

- Formed in 2013
- Office in Gothenburg
- 7 Members
- 46 Vessels - 6,500 dwt to 37,000 dwt
- Presently 8 Newbuilding’s on order
- The fleet will eventually consist of 12 dual fueled LNG powered vessels
- In 2019 the GTA fleet performed more than 1734 voyages, made over 3500 port calls and transported 15.6 mill tons of petroleum products, bio-fuels and chemicals

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| Vessels under construction

- THUN TANKERS NB 2019 17,500 1C
- THUN TANKERS NB 2020 17,500 1C
- THUN TANKERS NB 2020 17,500 1C
- THUN TANKERS NB* 2021 7,999 1A
- THUN TANKERS NB* 2021 7,999 1A
- THUN TANKERS NB 2020 4,250 NAABSA

* = Dual fuel / LNG
CoA’s – Cornerstone in our Commercial Strategy

By offering a large fleet of similar size and type vessels, dedicated to the region, we can offer CoA customers;

- **Reliability** - Vessels of known performance, with officers and crew that are familiar to the trade and customers requirements

- **Flexibility** – A large fleet improves the service level and our opportunity to accommodate loading & delivery dates as well as handle unforeseen changes

- **Reduced environmental footprint** - By optimizing the trading pattern and shortening the ballast to next load port we reduce total emissions per transported unit

For the Partners in Gothia Tanker Alliance the CoA's provide;

- **Continuity** - Cargo volume throughout the year offer the continuity necessary to justify investments in new and improved vessels

- **Optimisation** – By combining matching voyages in order to minimize ballast to the benefit of both the environment and our competitiveness

- **Efficiency** - Frequent calls to the same ports enable continuous improvement on efficiency and costs
Main trading area
Why Dual-fuel?

Factors behind the decision to convert the FURE WEST to dual-fuel and the design of the new vessels;

- Tightening regulations on bunker fuel
  - 2005 EU Sulphur Directive, ECA in the Baltic, max 1,5% sulphur
  - 2010 Max 0,1% sulphur in EU ports
  - 2015 SECA in the North Sea, max 0,1% sulphur

- Society and political environment
  - Sustainability, climate change and public health issues high on the agenda in the Nordic countries

- Customers awareness
  - Permits for refinery expansions conditioned by reduced emissions including from logistics
  - Suburban areas closing in on terminals and depots with pressure to reduce emissions, stench and noise

After we made the decision?

- IMO max 0,5% sulphur bunker by 2020
- Focus on public health risks due to NOX emissions and particulates
- Baltic Sea to become NECA-Area incl. TIER III requirement for new vessels by 1.1.2021
Furetank CO₂ Emissions – Drivers and Future Expectations

- Due to strong trade growth, strong freight market and busy shipyards limited focus was spent on energy saving features and design for vessels built 2000-2010

- 2009-2014 Weaker freight market & high bunker prices resulted in better focus on energy management, both for existing vessels and the design of new ships. First step was to reduce average speed and optimize speed to arrival

- 2013 - First installation of floating frequency, a device that enables better utilization of controllable pitch propellers at below design speeds

- December 2014 – decision to convert FURE WEST to dual fuel and LNG (in operation from 2016)

- 2015 - Placed order for the series of six 18,000 dwt dual fuel LNG together with Älvtank and Erik Thun AB

- 2018 – Delivery FURE VINGA, RAMANDA THUN VENERN and FURE VALÖ

- 2019 – Delivery of FURE VEN and RAMELIA

- 2 more vessel ordered, for 2020 and 2021
THE NEXT GENERATION DUAL-FUEL (LG) TANKERS ARE HERE NOW

Furetank continues to be the leader in developing efficient and environmentally friendly product and chemical tankers.

ENVIRONMENTAL CARE WITH QUALITY

Emissions reduced by:
- CO₂: 55%
- NOₓ: 86%
- SOₓ: 99%
- PARTICLES: 99%
- NOISE: 50%
NEXT GENERATION - Design features for lower environmental impact

**FUEL**
- LNG as fuel at sea and in port
- SCR on auxiliary engines
- Inert gas on LNG

**ENERGY SAVING EQUIPMENT**
- Propeller nozzle minimize required engine output - Ice Class 1A
- VFD pressure controlled engine room fans
- Low energy compressors
- Floating frequency for propeller efficiency
- Frequency controlled steering gear
- LED lights for low energy consumption
- Heat recovery from cooling water
- Active load curve and pitch adjustments for energy saving

**LUBRICANTS & FLUIDS**
- Chemical free ballast water treatment
- EAL oil in all equipment on open deck
- Ultrasonic anti fouling
- VGP compliance for all oil to water interface

**SAFETY & REDUNDANCY**
- UPS back up on all propulsion and navigation
- Class Note AV1-APS alternative propulsion system

**NOISE REDUCTION**
- Electric cargo pumps minimize noise pollution in port
- Propeller nozzle reduce noise level

**HULL PERFORMANCE**
- New low drag hull design
- High performance anti fouling for low friction
Furetanks’ solution to meet IMO’s emission targets for 2050

"Hybridpower", where batteries can be used instead of auxiliary engines to supply power

LNG as fuel lowers emissions of CO₂ and Nox. Eliminates emissions of SOx and particles

Lower fuel consumption thanks to floating frequency on main engine and energy efficient equipment - pumps, compressors, fans, lights etc

The ducted propeller increases thrust and reduces power requirement for main engine whilst still having highest ice class. A smaller engine can thanks to “floating frequency” be used to power the vessels pumps during discharge thus maximising time using the cleanest fuel - LNG

Low drag hull design and high performance antifouling
Comparison – Ducted vs. Open Propellers

4,500kW with ducted propeller equals 5,600kW with open propeller at low speeds - like when trading in ice

- Performance comparison in the diagram has been made basis 4,500 kW available power
- Total thrust normalized based on thrust at 13 knots (design sailing speed) and from 0 knots (maximum thrust)
- The ducted propeller enables us to have a smaller engine, with lower fuel consumption, and still maintain ice class 1A
Propulsion

- 5,000 mm ducted propeller that increases the thrust and enables the notation ice class 1A with lower engine power
- Low-noise ducted propeller for reduction of underwater noise
- Twisted lead Wärtsilä/Becker high efficiency flap rudder
- Take me home system with 1500kW power, Class notation: Assisted Propulsion. (more than 8,0 kn as Diesel electric)
- Low resistance underwater hull
Hybride/UPS Power Back-up

The hybrid solution with an UPS Power supply system minimizes the use of auxiliary engines and can supply all 24/230/440V necessary to operate:

- Main engine
- One steering gear
- All navigation & communications equipment
- Emergency remote anchoring device
- Emergency switchboard
- All lights

Using the UPS as the backup power source makes it possible to navigate in narrow waters (port entrances, canals etc.) with only the main engine running – thereby maximising the use of LNG and reducing emissions
EEDI (Energy Efficiency Design Index)

- EEDI is a resolution under IMO Marpol Annex VI, adopted in 2013 and aims to promote the use of more energy efficient design and less polluting equipment and engines for new ships.

- The score is calculated by a formula based on technical design parameters for a given ship, is non-prescriptive so it leaves the choice of technology to the industry.

- Expressed in grams of carbon dioxide (CO₂) per ship’s capacity-mile - the smaller the EEDI the more energy efficient ship design.

- IMO EEDI Requirement for a 17,999 dwt tanker ordered in 2015 and delivered in 2018 is 9,37.

- FURE VINGA EEDI score is 4,84 – which improved successively throughout the process; from design stage (6,09) via model test (5,44).

- The VINGA-series low score is a result of the unique combination with ducted propeller, floating frequency on main engine and hybrid technology where a battery can replace the auxiliary engines – together this corresponds to 3 EEDI points.
Fuel used at different modes, vessel development

FURE NORD
Conventional oil powered (inner ring)

FURE WEST
Dual fuel LNG without UPS Back-up (middle ring)

FURE VINGA
Dual fuel LNG with UPS back-up (outer ring)
Decision on engine set-up based on activity/energy usage analysis
Annual emissions per vessel, Reduction

Particles: -99%

CO₂ emissions/year

-57%

Nox- emissions/year

-90%
Environmental Assessment of LNG-Powered Tankers

- The Swedish Environmental Research “IVL” Institute have done an independent study, using EU-guidelines, to quantify the economic benefits to society from the reduced environmental impact.
- Annual economic values of reduced health impacts and crop losses associated with the LNG powered vessel compared to a conventional vessel are shown in the table.
**Designed for trade in sensitive areas**

- The FURE VINGA design was used by Sjöfartsverket for the simulated navigation tests in the “Mälarprojektet”, performed to ensure navigational criteria's for lake Mälaren after completion of the new locks in Södertälje.

- Intake on 7m freshwater draft is abt 10 000 tdw

- The series fulfil the stringent US & Canadian regulations for trading in drinking water reservoirs
  - Using only Environmental Acceptable Lubricants (EAL) on all water interfaces and deck machinery
  - Aluminium anodes on hull and
  - Ultrasonic antifouling system in box coolers
Efficient vessels offering benefits for our customers

Design developed together with naval architects FKAB bulling with our experience from the north European refined products trade

- 12 segregations with a tank and cargo-line layout that offers flexibility on parcel-size and load/discharge sequences - without compromising total performance
- Sigma Phenguard “Hot cured” epoxy coating
- Svanehøj deepwell pumps, electrically driven
- Super-strip system and separate drain tanks and for effective discharge and low ROB
- High capacity cargo tank ventilation with heated air to shorten tank preparation time
- Bow thruster, controllable pitch propeller and flap rudder for improved manoeuvring in port
- All mooring lines om winches for faster mooring/unmooring
Bunker Prices 2017 – 2020

Price of LNG, Gasoil (0,1%) & Marine Fuel (0,5%) (at equivalent energy content)

[Graph showing price trends for LNG, Gasoil (0,1% Sulphur), and Marine Fuel (0,5% Sulphur) from 2017 to 2020]
Questions and Thanks!