(Future of) LNG bunker vessels – the world largest LNG BSV „Kairos“

Klaipéda LNG Forum 2019

Klaipéda, May 15th 2019
The Linde Group is active worldwide with a global presence in more than 100 countries

Countries home to operational companies of The Linde Group

Comments

- The Linde Group, leading global player in industrial gases
- German Blue Chip Company (DAX 30)
- 135+ years of experience in gases, cryogenics and process engineering
- 18 bn EUR revenue with approx. 65,000 FTE
- Active in >100 countries

Source: The Linde Group, Nauticor
Nauticor has spear-headed the development of a downstream LNG supply chain in North-West Europe.

Nauticor in Europe

Projects / Operations

**Stockholm (operational)**
- 20,000 cbm LNG terminal in Nynäshamn
- World’s first LNG Supply Vessel: AGA’s SEAGAS

**Bunker Supply Vessel (operational)**
- Charter contract and yard contract signed in 2016 (Bernhard Schulte, Hyundai Mipo)
- Bunker vessel arrived in Europe

**Rotterdam / Rostock / Emden / Cuxhaven etc.**
- Hundreds of truck-to-ship bunkering operations for several customers
- Long-term supply of large ferries

Source: The Linde Group, Nauticor
Nauticor has conducted hundreds of safe truck-to-ship bunker operations with customers already.

Examples for truck-to-ship customers of Nauticor in Northwest Europe:

- **Ostfriesland**: world’s first retrofitted LNG ferry.
- **Helgoland**: first newbuild LNG ferry in Germany.
- **SeaRoad Mersey II**: first RoRo ferry with a mobile LNG tank.
- **Fure West**: world’s first chemical tanker retrofitted with an LNG engine.
- **Scheldt River**: world’s first dredger with an LNG engine.
- **Wes Amelie**: world’s first container vessel retrofitted with an LNG engine.
The ship-to-ship experience started with the world’s first LNG bunker vessel “SEAGAS” in 2013

Operations in Stockholm and Nynäshamn

• Experience: already 1600+ safe ship-to-ship bunkering operations
• Performance: fast fuelling operation to Viking Grace (45 minutes per refuelling operation)
• Quality: "State of the art" cryogenic technology manufactured by The Linde Group
The next level: developing new ship-to-ship solutions

The Linde Group has received its second LNG bunker supply vessel

**Vessel**
- LOA: 117 m
- Breadth: 18 m
- Draught: 5.3 m
- Crew: max. 20

**LNG**
- Capacity: 7,500 cbm (LNG)
- Flow rate: 200 - 1,250 cbm/h
- Delivery height: 2 - 25 m
- (MGO)
- Tank type: Type C
- Pressure: 3.75 barg
- Hose diameter: 6 inch (4+8 opt.)

**Set-up**
- Speed: 13 knots
- Generator: 3 DF gensets
- Propulsion: 2 x azimuth thrusters
- Dynamic Positioning 2 (DP2) ready
- 2 x pump jets

Source: Nauticor
Christening of „Kairos“ was done in Hamburg by the CDU federal chairman Annegret Kramp-Karrenbauer

Christening of the world’s largest LNG BSV in Hamburg
The design of “Kairos” allows the supply of LNG to a variety of customers at various locations in Northwest Europe.

Overview of “Kairos” activities in Northwest Europe

Source: Nauticor
The world largest LNG bunker supply vessel Kairos started operations in Northwest Europe in December 2018

First Kairos LNG loading operation in Klaipeda

Comments

• Start of operations in Northwest Europe in December 2018
• LNG terminal call in Lithuania: Loading of LNG from the FSRU in Klaipeda
• Re-delivery of LNG to a small scale LNG terminal in Klaipeda
• Regular transport of LNG between the FSRU and the small scale terminal on behalf of KN
Kairos has conducted its first LNG ship-to-ship bunker operations in the Baltic Sea area

Start of LNG bunker operations for Destination Gotland

Comments

- Start of LNG bunker operations in the Baltic Sea
- March 2019: First LNG bunker operation in the shipyard of Karlskrona (SWE)
- March 2019: First LNG bunker operation in the port of Visby (SWE)
- Start of regular LNG supply for Destination Gotland’s new LNG fueled ferry “Visborg” end of March 2019
- Preparation of ship-to-ship LNG bunker operations in North Sea & Baltic Sea, including The Netherlands, Denmark, Germany, and Sweden

Source: Nauticor
Kairos has started the supply of LNG to the Gothia Tanker Alliance’s LNG fuelled tanker fleet

LNG bunker operation for “Fure Valö”

Comments

• Start of LNG bunker operations for LNG fueled product tankers owned and operated by Gothia Tanker Alliance

• The contract covers the supply of LNG for 11 vessels in total

• April 2019: StS operation at anchorage near Sandhamn, Sweden
Kairos has conducted its first LNG ship-to-ship bunker operation for a container vessel.

Start of LNG bunker operations for container vessels (1/3)
The container vessel „Wes Amelie“ received >100 tons of LNG in front of the port of Visby

Start of LNG bunker operations for container vessels (2/3)

Comments

• April 2019: First ship-to-ship bunker operation for a container vessel in the Baltic Sea
• “Wes Amelie” received LNG at anchorage in front of the port of Visby, Sweden
• Transfer of >100 tons of LNG in less than 2 hours
• Preparation of frequent StS operations at anchorage and SIMOPS in port together with charterer Unifeeder
The transfer of LNG was done using „Kairos“ unique stern manifold with the support of the ship cranes

Start of LNG bunker operations for container vessels (3/3)