LNG for IWT – status / barriers / activities
Train Workshop – Go LNG / Interreg Baltic Sea Region
Copenhagen, 26th October 2016

Manfred Seitz
General Manager
E-Mail: seitz@prodanube.eu
Pro Danube International

Platform of private companies with strategic economic interest in better framework conditions and higher public investment in the Danube transport & logistics system

- Established autumn 2011 by companies & associations
- Non-profit association based in Vienna
- Network of currently more than 150 companies
- More than a lobbying organisation as it initiates and executes projects
- Service company: Pro Danube Management GmbH
- Initiator & coordinator of policy initiatives & projects in IWT, port development & LNG
- More info on: www.prodanube.eu
LNG experiences of Pro Danube

in TEN-T & CEF Transport:
• Masterplan for LNG as fuel and as cargo on the Rhine/Meuse-Main-Danube corridor (TEN-T 2012 / Innovation)
• Blue Baltics – LNG infrastructure facility deployment in the Baltic Sea region (CEF-T 2015 / MoS)
• ReaLNG – Turning LNG as marine fuel into reality in the North Sea-Baltic region (CEF-T 2014 / MoS)
• INtoLNG – Innovative LNG solutions to provide clean transport fuel (CEF-T 2015 / Innovation)
• PASCAL – Study for a small scale LNG bunkering network for the European ECA (TEN-T 2013)

in Horizon 2020:
• PROMINENT – Promoting Innovation in the Inland Waterways Transport Sector (ongoing)
• ModuFuel – A Modular LNG Fuel System for Intermodal Waterborne Transport (applied for funding)
• IW T needs Alternative Fuel – Innovation in LNG for deployment in inland waterway transport and other alternative fuels (under preparation)

Projects in preparation within the Danube region:
• LNG for Upper Austria
• LNG for Galati / Romania
• LNG for Constanta / Romania
LNG MASTERPLAN RMD IN NUMBERS

**PARTNERS**
- 33 EU FUNDED
  - 1 NON-EU FUNDED
  - 13 Countries

**INDUSTRY**
- 52 MEMBERS
  - 2 CONTINENTS

**ADVISERS**
- 21 BODIES
  - AUTHORITIES
  - BRANCH ORGANISATIONS

**BUDGET**
- MEUR 34
  - 50% FROM EU

**TIME**
- 1.2013 - 12.2015
  - 3 FULL YEARS OF COOPERATION

**COORDINATORS**
- PRO DANUBE
- PORT OF ROTTERDAM
MISSION
To facilitate the deployment of LNG as an eco-friendly alternative fuel and a new commodity for the inland navigation sector.

OBJECTIVES
1. Based on the input and recommendations from various project activities to elaborate strategy – action plan with measures – for LNG deployment in IWT
2. to test, operate and monitor LNG deployment pilots

MASTERPLAN
Strategy for LNG deployment in IWT

FRAMEWORK, MARKETS & FINANCES
VESSEL CONCEPTS
ENGINES & TECHNOLOGIES
TERMINAL CONCEPTS
SAFETY & OPERATIONAL ASPECTS
EDUCATION & TRATINING
REGULATORY FRAMEWORK
PILOT DEPLOYMENTS
TERMİNAL CONCEPTS

RHINE REGION
- LNG bunker station in Port of Antwerp
- LNG infrastructure in Port of Mannheim
- LNG infrastructure in Port of Switzerland

DANUBE REGION
- LNG small scale terminal in Constanta (RO)
- LNG small scale terminal in Galati (RO)
- LNG small scale terminal in Ruse (BG)
- LNG floating terminal in Komarno (SK)

Rhine/Meuse-Main-Danube: LNG ARTERY FOR EUROPE
Inland navigation functions as pioneer consumer and facilitator

© Pro Danube Management GmbH, December 2019

Co-financed by the European Union
Trans-European Transport Network (TEN-T)
LNG TERMINAL IN RUSE (BULGARIA)
Bulmarket DM Ltd.

Location: on the river Danube in the port area in Ruse, on the grounds of former heavy machinery building factory, on an area of 1,000 m²

Capacity: 4 vertical tanks of 250 m³ of LNG (total 1,000 m³)

Facilities: storage, vessel (un-) loading facility, truck-loading station, truck & vessel fuelling station

---

LNG-FUELLED RETROFITTED CONTAINER VESSEL – EIGER  
DCL Barge B.V. (Danser Group)

Size: 105 x 11.45 m (L x M). Draught (max): 3.55 m
Propulsion: 2 dual-fuel Wärtsilä 6L20DF, 900 kW
Bunker capacity (LNG): 60 m³ (gross)
LNG tank: Vacuum-insulated double-wall pressurised tank IMO type C

LNG-fuelled type G tanker Sirocco  
© Chemgas Barging S.a.r.l.

---

LNG-FUELLED TYPE G TANKER – SIROCCO  
Chemgas Barging S.a.r.l

Size: 110x 11.4 m (L x W). Draught: 3.15 m
Propulsion: single 8L20DF Wärtsilä main engine
Bunker capacity (LNG): 88 m³ (gross)
LNG tank: Single wall independent vacuum-insulated pressure tank with design pressure of 10 bar

---

LNG-FUELLED TYPE C TANKER – ECOLINER  
Damen Shipyard Hardinxveld B.V.

Size: 110x 11.4 m (L x W). Draught: 3.4 m
Propulsion: 4x Scania SGI-16M gas engine
Bunker capacity (LNG): 2 x 26 m³
LNG tank: double walled vacuum-insulated cryogenic tank: Specifics: Air lubrication system, Van der Velden Flex ® tunnel to reduce the resistance in shallow waters

---

LNG-fuelled retrofitted container vessel Eiger © DCL Barge B.V.

LNG-fuelled retrofitted container vessel Eiger © DCL Barge B.V.

LNG-fuelled retrofitted container vessel Eiger © DCL Barge B.V.
**LNG/GASOIL BUNKER VESSEL**
Size: 110 m x 13.5 m (L x W)
Propulsion: 3 x gas generators and 1 diesel generator (backup)
Tanks: 4 x 380 m³ of gasoil, 2 x 935 m³ of LNG

**LNG-FUELLED PUSH BOAT**
Size: 40 x 18 m (L x W). Draught: 1.6 m
Propulsion: 4 x 1,060 kW Wärtsilä 6L20DF
Bunker capacity: 165 m³ (gross) of LNG & 80 m³ of gasoil
LNG tank: double-shelled vacuum insulated type C (vertical design)

**LNG DANUBE RIVER-SEA TANKER & RIVER BARGE**
Size: 130 x 16.6 m (L x W). Draught (min): 1.6 m
Propulsion: dual-fuel (using boil-off)
Tanks (cargo): 10 x 348.5 m³ of LNG
Barge tanks (cargo): 3 x 348.5 m³ or 6 x 348.5 m³.

**RETROFITTING**
Dual-fuel propulsion with vacuum-insulated LNG tanks with a capacity of 2 x 49 m³ for the type TR 1000 and of 4 x 6.75 m³ for the type TR Muflon 1100 is considered as a viable option.

**LNG-FUELLED GAS SUPPLY SHIP**
Size: 110x18m (LxW). Draught: 5.3 m
Propulsion: 4 x Wärtsilä DF generators (use of boil-off gas, stored as CNG, to supply the gas engine)
LNG tank: range from 3,500 m³ to 13,000 m³
LESSONS LEARNED FROM LNG MP & BEYOND

• LNG is the **most promising alternative fuel for inland navigation** offering high environmental and economic benefits
• Use of LNG supports major EU transport, environment and energy policy objectives
• **Best possible bridge** for a strongly decarbonised inland shipping (e.g. fuel cell/Hybridization)
• **Bio-LNG will be needed to improve CO2 performance** significantly
• Inland vessels can deliver high volumes of LNG cost-effectively from seaside import terminals to economic heartlands of Europe
• Barging sector, therefore, is pioneer consumer of LNG and enabler of LNG supply supporting a more diversified European energy supply
• Rhine/Meuse-Main-Danube axis will serve as **European main LNG artery**
• LNG Masterplan prepares sector for successful follow-up EU projects, but:
  • **Implementation of comprehensive strategy and favourable framework conditions (market & policy) are needed for wide-scale deployment**
  • **Further optimization of LNG system components (engine emissions/efficiency/ tank & fuelling system) as well standards & procedures is required to make LNG more attractive and politically more accepted**
  • LNG is not a self-running case nor the solution to all evil in inland shipping
HOW TO REALIZE BEST A SMALL SCALE LNG TERMINAL – EXAMPLE DANUBE REGION

- Develop multi-client strategy to generate baseload for supply
  - Unite pioneer consumers searching clean & cost-effective energy (gas distributors, industry, off-pipeline energy user) & users of alternative fuel

- Win commitment of public administrations
  - Ensure smooth admission / permitting process / administrative efficiency
  - Integrate public transport/utility operators/port operators/vessel operators as pioneer consumers

- Create synergies in supplying waterborne and road transport
  - Generates economies of scale, reduces start-up losses and contributes to base load supply

- Seek public (EU) funding to level initial market risk and to compensate high investments
  - CEF/TEN, Operational Program Large Infrastructure, Cross-Border Cooperation Program, etc. offer funding opportunities

- Invest into awareness and provision of know-how on LNG
  - Helps to reduce NIMBY risk and let you gain policy/administration support

- Integrate/facilitate supply of Bio-LNG
  - Ensures local/regional supply of low volumes in ramp-up phase
  - Improves CO2 performance and strengthens political support

- LNG for Danube will come from multiple sources
  - Import from LNG terminals in Turkey & Greece, in future KRK/Croatia, Liquefaction of bio-methane & local stranded resources, Multi-modal supply from NW/SW-Europe
Integrated project - LNG for Galati / Romania

**L-CNG Fuelling Stations & Vehicles**
- L-CNG-fuelling stations
- LNG & fuelled Buses & Trucks

**Bio-methane Sources**
- Landfill
- Wastewater treatment facility

**LNG Terminal & Facility**
- Agro bio-methane production
- Liquefaction
- Small-scale LNG Terminal
- Bunker Station Maritime & Inland Vessels
12

Integrated project LNG for Constanta / Romania

LNG Fuelling Stations & Vehicles in City
- LNG-fuelling stations
- LNG-fuelled Buses & Trucks

©IVECO

©SOLUBS

LNG Terminal in Constanta Port
- Storage tanks
- Truck loading station
- Truck & railroad fuelling station
- Bunker Station Maritime & Inland Vessels

©Shell
©SINARA Group
©Pump Service

LNG-fuelled ferries to Georgia

Danube - Black Sea Canal

©Navrom
**RECOMMENDATIONS for policy makers**

1. **Develop and implement a National Strategy for Alternative Fuel with LNG as key element** (like many other EU States are currently doing)

2. **Take preparatory steps to LNG fueling infrastructure** parallel to EU Directive on Deployment of Alternative Fuels Infrastructure (DAFI)

3. **Stimulate engagement and commitment of public administrations** to develop public-private partnership structures to optimize EU funding

4. **Engage in EU activities for regulatory framework** of LNG as fuel (technical provisions for vehicles, standardization and harmonization of fueling, storage, safety, etc. regulations and administrative procedures)

5. **Set-up a National Platform for LNG** to unite public and private stakeholders for innovation and deployment projects (following the Dutch model)

6. **Stimulate investment in LNG fueling infrastructure** as well as in LNG-fueled vehicles operated by public organizations (e.g. public transit & public utility operators) and make use of EU Programs 2014-2020

7. **Secure LNG supply as part of national economic, transport & energy strategies**

8. **Use national potentials and foreign policy to overcome supply problems in start up phase**
LNG PROJECTS IN THE DANUBE REGION

**LNGAFT** (awarded and ongoing)

**Action:** Study with real-life-trials aiming to deploy 28 LNG buses and 2 LNG stations in Zvolen and Presov (Slovakia)

**Key facts:** First step towards the introduction of alternative fuels for heavy transport in Slovakia (first pilot deployment) in line with directive 2014/94/EC directive

**Timeline:** October 2016-December 2019

**EU funding (program/€):** (CEF/85%/€7,721,573)

**PAN-LNG-4-DANUBE** (awarded and ongoing)

**Action:** Deployment of a fixed LNG refueling station in Csepel-Freeport (Hungary) serving LNG to vessels, trucks and the possibility of trains. It is also foreseen to retrofit existing vessels with LNG propulsion

**Key facts:** Accelerate LNG availability in Rhine-Danube corridor

**Timeline:** June 2016-September 2019

**EU funding (program/€):** (CEF/85%/€6,032,578)

**CNG Clean Fuel Box Project** (awarded and ongoing)

**Action:** Introduction of the Clean Fuel Box (CFB) which is a LCNG self-service refueling station in Hungary able to refill CNG vehicles independently of the gas distribution network

**Key facts:** Develop CNG availability and use at country level in Hungary

**Timeline:** October 2016-December 2018

**EU funding (program/€):** (CEF/85%/€9,872,835)

**LNG for Galati/Romania** (planned)

**Action:** Studies, works and pilot deployment of a small scale LNG terminal (using bio-methane), a unit for agro bio-methane production and liquefaction, LCNG filling stations, LNG fueled buses/trucks and a bunker station for maritime/inland vessels

**Key facts:** Follow up of the pre-feasibility study made in the LNG Masterplan (LNG small scale terminal in the port of Galati/Romania with a capacity of 4,000 m³)

**Forseen funding program:** CEF

**LNG for Upper Austria** (planned)

**Action:** Combination of liquefaction and LNG bunkering infrastructure for vessels and trucks in Upper Austria. The sources of LNG will come from conventional stranded gas and bio-methane

**Key facts:** Commissioning core infrastructure (fuelling stations LNG & LG with hub Ennschafen and a number of pilot vehicles)

**Forseen EU funding program:** CEF
Thank you for your attention!

Manfred Seitz
General Manager
Pro Danube Management GmbH
E seitz@prodanube.eu
M +436764067878