

LNG for IWT – status / barriers / activities

Train Workshop – Go LNG / Interreg Baltic Sea Region

Copenhagen, 26th October 2016

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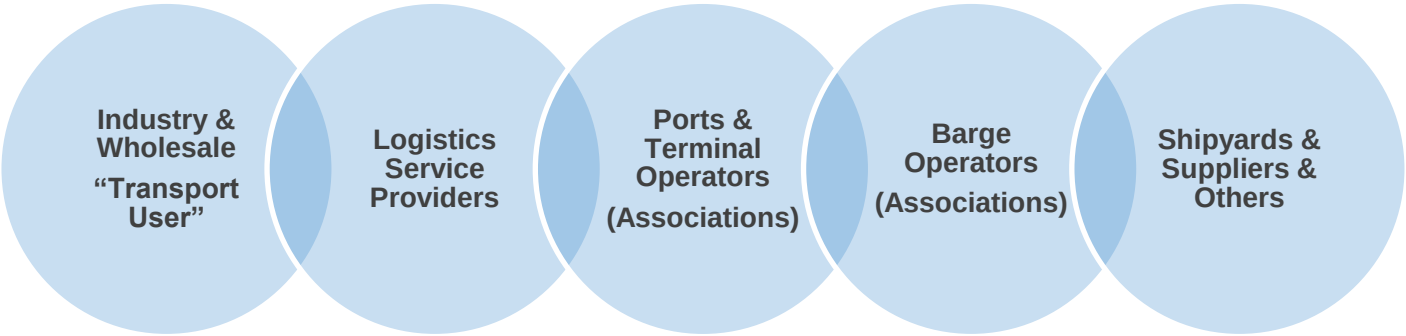
Pro Danube International

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

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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)
- **IWT 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

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LNG MASTERPLAN RMD IN NUMBERS

PARTNERS

33 EU FUNDED

1 NON-EU FUNDED
13 Countries

BUDGET

MEUR 34

50% FROM EU

INDUSTRY

52 MEMBERS

2 CONTINENTS

TIME

1.2013 - 12.2015

3 FULL YEARS OF COOPERATION

ADVISERS

21 BODIES

AUTHORITIES
BRANCH
ORGANISATIONS

CHIEFS

COORDINATORS

PRO DANUBE
PORT OF ROTTERDAM

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

MISSION & OBJECTIVES

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

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TERMINAL CONCEPTS

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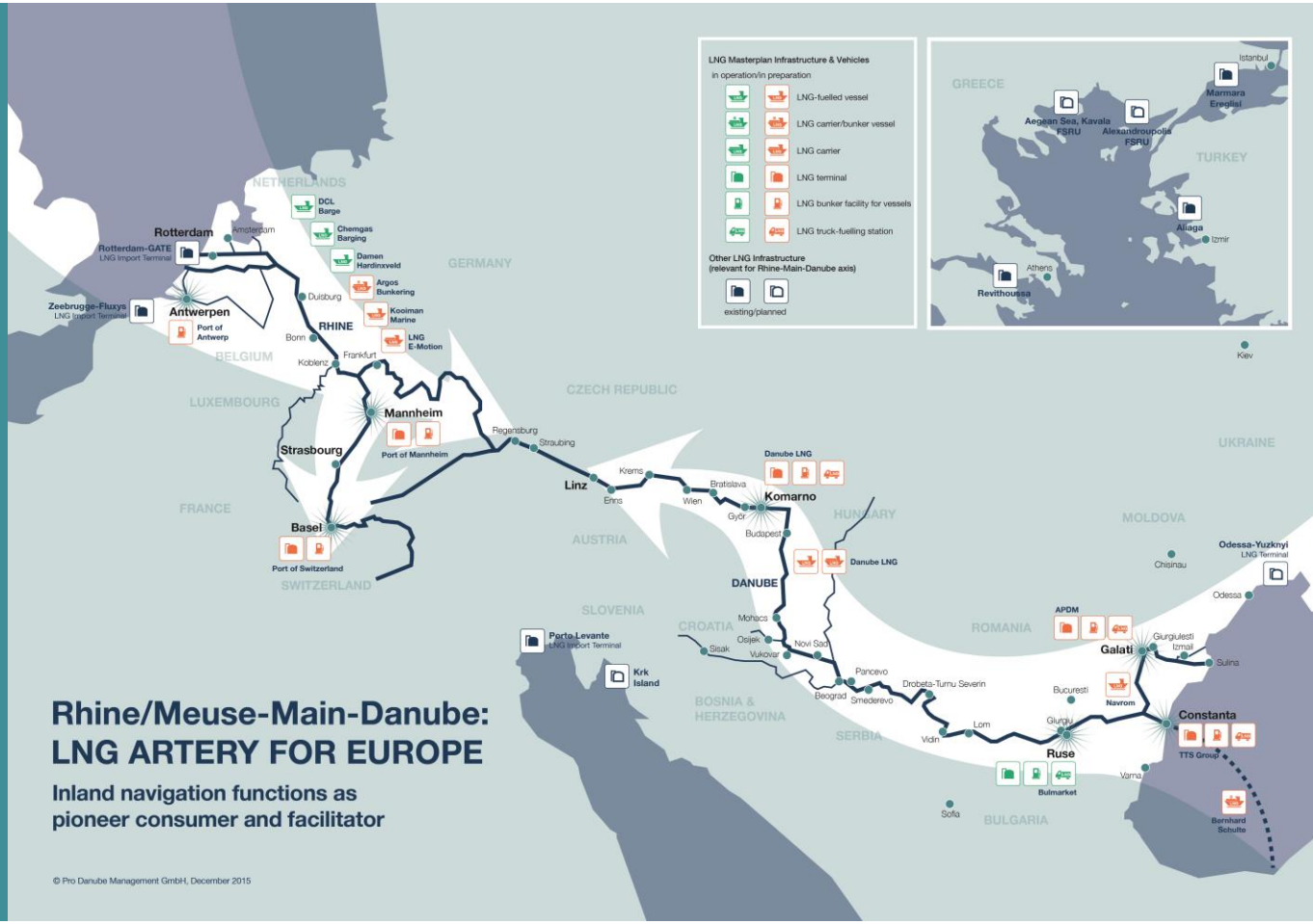
RHINE REGION

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)



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PILOT DEPLOYMENTS

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 m^2
Capacity: 4 vertical tanks of 250 m^3 of LNG (total 1,000 m^3)
Facilities: storage, vessel (un-) loading facility, truck-loading station, truck & vessel fuelling station

LNG small scale terminal in Ruse © Bulmarket

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 m^3 (gross)
LNG tank: Vacuum-insulated double-wall pressurised tank IMO type C

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

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 m^3 (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 m^3
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 type C tanker EcoLiner © Damen Shipyard Hardinxveld B.V.

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VESSEL CONCEPTS

LNG/GASOIL BUNKER VESSEL

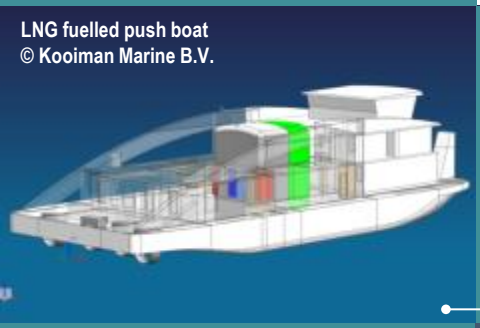
Size: 110 m x 13.5 m (L x W)
Propulsion: 3 x gas generators and 1 diesel generator (backup)
Tanks: 4 x 380 m^3 of gasoil, 2 x 935 m^3 of LNG in membrane tanks (GTT Mark III Flex membrane system)

LNG/Gasoil bunker vessel
© Argos Bunkering B.V.

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 m^3 of LNG
Barge tanks (cargo): 3 x 348.5 m^3 or 6 x 348.5 m^3.

LNG river-sea tanker with barges © Danube LNG



LNG fuelled push boat
© Kooiman Marine B.V.

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 m^3 (gross) of LNG & 80 m^3 of gasoil
LNG tank: double-shelled vacuum insulated type C (vertical design)

Retrofit solution
© Danube LNG

RETROFITTING

Dual-fuel propulsion with vacuum-insulated LNG tanks with a capacity of 2 x 49 m^3 for the type TR 1000 and of 4 x 6.75 m^3 for the type TR Muflon 1100 is considered as a viable option.

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 m^3 (gross) of LNG & 80 m^3 of gasoil
LNG tank: double-shelled vacuum insulated type C (vertical design)

LNG inland tanker
© LNG E-motion B.V.

LNG-FUELLED GAS SUPPLY SHIP

Size: 110x18m (LxW). Draught: 5.3m
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 m^3 to 13,000 m^3

LNG-fuelled gas supply vessel
© Bernhard Schulte, BMT TITRON

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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**

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HOW TO REALIZE BEST A SMALL SCALE LNG TERMINAL – EXAMPLE DANUBE REGION

MULTI-CLIENT STRATEGY

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

SYNERGIES

Create synergies in supplying waterborne and road transport

Generates economies of scale, reduces start-up losses and contributes to base load supply

PUBLIC COMMITMENTS

Win commitment of public administrations

Ensure smooth admission / permitting process / administrative efficiency
Integrate public transport/utility operators/port operators/ vessel operators as pioneer consumers

PUBLIC FUNDING

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

AWARENESS

Invest into awareness and provision of know-how on LNG

Helps to reduce NIMBY risk and let you gain policy/administration support

BIO-LNG

Integrate/facilitate supply of Bio-LNG

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

MULTI-SOURCING

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

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Integrated project - LNG for Galati / Romania

Integrated project LNG for Constanta / Romania

LNG Fuelling Stations & Vehicles in City

LNG-fuelling stations

LNG-fuelled Buses & Trucks

LNG Terminal in Constanta Port

Storage tanks

Truck loading station

Truck & railroad fuelling station

Bunker Station Maritime & Inland Vessels

LNG-fuelled ferries to Georgia

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)

LNG motion (awarded and ongoing)

Action: Feasibility studies and invest in 42 LNG fueling stations and 200 trucks fueled by LNG along six Corridors in 9 Member States.
Key facts: It is a part of the global project to establish EU wide LNG fueling infrastructure for trucks
Timeline: February 2016-December 2020
EU funding (program/%/€): (CEF/50%/€27.765.102)

LNG for Constanta/Romania (planned)

Action: Studies, works and pilot deployment of a small scale LNG terminal, storage tanks, a truck loading station, LCNG filling stations (also for trains), 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 Constanta/Romania with a capacity of 5.000 m3)
Forseen funding program: CEF

PAN-LNG Project (awarded and ongoing)

Action: Studies, works and pilot deployment for 5 LNG/LCNG filling stations and a small scale pilot liquefaction plant based on fossil gas wells and on biogas sources
Key facts: Contribution to the Hungarian roadmap required by the 2014/94/EC directive
Timeline: June 2015-September 2019
EU funding (program/%/€): (CEF/85%/€14.435.796)

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)

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 (fueling stations LNG/BLG with hub Ennshafen and a number of pilot vehicles)
Forseen EU funding program: CEF

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FURTHER INFORMATION

Thank you for your attention!

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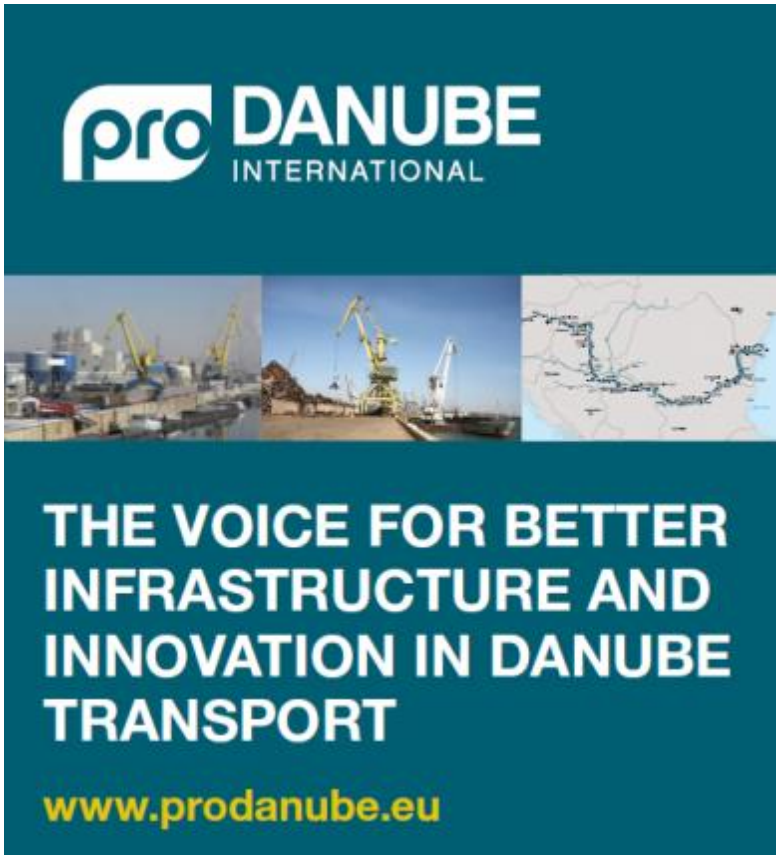

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