



## **Masterplan for LNG as fuel and cargo on the Danube**

### **Proposal for a TEN T Project**

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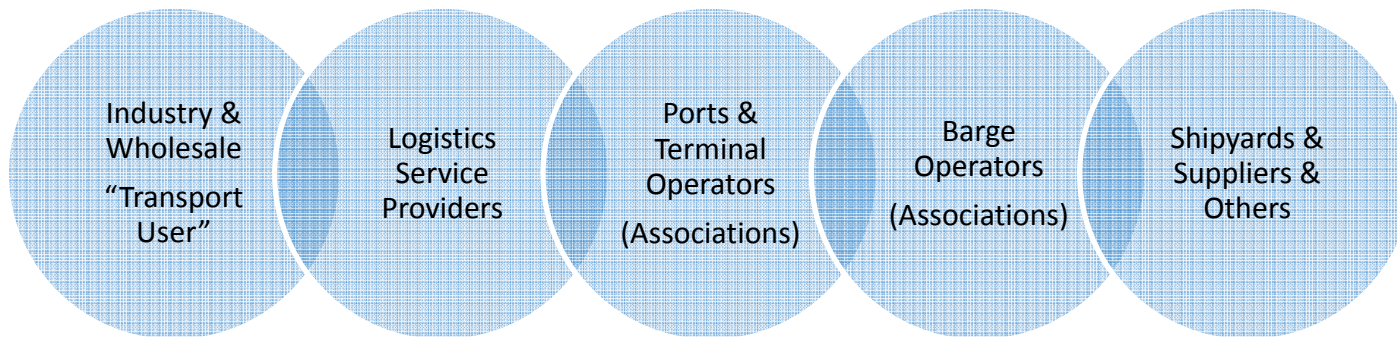
**Manfred Seitz, General Secretary**

CCNR Workshop Strassbourg, 13 November 2012

# What is Pro Danube International?

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**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 120 companies
- More than a lobbying organization as it initiates and executes projects which improve framework conditions resulting into a higher use of the Danube

# What are our core objectives?

Create a more favourable policy framework



- **Work with the European Institutions** on programs and initiatives for Danube region
- Contribute to implementation of **EUSDR Action Plan & Naiades**
- Support members in defining and lobbying **national action programs & initiatives**
- Lobby for **public funding schemes** and active national inland navigation policy
- Increase **awareness of decision makers, media & public**
- support members in **design and execution of lobbying strategies** and by implementation of projects
- **Maximise use of EU funds for project implementations**

Improve waterway infrastructure



- **Enforce minimum standards in waterway maintenance** through monitoring and interaction with responsible authorities
- Support **elimination of TEN-T bottlenecks** (shallow water sections) following UNECE/AGN recommendations
- Engage in **further development of River Information Services**
- Act for **better maintenance of locks**
- Push for **upgrading of connecting waterways/existing canals and for missing links**
- Engage in **sustainable waterway development** (e.g. ICPDR)

Promote investment in ports & fleet, education & training and innovation



- Lobby for **investment programs in ports and terminals** as well as for **modernization of Danube fleet**
- Trigger **implementation projects** for improvement of ports and fleet with regard to higher efficiency and sustainability
- Initiate and support implementation of **LNG as fuel for Danube navigation and as cargo**
- Initiate and execute **RTD and modal shift projects**
- Identify and implement **projects to ensure skilled nautical and logistics personal**

## What is the rationale for the project?















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- There is a strong need to modernize Danube fleet in order to improve environmental and economic performance
- LNG as fuel will significantly reduce vessel emissions (-20% CO<sub>2</sub>, -80 to 90% NO<sub>x</sub>, almost zero PM & SO<sub>x</sub>) and will increase the competitiveness of Danube transport (fuel cost savings relate into lower transport costs of est. up to 15%)
- Further CO<sub>2</sub> reduction possible by blending with BIO-LNG
- LNG as cargo will increase transport volumes and will offer energy (cost) savings to many industries in the entire region
- **But, implementation of LNG requires co-ordination of public and private actions along a well defined strategy. This is why we need a transnational**

### **MASTERPLAN FOR THE IMPLEMENTATION OF LNG ON THE DANUBE**

*In line with European Union Climate Action - Climate Energy Policy (2009), with Europe 2020 – New Economic Strategy; White Paper on transport; NAIADES and in particular with EUSDR*

# LNG - reduced greenhouse gas emissions

	Extraction	Processing	Fueling, transportation and storage	Emissions at end use	Total life cycle	
Natural gas (LNG)	 78 g/km	 36 g/km	 150 g/km	 824 g/km	1,088 g/km	 >20% GHG reduction
Diesel	 227 g/km	 130 g/km	 12 g/km	 1,114 g/km	1,483 g/km	
Biogas (RNG*)	 -1,472 g/km	 437 g/km	 97 g/km	 824 g/km	-114 g/km	 The Only Carbon Neutral Transport Fuel

Source: TIAX LLC (March 2008) Life-Cycle Cost Model and Pollutant Emissions Estimator. Available at [http://www.westport.com/pdf/GHG\\_and\\_Criteria\\_Pollutant\\_Emissions\\_Estimator.pdf](http://www.westport.com/pdf/GHG_and_Criteria_Pollutant_Emissions_Estimator.pdf) and CONCAWE (2006) "Well-to-Wheels Analysis of Future Automotive Fuels and Powertrains in European Context"

**Westport**

\*: RNG = Renewable Natural Gas

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# European framework – It is the right time to act!

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## **Several initiatives in Europe to use LNG as fuel for maritime vessels**

- Drivers: ECA & SECA regulation, oil price forecasts, EU transport & energy policy
- Several EU funded projects (DMA Nordic LNG Feasibility, SSS Projects in TEN T, etc.)

## **Built-up of LNG infrastructure in Europe**

- Gate Terminal Rotterdam, Wilhelmshaven, Stockholm, Swinoujscie, several other projects in France, Spain, Italy, etc.

## **First LNG inland vessels on Rhine**

- Deen Shipping vessel operational as well as other vessels under construction

## **CCNR authorized use of LNG as fuel for inland vessels in 01/2012**

## **Key LNG technology available on market**

- All major engine producers offer gas or dual-fuel products
- Small-scale bunkering solutions already implemented

## **High potentials for LNG use in transport sector**

- Example: 5.000 trucks in US, 4.000 in China, 200 in Europe
- Build up of LNG filling stations networks in several countries
- Blue Gas Corridor Initiative of NGVA

## **EU program period 2014-2020 will offer new opportunities**

- Connecting Europe Facility, Structural Funds, Horizon 2020

## Masterplan LNG – What is the concept?

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- Project in the EU TEN T program (proposal in the MAP call 2012 planned for November 2012)
- Project start in Q3/2013 with cost reimbursement as from January 2013
- Project duration 3 years: 2013-2015
- Feasibility phase (2013-Q2/2015) & Preparation & pilot deployment (Q3/2014-2015)
- Transnational consortium made up by:
  - national administrations, vessel classification societies
  - barge operators, terminal operators in river ports & related seaports,
  - vessel engine producers, technical equipment providers, terminal planners & suppliers,
  - education & training institutions, shipyards, gas industry, etc.
- Close interaction with related MoS projects and actions in maritime sector
- Industry reference groups & interfaces for involvement of 3<sup>rd</sup> countries (SER, UA, MD) as well as overseas technology providers
- Project volume (depending on partner commitment & pilot deployment): 25–50 million € (50% EU funding)
- Project co-ordination by Pro Danube Management GmbH

## What is the aim of the Masterplan?

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- To investigate into the costs and benefits of the implementation of LNG as fuel and as cargo for the Danube fleet
- To identify obstacles and to elaborate **solutions for cost-effective and stepwise deployment** in co-operation of public authorities and private industry
- To provide **assessment of potential LNG pioneer markets** in the hinterland of river ports and to explore this markets as part of a hub & spoke distribution concept
- To co-ordinate and to harmonize public legislation and public – private investment; to prepare full scale implementation of LNG as fuel and cargo & optimize EU funding
- To bring know how from Northern Europe & maritime sector to Central/ South Eastern Europe and to the Danube navigation sector
- It will develop a **comprehensive strategy together with a detailed roadmap** for the implementation steps in line with EU transport/energy/environmental policy goals and actions

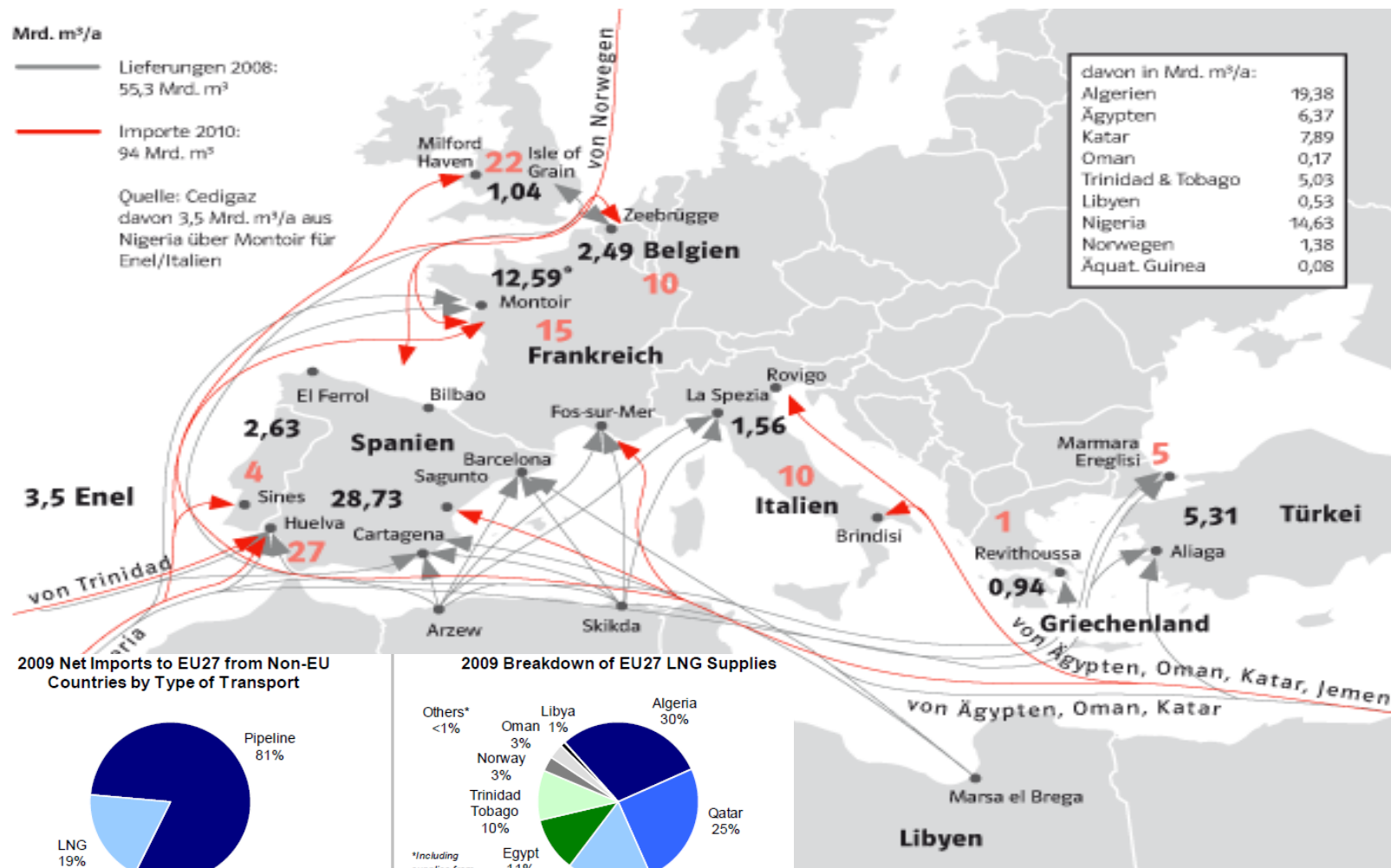


# Danube Ports for LNG distribution to the hinterland

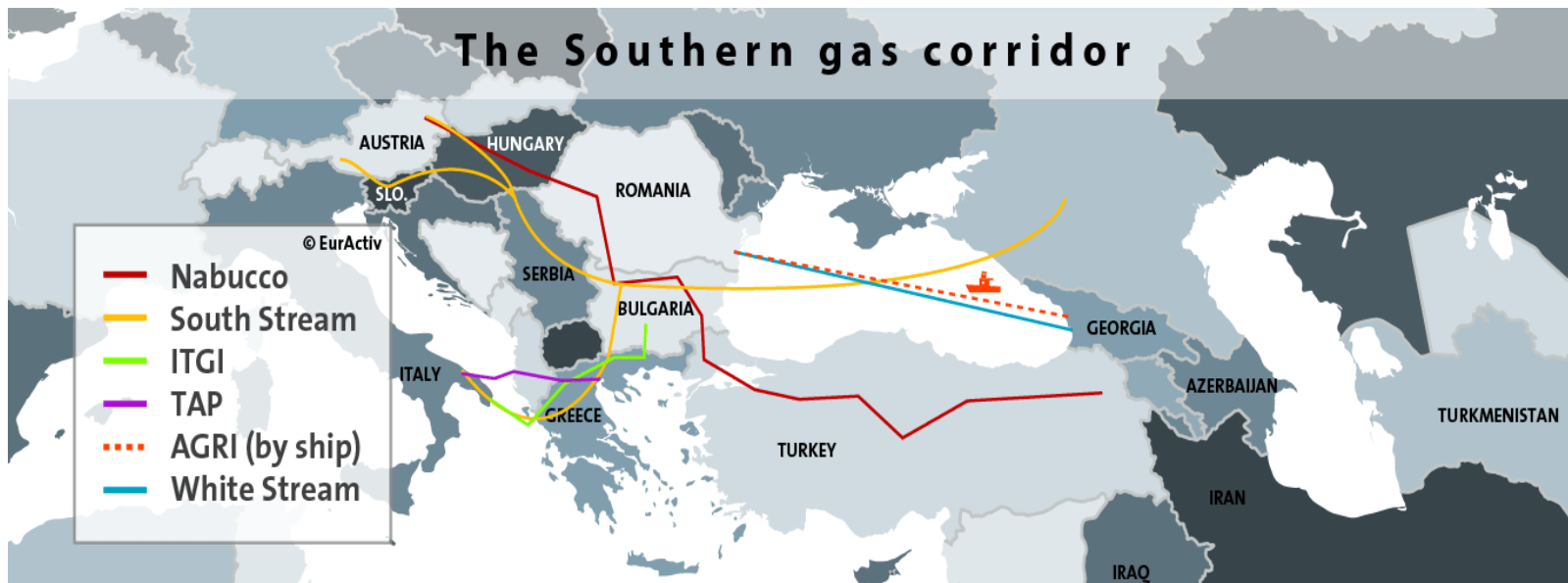


**Danube = GREEN „BLUE GAS CORRIDOR“**

# LNG Supply & Distribution in Europe



# Gas Pipeline Projects in SE Europe

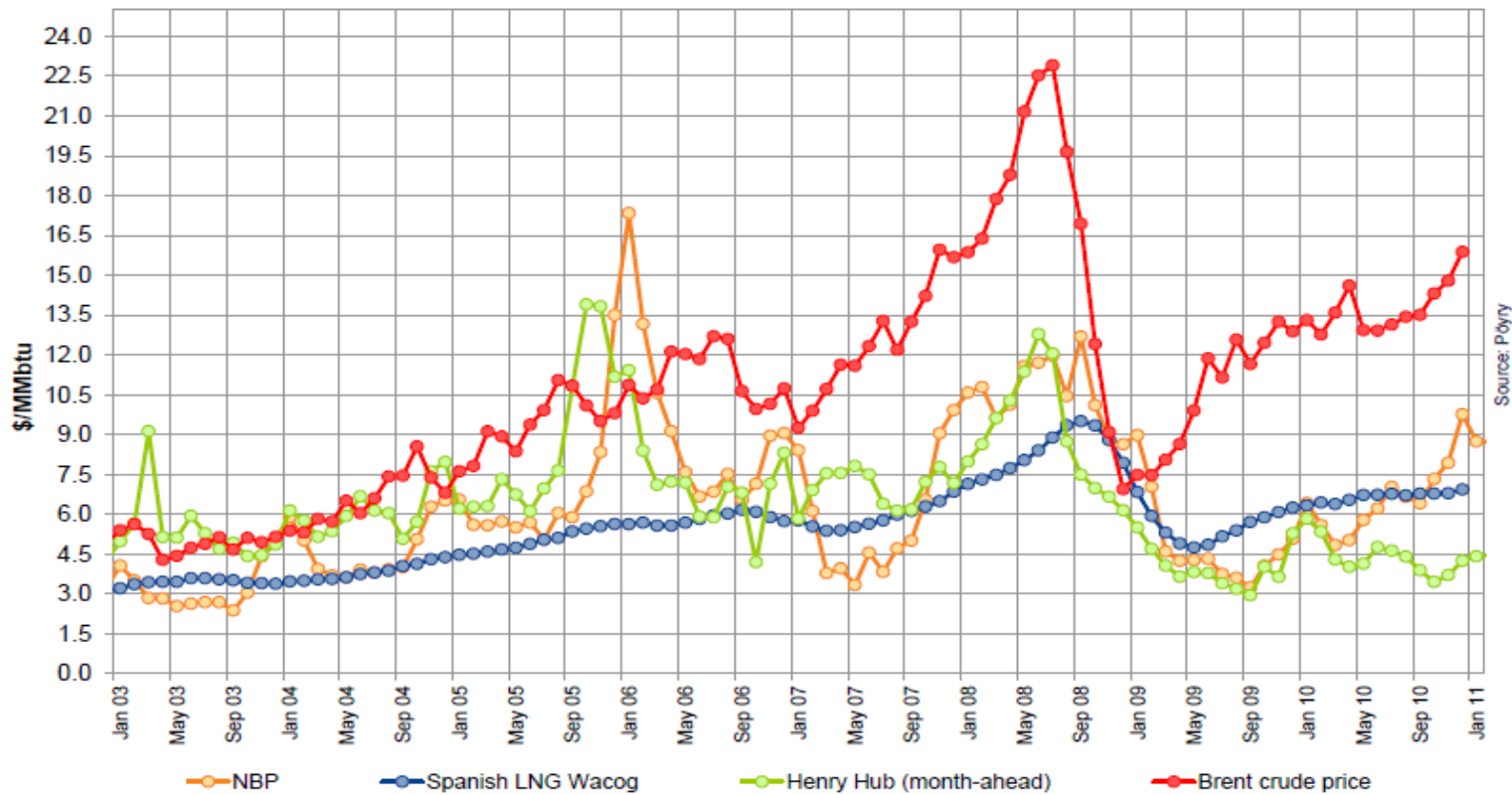


# Analysis of price development

## LNG v/s Brent 2003 - 2011



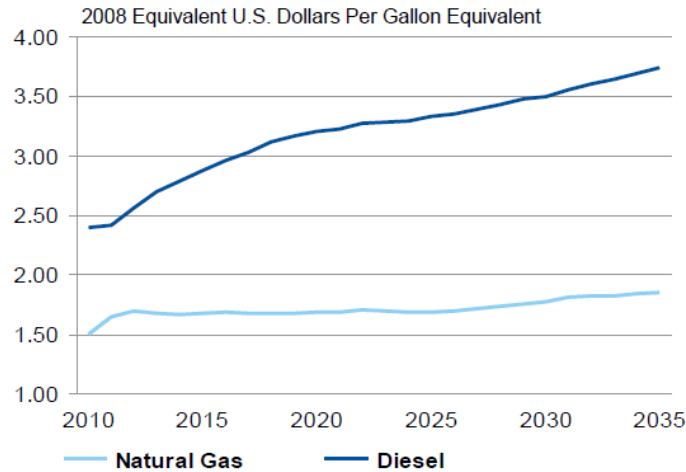
MARINE SERVICE GMBH



# Analysis of Fuel Price

## Forecasted Price of Natural Gas and Diesel

**Forecast: Delivered Energy Prices for Diesel & Natural Gas Transportation Fuels, 2010-2035**



Westport

Source: U.S. Energy Information Administration, Annual Energy Outlook 2010

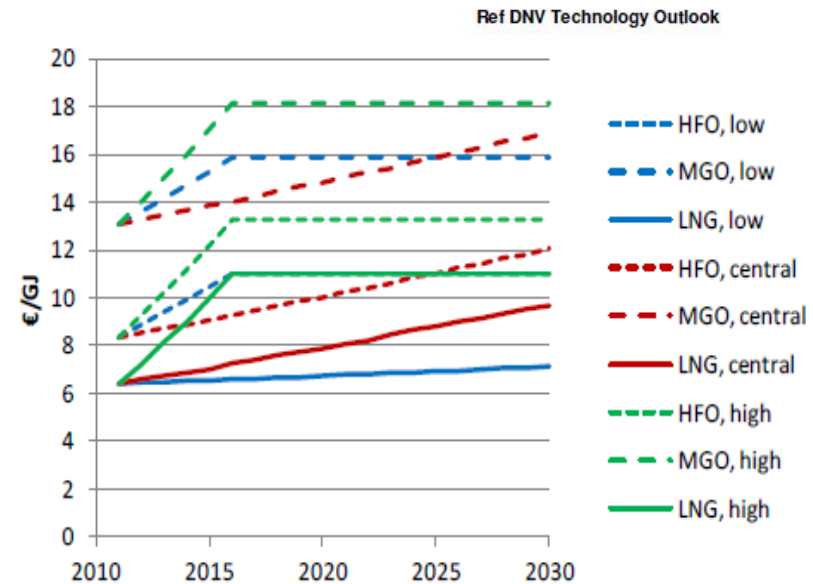
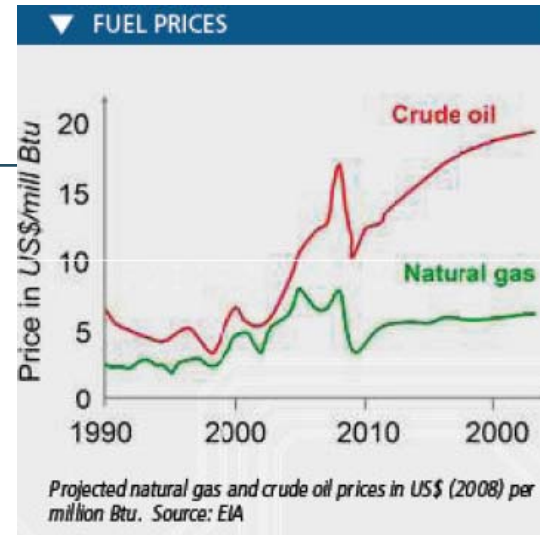


Figure 3. LNG and crude oil price forecasts to 2030  
Source: AF-Mercados EMI internal analysis

# Comparison of fuel prices

## LNG Fuel End-user Prices



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LNG Prices				
Item	Value	\$/MMBTU	\$/ton	€/ton
LNG base price	TTF	\$8,43	\$396	€ 319
LNG terminal capacity holder margin & reloading charges	30%	\$2,53	\$119	€ 96
Logistics <b>1, 2, 3</b>	\$6/MMBTU	\$6,00	\$282	€ 227
Total delivered to the vessel		\$16,96	\$796	€ 643

- 1 SSPA & AF Industry AB estimated €150 - €250/t (\$4,21 - \$7,02/MMBTU) for LNG logistics cost from LNG hub to ship bunker tank in the DMA North European LNG Infrastructure Project feasibility study report d.d. 2011/12/16
- 2 Marine Service found a range of \$5 - \$7/MMBTU for LNG logistics cost from LNG hub to the ship's bunker tanks
- 3 \$6,00 / MMBTU (€227/t) has been added to the FOB prices for LNG logistics to the ship's bunker tank



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Fuel pricing 2012/06/04		
Fuels	Price [\$/ton]	Price [\$/MMBTU]
IFO-380 Rotterdam	\$585	\$15,34
MGO Rotterdam	\$861	\$21,26
LNG Henry Hub future	\$113	\$2,40
LNG TTF future prices	\$396	\$8,43
LNG NBP spot	\$382	\$8,14
LNG CIF Japan	\$821	\$17,50

## Is there sufficient LNG available?

### LNG Flood in 2020?



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- Global LNG production 2011: approx. 240 MTPA

Global LNG production capacity expansion in MTPA			
Country	Under construction	Overly optimistic forecast	More realistic forecast
Australia	65.2	139.3	81.2
Angola	5.2	5.2	5.2
PNG	6.6	8.6	6.6
Malaysia		3.6	3.6
Nigeria		38.4	
Equatorial Guinea		4	4
Mozambique		50	20
USA & Canada		137.8 & 30.7	25 & 10
Russia		43.5	10
Cyprus / Israel		15	
Iran		78	20
<b>Total</b>	<b>77</b>	<b>554.2</b>	<b>185.6</b>

25 June 2012

LNG Fuel for Vessels: Pricing & Trading

# Good Practice: LNG for Short Sea Shipping in Norway

## Production- Infrastructure – bunkering- use





# Market studies for pioneer markets

## Heavy trucks in urban areas

LNG tractor units from MB and IVECO

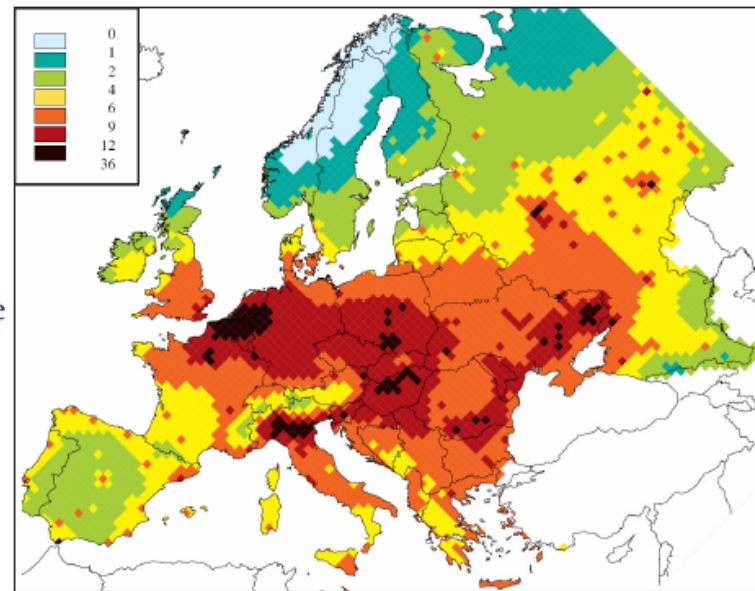


MB Econic 280 CV



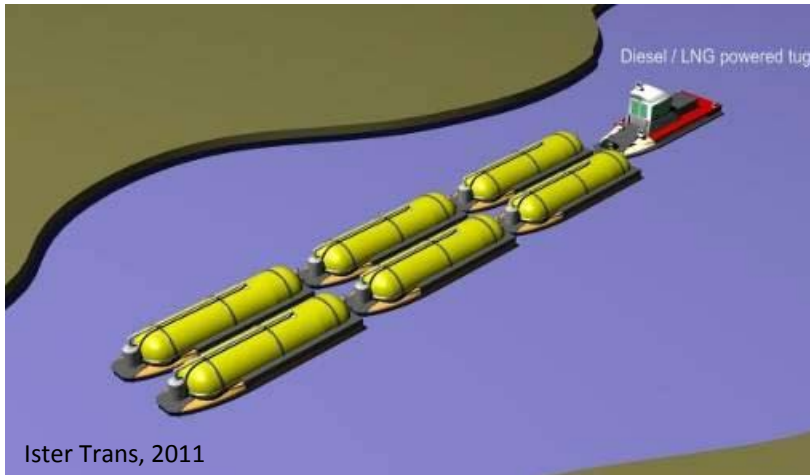
IVECO Stralis 280 & 330 CV

Loss in life expectancy attributable to exposure to fine particulate matter - 2000



Loss in statistical life expectancy that can be attributed to the identified anthropogenic contribution to PM2.5 (months), for the emissions of the year 2000. Calculation results for the meteorological conditions of 1997. Source: IIASA

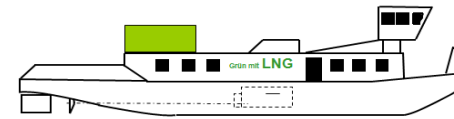
# Conceptional designs for vessels (new & retrofitted)



## Tanks auf Aufbauten

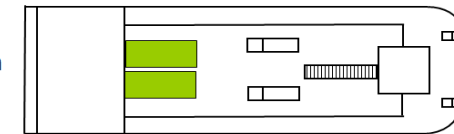
### Positiv:

- Mobile und feste Tanks
- Gute Lüftung



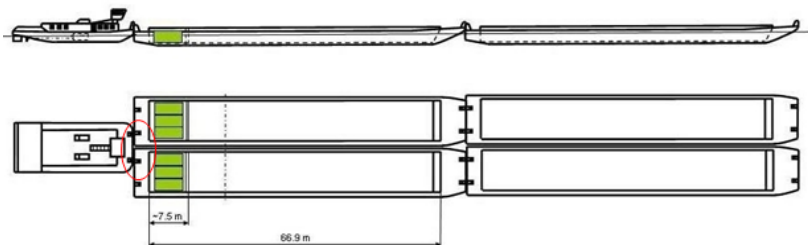
### Negativ:

- Abgasleitungen
- Tank im Wohnbereich
- Überdruckventil-auslässe



viadonau

## Umrüstkonzept (2) Schubschiff + 4 Leichter (Europa IIB)



Detailuntersuchung erforderlich:  
flexible Verbindung zwischen Schubschiff und Leichter

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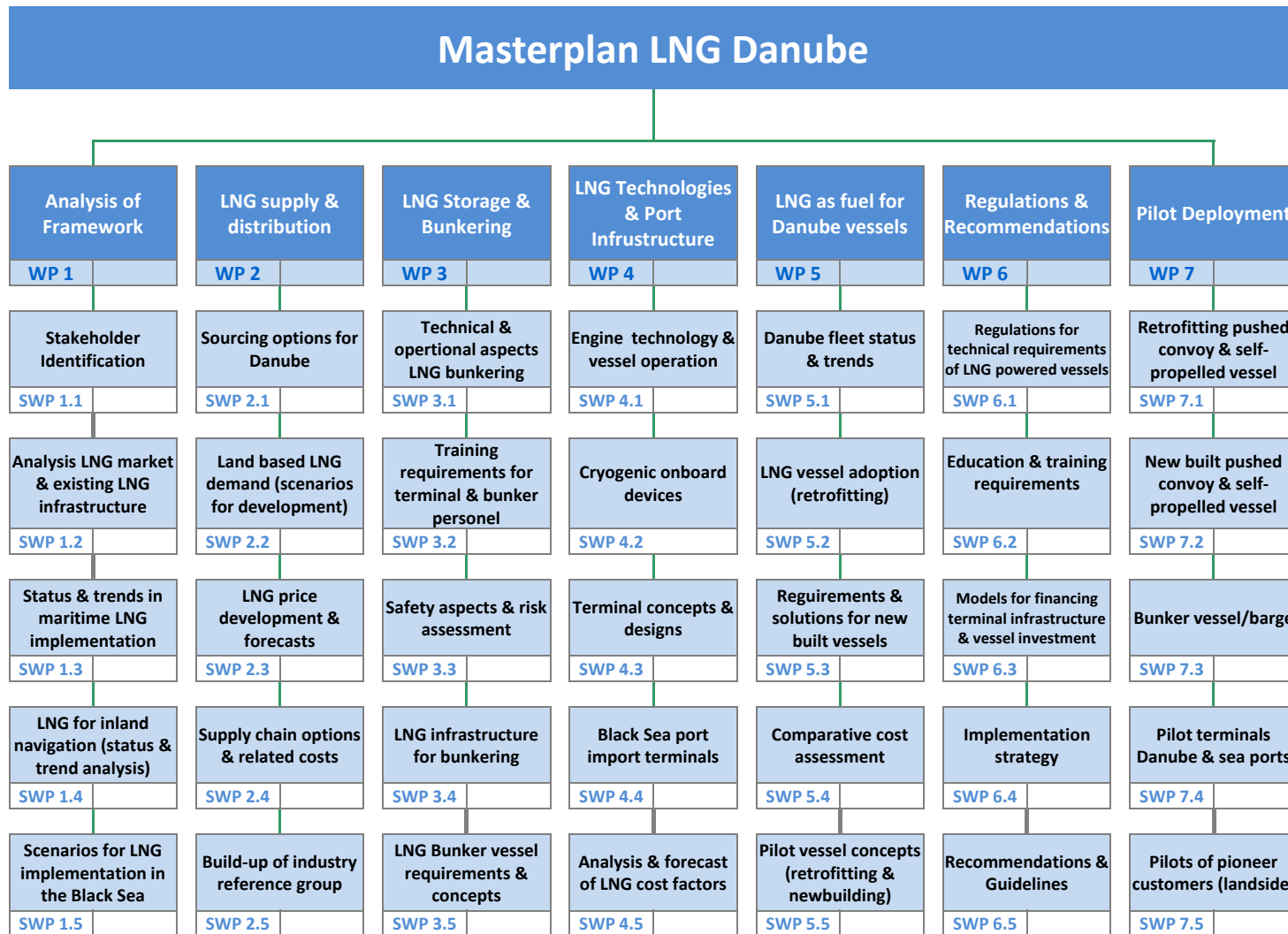


## What will be the output of the Masterplan?

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- Economic analysis and evaluation of alternative LNG sourcing options
- Study on legal and administrative requirements for fuel use and transportation
- Pre-feasibility studies on technical solutions for new and retrofitted vessels for LNG fuel and carriage as well as conceptual vessel designs
- Cost-benefit analysis of waterborne LNG supply chains and investment into LNG equipment & infrastructure by barging and terminal operators
- Economic assessment of a network of LNG terminals located in river ports and connecting Black Sea ports including conceptual terminal design
- Market studies on LNG demand in the port hinterland (pioneer markets)
- Identification of training requirements for crews and terminal workers and drafts for harmonized education and training standards
- Models for financing terminal infrastructure and vessel investment
- Comprehensive strategy for the implementation of LNG as well as a detailed roadmaps for the implementation
- Preparation of pilot deployment as well as execution of pilot projects

# Proposed Work Breakdown Structure



## Next steps – Project timeline

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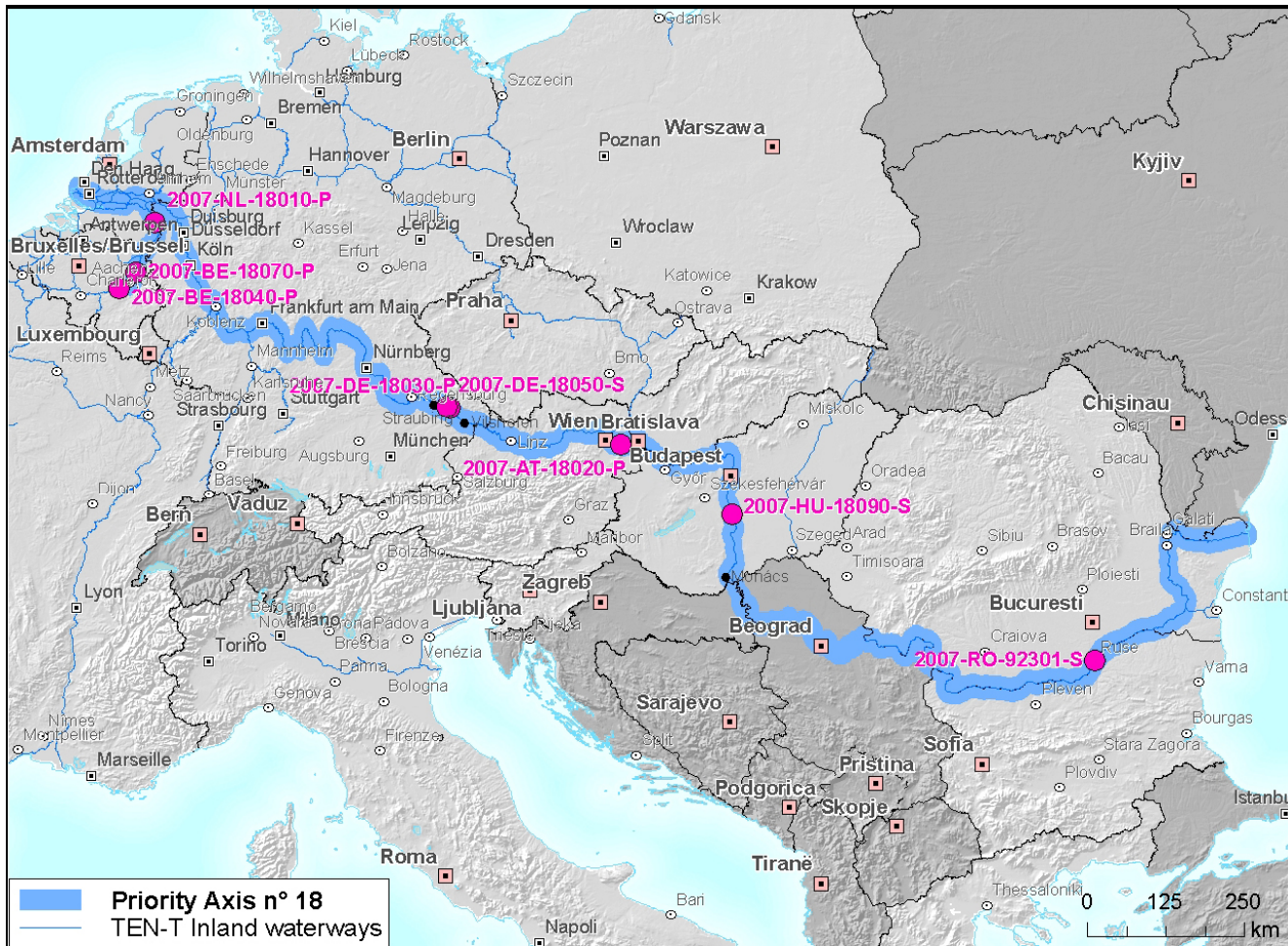
- **Identification and assignment of stakeholders (ongoing)**
  - Non Disclosure Agreement, LOI, Proposal Fee Agreement
  - “Tour de Capital” (National authorities, industry stakeholders in Danube region)
- **Project presentations at DG Move, DG Regio and TEN EA (ongoing)**
  - Clarifications on call timeline, project duration, relationship MoS, project volume, etc
  - Integration of project into European Union Strategy for the Danube Region (EUSDR)
- **Integration of stakeholders from North & Western Europe & maritime sector (ongoing)**
- **Build-up of project management team (ongoing)**
- **Phasing-in of project partners & assignment of responsibilities (ongoing)**
- **Elaboration of project proposal (start September)**
- **Currently Evaluation of: LNG Masterplan Rhine – Danube**

## Why a European Masterplan?

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- European IWT sector is vulnerable to increases in fuel costs
- Inland navigation sector needs harmonized European regulatory framework
- Elaboration of regulatory framework should be done in close co-operation of public – private sector and based on existing leadership (CCNR for technical specifications of vessel)
- Forthcoming new air emission legislation will require vessel investment
- Enables IWT to optimize public support via national & EU funding schemes (alignment of EU programs & budgets)
- Development (down–scaling) of (maritime) LNG equipment & technologies can be achieved faster and will produce more cost-effective solutions (economies of scale)
- Allows to copy success of River Information Services (series of co-ordination & co-operation projects lead to EU-supported deployment)

# TEN-T Call 2012



Source: TEN-T Executive Agency

## Specific objectives: **Priority project 18 „Rhine – Main – Danube“**

- Eligible are (1) Member States themselves as well as (2) international organisations, joint undertakings or public or private undertakings from EU Member States
- Applications submitted by (2) **shall be presented with the agreement of the “Member State(s) concerned” [Ministries of Transport]** (= Member States on the territory of which the Action will be implemented; in this case the Member States along PP18)

## ***Where does the Masterplan refer to? – Draft TEN-T Call 2012***

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TEN-T aid may be granted to:

*„Studies that lead to implementation of **innovation and new technologies** ... contributing to decarbonisation or the reduction of external costs in general“*

SCOPE

*Development of the necessary **TEN-T infrastructure and facilities that will support the use of alternative fuels** and propulsion replacing fossil fuels, including ... CNG, **LNG**, including **LNG bunkering vessels** and biofuels as well as any combination thereof. Facilities may include also **emission reduction technologies** and **energy storage equipment** installed in the vehicles.*

**Info Day for TEN T - Applicants: 29 Nov 2012 Brussel**



# Conclusions

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- **EU- wide Masterplan will overcome “Chicken and Egg” – situation**
- Provides an appropriate project platform and fosters a co-ordinated & structured development & pilot deployment for LNG terminals and vessels
- Provides basis of an European wide legal & organisational framework for development & deployment of LNG (vessel technical regulations, terminal regulations, etc.)
- Inland navigation will be more competitive and the most environmentally friendly transport mode; LNG as cargo will increase the political awareness for the Danube as import transport resource
- Inland barging sector is a pioneer market for LNG as fuel and a cost-effective transport solution to reach European hinterland
- Inland terminals will function as satellites to the hinterland enabling to reach other pioneer markets like public (transport) sector and heavy duty transport industry (buses, garbage collection trucks, city logistics)
- **The LNG masterplan will pave the way for a full scale-deployment and provides guidance for public and private investment as well as for EU funding**

## Further information

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The image shows a promotional banner for Pro Danube International. At the top, the logo features the word 'pro' in a white circle on a dark teal background, followed by 'DANUBE' in large white letters and 'INTERNATIONAL' in smaller white letters below it. Below the logo is a horizontal strip of three images: a construction site with yellow cranes, a large industrial facility, and a map of the Danube river basin. The bottom half of the banner is a solid dark teal color with the text 'THE VOICE FOR BETTER INFRASTRUCTURE AND INNOVATION IN DANUBE TRANSPORT' in white, bold, uppercase letters. At the very bottom, the website 'www.prodanube.eu' is written in yellow.