

WP4 – Preparatory actions

WP4.1 – Individual advanced vessel concepts & energy efficient navigation

SHIP DESIGN GROUP (SDG) and NAVROM involvement

GRENDL Consortium & Kick off meetings, Constanta, 27-30 August 2018

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SDG and NAVROM Project Involvement



Main goal of WP 4 is to assist selected fleet operators in concrete preparatory activities for investing in green fleet. These companies shall function as “first movers” and deliver good practices for the others to follow.

NAVROM and SDG will activate in the following tasks:

- Project management (progress reports, validation of expenditure, SCOM meetings) (**WP1**)
- Communication activities (promotion of the project, kick-off & final event) (**WP2**)
- Participate at know-how transfer workshops (**Act. 3.1 – Technical aspects, Act. 4.2 Transport management, Act. 4.3 Finances**)

NAVROM will be supported by SDG in the fields:

- Elaboration of detailed company individual Fleet Investment Plans (**Act. 3.2**);
- Elaboration of advanced green vessel and operational concepts (**Act. 4.1**);
- Cooperation during the analysis of own processes & provide input regarding their requirements (**Act. 4.2**)

SDG and NAVROM Project Involvement



Other tasks

- **SDG and NAVROM** will perform Comments & review outcomes & deliverables, contributions to the public consultations (**Act. 3.3 Consultated investment needs & training requirements; Act. 5.1 Regulatory framework; Act. 5.2 State aid “activities”; Act. 5.3 Danube Fleet Modernization Strategy & Recommendations**)
- **NAVROM** will assess the financing opportunities provided by EBRD and provide feed back (**Act. 4.3**)
- **SDG** will active elaborate (as one of the main contributors to certain deliverables according to their field of expertise) (**Act. 3.1, Act. 3.3, Act. 5.1, Act 5.3**).

In the following slides, the detailed activities of NAVROM and SDG within **Act. 4.1** will be presented.

SDG and NAVROM Project Involvement



The role of activity 4.1, as part of WP4, is to prepare selected fleet operators for fleet modernization activities by elaboration of advanced “green” vessel designs.

As part of its GRENDEL activities NAVROM (one of the most important European ship-owners) and SDG (with extensive design experience for inland ships) will elaborate advanced vessel concepts taking into account the most promising alternative and green technologies and solutions. These concepts are the first steps to start the permitting process and follow up construction and retrofitting of vessels. Future deployment of these new concepts will have a positive impact on the regional economy as well as environment, thus social well-being of the citizens.

The solutions elaborated will be shared with the Danube IWT sector as possible blueprints through the established stakeholder platform, thus ensuring the wide capitalization of the project results.

SDG and NAVROM Project Involvement



NAVROM will participate in the know-how exchange transfer, consultations with the public entities (ministries, authorities, Danube Commission). It will contribute to the elaboration of investment needs (both financial and technological aspects) by preparing the investment plan for own company and support with input - relevant figures of other TTS Group (mother company) fleet operators. Further to this NAVROM will look into the conceptual designs for own fleet.

In the same time, **SDG as the ship design expert** will gather new references and the sector, as well as region, will have “best practice” vessel concepts available for future deployment activities. These best practices, when deployed, should increase attractiveness of the sector as environmentally friendly & modern transport mode.

Finally, NAVROM and SDG, together with the other work package partners, will consolidate all these advanced green vessel & operational concepts, including their economic viability, into publishable reports with main facts and lessons learned, providing the basis for disseminated activities such as presentation at conferences, technical workshops as well as electronic information services defined in WP2.

SDG and NAVROM Project Involvement



Activities performed by SDG and NAVROM within GRENDL Project will be developed in line with the policy of CEF.

- The Connecting Europe Facility (CEF) for Transport is the funding instrument to realize European transport infrastructure policy.
- CEF aims at supporting investments in building new transport infrastructure in Europe or rehabilitating and upgrading the existing one.

GRENDEL - Needs and Criteria



Support for modernization of inland waterway freight transport will be focus on three main objectives / criteria

Fig. 1 The needs and criteria for IWT modernization

		C R I T E R I A		
N E E D S		Reduction of environmental impacts	Increasing multi-modality of freight transport	Increasing safety of IWT
	Need to replace engines	X		X
	Investment into new vessels	X	X	X
	Requirements of new prospective market segments		X	



1. Needs to replace engines (following Stage V requirements) / replacement / refurbishment of existing fleet

Converting a ship with classical propulsion into an low emission ship requires a substantial investment and the technical scope, feasibility, and applicability depends on the ship type / size. **SDG** will perform the **conceptual design** for replacement of the actual engine with a **low emission engine**.

The ships belonging to **NAVROM fleet** that will be the subject of engine replacement are:

- Pushers 2x1200/2x1600 hp, nowadays having Diesel engines DEUTZ SBW 6M 628 (fleet of 4 ships)
- Pushers 2x1200 hp, nowadays having Diesel engines CUMMINS KTA 38 M2 V (fleet of 4 ships)

GRENDL - Needs



Solutions for improvement of the environmental performance of inland vessels comprises of:

- **internal engine improvements (exhaust gas recirculation - EGR, advanced injection systems, inlet air humidification, in-cylinder water injection and homogeneous charge compression ignition - HCCI),**
- **exhaust gas after treatment (diesel oxidation catalyst, selective catalytic reduction - SCR, particulate matter filter - PMF, scrubbing of exhaust gas and electrostatic precipitation),**
- **higher diesel fuel quality (low sulphur fuel - LSF),**
- **alternative fuels (biodiesel - BD, biodiesel blend - BDB, diesel-water emulsion, natural gas and hydrogen),**
- **alternative combustion engines (natural gas engine – NGE),**
- **new propulsion and auxiliary systems (diesel-electric propulsion & fuel cells)**
- **electronic drive management systems (ATM, RIS).**

Used
for SDG
concept
design



2. Needs to invest into new vessels

SDG will develop the conceptual design of a new LNG propelled pusher, to be included in the NAVROM fleet. Next slide presents the starting point for such design.

In relation with, it is necessary to develop a chain of refueling stations along the Danube navigation area.

For this reason, **the conceptual design for a bunkering barge to carry on LNG will be also developed by SDG**. This will create the path for a potential cooperation with OMV, in the framework of CEF.

GRENDEL - Needs



Fig. 2 SDG conceptual design of a new LNG propelled pusher

GRENDL - Needs



3. **Needs** coming from requirements of new prospective market segments (where current fleet can't offer services yet due to its (limited) technical characteristics)

The two **main pillars of Danube shipping** are:

- the steel industry,
- the agricultural sector.

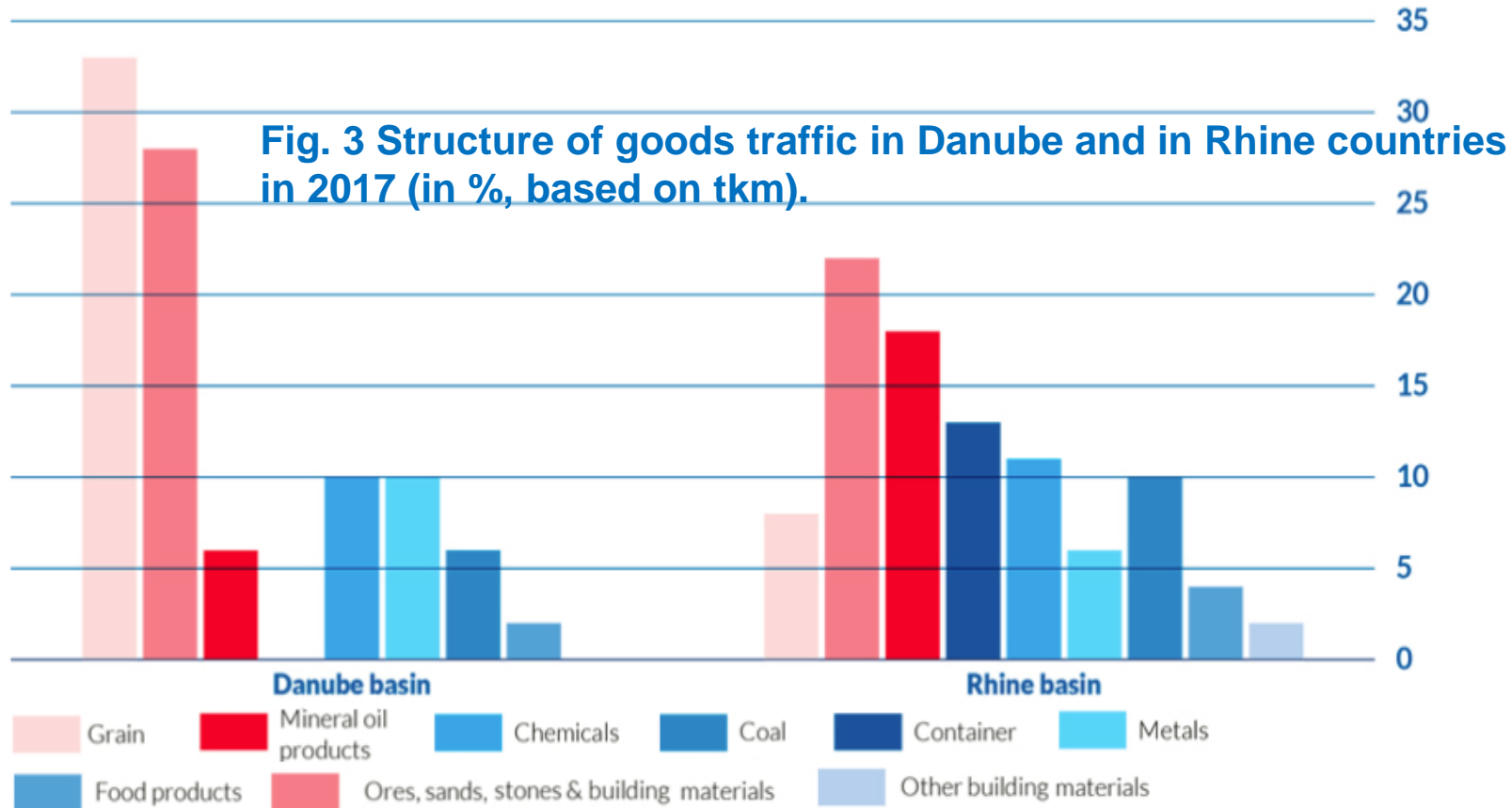
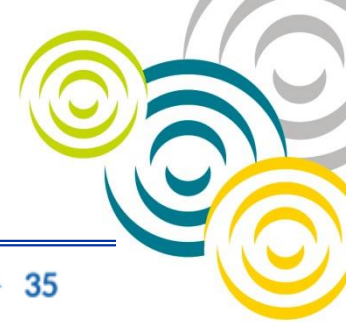
Agricultural products, especially grain, enjoy a share of one third of total transport performance in Danube countries (without foodstuffs).

Agriculture and foodstuff production plays a big role, especially in the middle Danube region (Slovakia, Hungary, Croatia, Serbia), and is strongly tied with inland shipping, although it stands in competition with road transport.

The steel segment, needs iron ores in large volumes, which are imported from overseas and transshipped at the Black Sea ports. Iron ore transport has a share of around 20% of total transport performance in Danube countries. The associated volumes of additional iron ore traffic on the Danube will start to have an influence on transport demand in 2018.

In **Fig. 3 a graph in percentages** is presented for goods traffic in Danube and in Rhine countries.

GRENDL - Needs



Danube countries: Austria, Bulgaria, Croatia, Hungary, Romania, Slovakia;
Rhine countries: Belgium, France, Germany, Luxembourg, the Netherlands.

GRENDL - Needs



Comparing the Danube with the Rhine countries, it can be observed that:

- **Goods transport in the Rhine region is more diversified.**
- This diversity is partly due to **container transport**, which accounts for 13% in Rhine countries, **while it is almost inexistent in the Danube region.**
- **The large share of agricultural products in Danube shipping** makes it quite vulnerable to bad harvest results.
- **It should also be noted that navigation on both, the Danube and the Rhine, is vulnerable to low water periods**, affecting strongly the overall transport performance in both river basins.
- **An almost inexistent transport segment on Danube is represented by cars and finite products.** This segment will require more attention for the next period of time.

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THANK YOU FOR YOUR ATTENTION

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GRENDEL “Green and efficient Danube fleet”

Towards modernisation & greening of Danube inland waterborne sector and strengthening its competitiveness

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