Interreg

EUROPEAN UNION

Danube Transnational Programme

GRENDEL

Green and efficient Danube fleet

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

Output 3.1 – Know-how Transfer Events on technologies

Work Package 3 Fleet investment planning

Version 1.0

Date: 30/11/2020

FINAL

O 3-1_GRENDEL_Know-how Transfer Events - technologies_v1.0_FINAL_2020-11-30

Project co-funded by European Union Funds (ERDF, IPA)

Document History

Version	**Date**	**Authorised**
1.0	30.11.2020	Pro Danube

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1 Scope of the document

The Green and efficient Danube Fleet project (GRENDEL) is co-funded by European Union Funds (ERDF, IPA) under the Danube Transnational Programme and it aims at supporting the Danube vessel fleet operators and their public counterparts in modernisation of the sector. The project's overall goal is the improvement of the environmental and economic performance of the Danube fleet.

Main goal of the know-how transfer events in the framework of the project was to ensure that Danube fleet operators and other IWT stakeholders gain comprehensive up-to-date knowledge on greening technologies and on viable solutions for efficient fleet management including their financial, operational and environmental impact when being deployed. The know-how transfer is important in order to facilitate investment decisions.

The two know-how transfer events organised were addressing the following areas:

(i) use of alternative fuels - both deployable at short time (drop in fuels/bio-fuels) and those needing more extensive preparation (LNG, hybrid, fuel cell, hydrogen);

(ii) air pollutant emission reduction covering i.e. after treatment systems for existing diesel engines, new engine concepts and alternative optimisation solutions, on-board emission and fuel consumption monitoring;

(iii) reduction of energy consumption, incl. energy efficient navigation, energy efficient ship design, hybrid and electric propulsion.

Further to this (iv) new regulations (NRMM, ES-TRIN) and their consequences for inland shipping were addressed and discussed.

The 1st know-how transfer event was organised by PDI and DST on 07-08.03.2019 in Vienna (Austria). The 2nd know-how transfer event took place on 29.09.2020 (online) and was organised by PDI, DST and DC as host. The events brought together representatives of the European Commission, international organisations, IWT stakeholders, as well as innovation experts and suppliers to debate on available technologies which have the potential to pave the way towards climate neutrality by 2050, as foreseen by the European Green Deal. The events gathered each time over 70 participants and resulted in fruitful discussions and information exchanges between technology providers and IWT stakeholders.

The present document intends to give an overview on the know-how transfer events by providing the meeting minutes of these events, including each time the agenda and the list of participants. Besides, the GRENDEL website offers the possibility to consult the presentations held during the 1st know-how transfer event[1] and during the 2nd know-how transfer event[2].

[1] http://www.interreg-danube.eu/news-and-events/project-news/3764

[2] http://www.interreg-danube.eu/news-and-events/project-news/5469

Interreg

Danube Transnational Programme

GRENDEL

Green and efficient Danube fleet

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

Output 3.1 – 1st Know-how Transfer Event on technologies

07-08.03.2019, Vienna

Work Package 3 Fleet investment planning

Version 1.0

Date: 30/11/2020

FINAL

Project co-funded by European Union Funds (ERDF, IPA)

”Know-How Transfer Event on Modernisation of Danube Vessels Fleet”

Meeting Minutes

Date & Time: 7 March 2019, 13:00 – 17:00

Venue: Tech Gate Vienna (The Sky Stage, 19th Floor), Donau-City-Straße 1, 1220 Vienna, Austria

Meeting purpose: Given the enormous challenges inland shipping is currently facing with regard to further optimization of energy efficiency, environmental and climate protection, GRENDEL, in cooperation with the INDanube Innovation Transfer Centre, prepared the “Know-How Transfer Event on Modernisation of Danube Fleet”.

Minutes by: Siot Charlotte (PDI)

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Agenda

13:00-13:30	**Opening session** • Welcome & introductory remarks by the moderator *Setting up scene, purpose and objectives of the know-how transfer event (Manfred Seitz, PDI)* • Keynote opening speech *EU support initiatives for inland vessels modernisation (Hugues van Honacker, DG MOVE/EC)* *Activities in the framework of CCNR (Gernot Pauli, CCNR)*
13:30-14:15	**Inland vessel modernisation projects & initiatives** • GRENDEL – Green and efficient Danube Fleet *Insights into the GRENDEL project, a unique project in the Danube region addressing environ-mental & economic performance of Danube fleet (Charlotte Siot, PDI)* • Fleet modernisation initiatives in France *Insights into the state aid scheme in France and inland vessels modernisation initiatives triggered & facilitated through public support (Eloi Flipo, VNF)* • A battery powered ferry as a successful example for an Interreg funded project *New technology in pilot deployment through Interreg and insights into to diesel-electric, cabin vessels, solar powered, etc. (Kai Buchloh, Schiffstechnik Buchloh GmbH u. Co. KG) (participation cancelled)*
14:15-14:45	**Setting the framework of the event** • Non-Road Mobile Machinery (NRMM) Directive and implication to the inland shipping *NRMM: Challenges, solutions & outlook for different technologies (Khalid Tachi, EICB)* *NRMM: Comments from manufacturers industry (Klaus Poepsel, EUROMOT)* • GRENDEL Innovation Factsheets & collection of technological requirements of Danube fleet feeding to State Aid schemes *(Benjamin Friedhoff, DST)*
14:45-15:15	**Coffee offered by organiser**
15:15-16:30	**Future-oriented & innovative solutions for inland waterway transport sector** • *Cold-ironing as sustainable & eco-friendly shore-side power supply – effects on pollution, fuel consumption & emissions (Christoph Kreuzinger, Würzburger Hafen, Germany) (participation cancelled)* • *The first steps of our journey towards autonomous vessels (Stephan Stout, DAMEN, Netherlands)* • *Ambient Water Transmissions (Dominik Cofalka, Reintrieb, Austria)*

	• *On the way to zero emission shipping: hydrogen in combustion engines (Igor Sauperl, Large Engines Competence Center, Austria)* • *Q&A*
16:15-17:00	**Industry show-cases and projects** • *CLean INland SHipping „CLINSH" (Frank Appelman, Province Zuid-Holland)* • *Waterbus in Slovakia: Regular service line on Danube river (Gabriel Meszaros, PRODANUBIA)* • *Q&A*

Meeting Minutes

1 Opening session

1.1 Welcome & introductory remarks by the moderator

Mr. Manfred Seitz welcomed the participants. He briefly presented the agenda and the main objective of the event. This Know-how transfer event is the first one organised in the framework of the GRENDEL project. It is organised in cooperation with the INDanube Innovation Transfer Centre. The main objective was to create awareness on innovative and environmental friendly technologies among Danube vessel operators. The event provided first-hand information on frequently discussed propulsion options, addressing issues such as gas and gas-electric propulsion, EURO VI engines or diesel after-treatment.

Other topics of interest evolved around future technologies like battery electric solutions, fuel cells or energy efficient navigation. Furthermore, Mr. Seitz underlined that GRENDEL is one central element of the Green Deal Initiative, a policy instrument developed by Pro Danube International (PDI).

1.2 Keynote opening speech

Mr. Hughes van Honacker, Senior Expert in Ports and Inland Navigation, DG MOVE, presented the existing European support initiatives for the modernisation of inland vessels. He argued that greening and modernising the Danube fleet represents a challenge because the market is quite small.

In order to reduce the emission of environmental harmful emissions, the further development and integration of alternative fuel infrastructure in IWT (inland waterway transport) is crucial. Member States play in this sense a vital role. He underlined that IWT should play a more prominent role in the international transport and logistics chains, as it represents a viable alternative to more pollutant modes of transport. The European Commission fully supports the development of IWT on the Danube and welcomes initiatives such as GRENDEL.

Indeed, the development of a harmonised State Aid scheme at the transnational level (states of the Danube region) could provide a significant step forward in the complex modernisation process of the Danube fleet. The core idea of modernising the fleet with the financial support of the European Union undoubtedly represents a viable basis in this sense. Nevertheless, Mr. van Honacker noted that the IWT sector suffers from a lack of capacity to attract EU funding. The necessary expertise in applying for projects is limited. Finally yet importantly, Mr. van Honacker said that currently support to IWT is as high as 1.7 billion EUR. That means that 7% of the total CEF transport funding is allocated to IWT. He concluded that the dedicated funding to IWT should increase to 20% in order to facilitate a comprehensive development of IWT as an efficient, reliable, environmental-friendly and safe mode of transport.

Mr. Gernot Pauli, Chief Engineer of the Central Commission for the Navigation of the Rhine, made a presentation on the objectives and activities of CCNR. The main objective of CCNR is to ensure the unity of the legal regime governing navigation on the Rhine. In order to achieve this, CCNR not only adopts common rules, but also makes sure that these rules are interpreted and implemented in all Member States in a similar way. According to the Mannheim Act, the CCNR plays an essential role in regulating navigation on the Rhine.

CESNI - European committee for drawing up common standards in the field of inland navigation – is a working body that was created in 2015 by a resolution adopted by CCNR to promote the evolution of uniform, modern and user-friendly requirements for the development of inland navigation. CESNI is an important European player in the overall greening of vessels, adopting technical standards for various fields, like for example the deployment of new technologies and alternative fuels and the overall reduction of the impact of IWT on the environment.

ES-TRIN (European Standard laying down Technical Requirements for Inland Navigation Vessels) is a legal tool that was developed by CESNI. This is a standard, not a binding legal document. Nevertheless, it represents a harmonisation of technical requirements for ensuring safety. It is available in several European languages. Furthermore, CESNI will publish in April a FAQ catalogue in order to help to understand and interpret the applicable legal requirements to engines.

Mr. Pauli concluded that derogations play a vital role in the complex chain of technological innovation. Therefore, CESNI plans to publish a guide of derogations, in order to support innovative technological development from a legal point of view.

2 Inland vessel modernization projects & initiatives

2.1 GRENDEL – Green and efficient Danube Fleet

In her capacity as the project manager of GRENDEL, Ms. Charlotte Siot presented the main activities, objectives and expected outcomes of the GRENDEL project. One of the main objectives of the project is to support the Danube fleet operators and their public counterparts in the challenging modernisation process of the fleet. In this regard, GRENDEL addresses various fleet modernisation aspects: use of low carbon and alternative fuels, reduction of air pollutant emissions, overall energy consumption and better integration of the Danube IWT into logistics chains through new services. The project has partners from 8 countries of the Danube region.

The overall improvement of the environmental and economic performance of the Danube fleet will be achieved through know-how transfer to Danube fleet operators, the elaboration of innovative technical vessel concepts and the development of a favourable regulatory framework in particular via the elaboration of a Model State Aid scheme.

2.2 Fleet modernization initiatives in France

Mr. Eloi Flipo from the French Waterways Authority VNF that is responsible for the management of France's inland waterway network, presented the State Aid scheme prepared in France by VNF and the inland vessels modernisation initiatives that are facilitated through public support.

The department led by Mr. Flipo collects information on the origin, tonnage, direction and the general activity of barges on the territory of France. This data is extremely valuable in determining the needs and challenges of the sector. This way, the department has a general overview not only on the general activity of the sector, but also on the fleet structure. Currently, even though the potential is much higher, only 4% of the transport is made in France via IWT. In order to increase the attractiveness of this mode of transport, one of the main objectives of the French Waterways Authority is to actively support ship owners in modernising their fleet. This happens through a dedicated State Aid scheme.

The French State Aid scheme (PAMI), that can be regarded as an excellent example of good practices, has a total budget of 16.5 million EUR. The programme is in force for a period of 5 years. The projects submitted are evaluated according to several criteria: relevance, project level readiness and the concrete impact of VNF subsidy on the general development of IWT. PAMI addresses several issues: the improvement of the fleet's environmental performance, strengthening the integration of IWT in the supply chain, renewal of the human resources and the facilitation of innovation in IWT.

3 Setting the framework of the event

3.1 Non-Road Mobile Machinery (NRMM) Directive and implication for the inland shipping

Mr. Khalid Tachi made a presentation on the challenges faced, possible solutions and the outlook of different innovative technologies. NRMM Stage V represents compared to earlier regulations a huge step forward and has the aim to reduce the emissions by up to 80%. He argued that a transition period for the existing engines is important, since greening the fleet also means to have viable solutions for the existing one.

Mr. Klaus Poepsel argued that there is a concrete need for more tangible stimulation for the innovation market. The main problem is that certification costs are extremely high and often too time consuming. He made a strong plea to find solutions that could reduce the overall certification costs. Another issue is that the market size is continuously decreasing, a development that represents a huge challenge.

3.2 GRENDEL Innovation Factsheets & collection of technological requirements of Danube fleet feeding to State Aid schemes

Mr. Benjamin Friedhoff presented the current state of the art of the technological innovation factsheets. In the lifespan of the GRENDEL project, a total of 8 factsheets will be published in order to provide an overview of most relevant/promising technological innovations. The factsheets contain information on innovative technologies, their advantages and disadvantages. Until now, 3 have been published and are available for download on the official website of GRENDEL: Gas and gas-electric propulsion (Factsheet n°1), Diesel-electric propulsion (Factsheet n°2), After-treatment (Factsheet n°3). Printed factsheets are available during the event.

Moreover, a fleet investment plan template will be filled out by the funded fleet operating partners of GRENDEL covering the upcoming years. This is regarded as an important input in the drafting of the transnational Model State Aid scheme as the information gathered will give an overview on the fleet investment necessities in terms of technologies needed and from the financial point of view.

4 Future-oriented & innovative solutions for inland waterway transport sector

4.1 The first steps of our journey towards autonomous vessels

Mr. Stephan Stout made a comprehensive presentation on possible future developments in autonomous vessels. This development requires further in-depth research. Even though automatisation will play an increasing role in the overall digitalization process of inland waterway transport, it seems that fully autonomous vessels will, at least in the near future, not be able to fully replace human resources.

4.2 Ambient Water Transmissions

Mr. Dominik Cofalka presented an innovative technology: he and his team have developed a method to lubricate gears with ambient water. They have developed the first high-performance, oil free water lubricated gear box in the world. This technology has the potential to completely replace oil – a polluting material that is harming humans, animals and the environment. Many tests were already conducted to make sure that this method works. A European Patent has already been awarded.

The side-by-side propeller is another important milestone in making waterway transport more efficient. This method, developed by Reintrieb, promises to have comparable efficiency with currently existing propellers while having the capacity to operate at lower water levels.

4.3 On the way to zero emission shipping: hydrogen in combustion engines

Mr. Igor Sauperl presented the main activities and objectives of the Austrian Large Engines Competence Center. The center is a leading research institution for large engine technologies, a global innovation hub for sustainable energy and transportation systems. Their research activities focus on the reduction of pollutants towards zero emissions.

Mr. Sauperl presented the advantages of the MyMethShip system. This innovative system is expected to be applicable on different types of vessels. The main idea of the project is to develop hydrogen as a feasible alternative to other types of fuels. Research conducted so far concluded that this type of ship propulsion is easy to install, has extremely low emissions rates and is not endangering the environment or human health.

5 Industry show-cases and projects

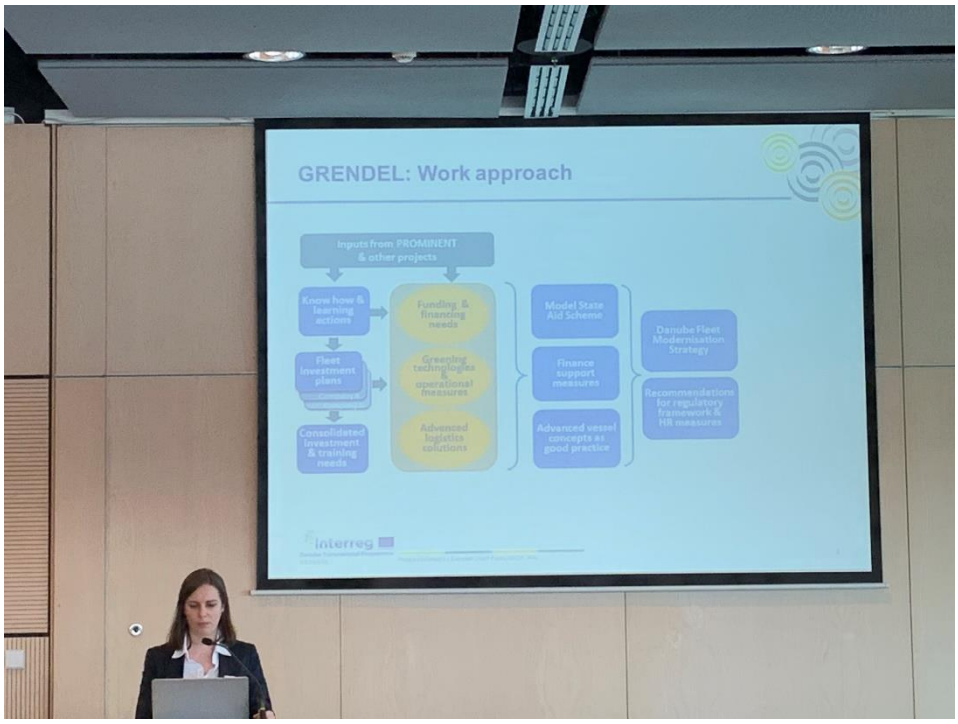
5.1 Clean Inland Shipping "CLINSH"

Mr. Frank Appelman explained that the main objective of this project is to significantly improve air quality in urban areas by reducing emissions caused by IWT. Furthermore, CLINSH demonstrates the environmental impact of emission reduction technologies, alternative fuels and OPS in real world conditions, it develops models on how emissions reduction can be applied to the existing European IWT fleet in relation to costs and benefits and it increases awareness and support among ship-owners and policymakers on cleaner inland shipping. The approach of the project is to continuously monitor and measure emission reducing technologies on CLINSH ships until June 2020. The measurement results are collected in a database and analyzed. On this basis, policy recommendations will be formulated.

5.2 Waterbus in Slovakia: Regular service in the Danube river

Mr. Gabriel Meszaros presented the potential of inland waterway in public transportation. The continuously increasing number of population in the Slovak capital has created high congestion on the roads in and around the city. This development is caused by the high number of commuters travelling from the surrounding cities to work in Bratislava. In order to decrease the congestion of the roads, Prodanubia proposed to implement public transportation on the Danube, directly connecting neighboring communities with the Slovak capital. The plan is to have 6 high-speed hybrid boats. Public transportation on the Danube should work following the park-and-ride principle. It is expected for the tender process to start in April 2019.

Meeting ended at: 17:15


GRENDEL: Work approach
Inputs from PROMINENT & other projects
Know how & learning actions
Fleet investment plans
Consolidated investment & training needs
Funding & financing needs
Greening technologies & operational measures
Advanced logistics solutions
Model State Aid Scheme
Finance support measures
Advanced vessel concepts as good practice
Danube Fleet Modernisation Strategy
Recommendations for regulatory framework & HR measures

” Know-How Transfer Event on Modernisation of Danube Vessels Fleet”

Meeting Minutes

Date & Time: 8 March 2019, 08:30 – 13:15

Venue: Tech Gate Vienna (The Sky Stage, 19th Floor), Donau-City-Straße 1, 1220 Vienna, Austria

Meeting purpose: Given the enormous challenges inland shipping is currently facing with regard to further optimization of energy efficiency, environmental and climate protection, GRENDEL, in cooperation with the INDanube Innovation Transfer Centre, prepared the “Know-How Transfer Event on Modernisation of Danube Fleet”.

Minutes by: Siot Charlotte (PDI)

Participants (58) *See as well signed & scanned list of participants*

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Agenda

08:30-09:00	**Welcome, registration & morning coffee offered by organiser**
09:00-09:55	**Propulsion systems and solutions for inland waterway transport sector** *Insights into propulsion solutions and the effects on reduction of air pollutant emissions, fuel & energy consumption* • Hybrid/Diesel-electric solutions & propulsion systems for inland vessels *Electric propulsion: Integrated solutions for inland vessels (Stephan Krahn, Baumüller Anlagen-Systemtechnik)* • Gas and gas/electric solutions & propulsion systems *Mobile gas engine for marine applications – S4000 (Klaus Poepsel, MTU Friedrichshafen GmbH)* • Options and trends in propulsion of future river cruise vessels *(Gerhard Untiedt, MEYER WERFT GmbH & Co. KG)*
09:55-10:45	**After-treatment solutions and greening measures in inland waterway fleets** *Insights into solutions and initiatives addressing climate change by decreasing air pollutants and emissions from inland vessel* • *After-treatment solutions (SCR/DPF) for Diesel engines (Florian Franken, TEHAG Deutschland)* • *Cleaner Future by new diesel fuels? (Sebastian Dörr, Neste / Lubtrading GmbH)* • *How Rhenus answers the modernisation needs of its fleet (Thomas Maaßen, Rhenus SE & Co. KG)*
10:45-11:15	**Coffee offered by organiser**
11:15-12:15	**Panel discussion: What is needed to modernise Danube inland waterway vessels?** ***Panellists*** *Gernot Pauli (CCNR)* *Klaus Poepsel (MTU Friedrichshafen GmbH)* *Michel Voorwinde (VIV - Vereniging voor Importeurs van Verbrandingsmotoren)* *Gerhard Untiedt (MEYER WERFT)* *Bernhard Bieringer (Anzböck - Consulting Engineers for Naval Architecture & Ship Technology)* *Thomas Maassen (Rhenus SE & Co. KG)* ***Moderator*** *Manfred Seitz (Pro Danube International)*
12:15-13:15	**Buffet Lunch offered by organiser**

Meeting Minutes

1 Welcome, registration & morning coffee offered by organiser

The moderator, Mr. Manfred Seitz, opened the second day of the event at 09:00. He briefly presented the agenda of the day.

2 Propulsion systems and solutions for inland waterway transport

2.1 Hybrid/Diesel-electric solutions & propulsion systems for inland vessels

Mr. Stephan Krahn started his presentation by explaining the main objectives and activities of his company. Baumüller is a family owned company and was established in 1930. Mr. Krahn presented electric solutions for inland vessels. Baumüller Anlagen-Systemtechnik develops hardware and software solutions for automation.

Mr. Krahn presented one of the most successful projects of the company - the full electric ferry. The ferry has zero emissions and is successfully being operated in Asia. The company also has a great deal of experience in developing innovative hybrid ferries. In this sense, Baumüller developed special components that meet the needs of ships. This type of vessels have a high degree of energy efficiency.

In the era of digitalization, data management and connectivity solutions both play a significant role. Baumüller offers in this regard tailored solutions for the needs of the industry.

2.2 Gas and gas/electric solutions and propulsion systems

Mr. Klaus Poepsel presented the advantages of mobile gas engines for marine applications. The mobile gas engines form an integral part of the company's green and high-tech initiative. The fuel used for the propulsion of this kind of engine is LNG. LNG is a reliable alternative to unsustainable types of ship fuels. Furthermore, LNG contributes to the reduction of harmful emissions, meeting the strict requirements of Stage V emission limits. At the same time, LNG is also from an economical point of view a feasible alternative to diesel since it is significantly cheaper.

2.3 Options and trends in propulsion of future river cruise vessels

Mr. Gerhard Untiedt presented the options and trends in propulsion of future river cruise vessels. He made a strong plea to reduce energy. According to Mr. Untiedt, batteries are not a suitable solution for long distances. This is the reason why alternative fuels have to play a significant role in future technological developments. Hence, methanol seems to be a feasible type of alternative fuel used for vessels. Unlike LNG, methanol is easier to be stored. From his point of view, the storage possibilities definitively play a decisive role in making the use of alternative fuels more attractive and accessible. Innovative technology should be simple and sustainable.

3 After-treatment solutions and greening measures in inland waterway fleets

3.1 After-treatment solutions

Mr. Florian Franken made a comprehensive presentation on after-treatment solutions. Tehag Group is specialized on exhaust after-treatment for fuel burning engines. Currently, there are long term proven exhaust after-treatment technologies that are capable to reduce harmful emissions. The company proposes customized solutions for the specific needs of companies.

3.2 Cleaner future by new diesel fuels?

Mr. Sebastian Dörr presented the advantages of new types of diesel fuels. Renewable fuels are currently the most efficient way for decarbonization. Electric vehicles don't have yet the capacity to fully replace conventional types of fuel.

Studies performed so far proved that the use of alternative fuels perform very well in aviation. Continuous research to further expand the use of raw materials in producing diesel fuels is underway. The expected results are promising.

3.3 How Rhenus answers the modernization needs of its fleet

What consequences does the increasing number of fuel alternatives have for vessel operators? At first sight, one may think that more alternatives have a beneficial impact on the industry, as reminded Mr. Thomas Maaßen. Nevertheless, unlike in the case of automobiles, vessels are built to be operational for a much longer time – on average for 40 years. The problem is that during this time, innovative technologies that often require high investment capacities are continuously evolving. Therefore, the challenges vessel operators face is to ask in what exactly to invest, what is feasible and what makes, from a financial point of view, sense.

4 Panel discussions: What is needed to modernize Danube inland waterway vessels?

The event was concluded by a panel discussion moderated by Mr. Manfred Seitz (PDI). The panelists were Mr. Gernot Pauli (CCNR), Mr. Klaus Poepsel (MTU Friedrichshafen GmbH), Michel Voorwinde (VIV), Gerhard Untiedt (Meyer Werft), Bernhard Bieringer (Anzböck), Thomas Maasen (Rhenus SE & Co. KG).

The discussions in the panel evolved around the solutions provided to vessel operators by the innovative technology industry to make IWT fit for the future and to better integrate this reliable, cost-effective and environmental-friendly mode of transport in the transnational transport and logistics chain.

Stage V engines are expected to be available on the market next year. Companies are struggling to fulfill the certification requirements. Type approval for gas engines is expected in about 1,5 years from now.

The current technical standards (ES-TRIN 2017 and ADN 2019) are the same for the Rhine and for the Danube region. LNG is accepted as standard fuel under both regulations. There are no exemptions or derogations necessary anymore. Using cargo LNG as fuel is not yet regulated. However, this might be difficult in particular with a view to customs procedures, taxation and billing to the customers of cargo.

There is a risk that the currently a rather high number of different technical solutions might lead to even further fragmentation of an already very small market.

It was concluded that Governments should proactively support the greening of the fleet. By looking at the current regulatory framework, it becomes clear that concrete incentives are, with few exceptions, missing. The IWT sector should be directly involved in the complex decision making process at both European and national levels. NAIADES III should be developed in a way to generally improve the overall status of IWT on a transnational level.

Meeting ended at: 13:20


Panel: What is needed to modernise
Danube inland waterway vessels?
INDanube
CENTRE FOR INNOVATION
TRANSFER IN INLAND
NAVIGATION


S4000 M05-N
Engine Concept & Technical Concept
GRENDEL

Green and efficient Danube fleet

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

Output 3.1 – 2nd Know-how Transfer Event on technologies

29.09.2020, online

Work Package 3 Fleet investment planning

Version 1.0

Date: 30/11/2020

FINAL

Project co-funded by European Union Funds (ERDF, IPA)

2nd Know-How Transfer Event on Modernisation of Danube Vessels Fleet

Meeting Minutes

Date & Time:	29 September 2020, 09:00 – 13:00 CEST
Venue:	Online event (use of Webex)
Meeting purpose:	Objective to bring together inland vessel operators from the Danube region with technology & innovation experts as well as technology suppliers to debate available technologies which could fit in the transition pathway towards (near) zero emission performance and future alternative solutions which still need further research. Besides technologies, insight into digitalisation aspects leading to paperless sailing and increasing efficiency of transport processes as well outlook to expected funding and financing and to the elaborated GRENDEL Model State Aid Scheme will be provided.
Minutes by:	Pro Danube

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Agenda

09:00 – 09:20	**Setting the scene**
	Setting the scene - political and regulatory framework for modernisation of Danube inland waterway vessels • *Manfred Seitz (Danube Commission)* • *Laure Roux (CCNR)*
09:20 – 10:50	**Low emission propulsion solutions**
	• EU Stage V Update from the Manufacturer, Formerly known as the Dealer *(Peter Snijders, Koedood)* • Marinized Euro VI DAF Paccar engines for IWW Stage V *(Peter van der Heijden, NPS Diesel)* • Stage V Marine Developments *(Jan-Willem Vissers, Volvo Penta Europe)* • Scania propulsion and auxiliary solutions for inland waterway vessels: Marinisation of industrial engine range (NRE category engine) including EU Stage V approval according BAnz AT 20.12.2018Bz (IWA/IWP-solution) *(Detlef Plachta, ScanDiesel)* • Discussion
10:50– 11:05	**Pause**
11:05 – 11:25	**Powertrain technology outlook & transition pathway towards (near)zero emissions**
	• Future Powertrain Technology Options for Inland Waterway Transport *(Thomas Kammerdiener, AVL List GmbH)*
11:25 – 12:15	**Clean carbon neutral (alternative) fuels**
	• Overview of alternative energy carriers for inland navigation *(Friederike Dahlke-Wallat, DST)* • Alternative fuels – best practices and possible outlook *(Sebastian Dörr, Lubtrading)* • Discussion
12:15 – 12:35	**Increasing resilience and energy efficiency**
	• (Hydrodynamic) solutions to increase resilience & energy efficiency *(Benjamin Friedhoff, DST)*
12:35 – 13:00	**Discussion & Closing of the day**

The presentations of the following topics will be circulated to the participants on beforehand. Questions on these topics are welcome during the discussion session from 12:35-13:00.

	Digitalisation of transport processes in inland waterway transport
	• Automation of Inland Navigation to Increase Safety and Energy Efficiency *(Alexander Lutz, Argonics GmbH)* • NOVIMAR – The vessel train concept *(Erwin van der Linden, EICB)* • River Information Services Corridor Approach – RIS COMEX and intended systems *(Mario Kaufmann, via donau)* • Introduction of new services for vessel management - VEMASYS *(Tony Ameryckx / Willem De Braal, Bluecentury)*
	Funding and financing for modernisation of inland vessels
	• Funding and financing of modernisation of inland vessels - outlook *(Markus Eppich, Pro Danube Management)* • State Aid model for Modernisation of Danube fleet *(Charlotte Siot, Pro Danube International)*

Meeting Minutes

1 Setting the scene

Mr. Manfred Seitz (Danube Commission) welcomed the participants to the 2nd Know-how transfer event (online format) organised in the framework of the GRENDEL project. This event was organised by GRENDEL in cooperation with the INDanube Innovation Transfer Centre, with the Danube Commission as host.

One of the main objectives of the GRENDEL project is to support the Danube fleet operators and their public counterparts in the challenging modernisation process of the fleet. In this regard, GRENDEL addresses various fleet modernisation aspects: use of low carbon and alternative fuels, reduction of air pollutant emissions, overall energy consumption and better integration of the Danube IWT into logistics chains through new services. Know-how transfer to Danube fleet operators, the elaboration of innovative technical vessel concepts and the development of a favourable regulatory framework in particular via the elaboration of a Model State Aid scheme are key activities of the project.

Mr. Seitz briefly presented the agenda and the main objective of the event to debate available technologies which could fit in the transition pathway towards (near) zero emission performance and future alternative solutions which still need further research. Besides technologies, insight into digitalisation aspects leading to paperless sailing and increasing efficiency of transport processes as well outlook to expected funding and financing are provided via two dedicated sessions on "digitalisation of transport processes" and on "funding and financing".

Referring to the political and regulatory framework for modernisation of Danube inland waterway vessels, he introduced **Mrs. Laure Roux (Central Commission for the Navigation of the Rhine - CCNR)** who provided an overview of the CCNR activities related to the energy transition. After reminding some key elements about the CCNR and the Rhine fleet, the past and current emission regulations in inland navigation were mentioned. The emissions regulation have become stricter and stricter. The latest regulation is the Stage V EU emission regulation which is in particular stricter in terms of NOx and PM emission. Only air pollutants are currently regulated, not Greenhouse Gas emissions. This is in particular important when one considers that all the European and CCNR objectives towards 2050 both consider to reduce and to largely eliminate the emissions for air pollutants and Greenhouse gases.

The Mannheim Ministerial Declaration was adopted in 2018 and sets the objective of largely eliminating emissions in inland navigation by 2050. At this occasion, the CCNR was tasked to develop a roadmap in order to:

- reduce greenhouse gas emissions by 35% compared with 2015 by 2035,
- reduce pollutant emissions by 35% compared with 2015 by 2035,
- largely eliminate greenhouse gases and other pollutants by 2050.

This work is ongoing and consultation of CCNR observers and recognised Non-Governmental Organisation is foreseen at the end 2020 / 1st semester of 2021.

The Mannheim Declaration also pointed to the need for new financial instruments to achieve these environmental objectives and entrusted the CCNR with the task of leading this development. As such, ongoing studies are taking place in parallel on the topic of energy transition:

- a study on "The financing of the energy transition for a zero emission European inland navigation sector"

- a study about the evaluation of greening technologies towards a zero-emission IWT sector and identifying scenarios for transition options as well as their related costs
- a study on polluter pays systems and their application to the IWT sector.

First results will be available by the end of 2020.

More generally, Mrs. Roux reminded the importance to have in mind the panel of technologies available in inland navigation for the energy transition and to have a modular approach.

The work of CESNI was underlined in the context of the energy transition. ES-TRIN was developed in the context of CESNI and represents the core technical requirements for inland navigation vessels in Europe. It is revised every two years.

Mrs. Roux also informed about the existence of a leaflet (available under the following link) concerning pilot projects using a new technology which require a derogation from CESNI.

2 Low emission propulsion solutions

Mr. Seitz introduced the first session dedicated to low emission propulsion solutions and gave the floor to the company Koedood Marine Group. **Mr. Peter Snijders (Koedood)** went through his presentation. The ambition of Koedeed is to have in 2021 an EU Stage V certified range from 500 to 1.700 kW of propulsion and auxiliary engines for the inland waterway auxiliary and propulsion systems. Koedood is right on track to achieve this ambition. Koedood used to be a dealer and is working on becoming a manufacturer, with the respective responsibilities. Further elements were presented:

- Engine-After-Treatment Family
- Development work
- Solution of Koedood
- Value of Koedood:
    - Optimized for total fluid consumption
    - Robust
    - Proven

Mr. Jan-Willem Vissers (Volvo) presented some updates on Volvo Penta solutions for Stage V marine which has an impact on the inland waterway business:

- Volvo Penta EU/IWW Stage V Offer Strategy
- Leverage IMO Tier III (<300kW): it will be a Stage V certified product.
- Growth through partnerships
    - Koedood D16 MG/MH (368 - 550kW)
    - Conversion of TAD1381-85 VE for IWW use
    - Conversion of TAD1385 VE for IWW use
    - Etc.
- Stage V Marine summary
- Volvo Penta Stage V marine

A newsletter will also be available after the meeting. *[The newsletter was published under the dedicated News on the GRENDEL website]*

Mr. Peter van der Heijden (NPS Diesel) gave an overview of the Marinized Euro VI DAF Paccar engines for IWW Stage V:

- Euro VI DAF – Paccar engines for IWW Stage V
- Stage V Emission Standards
- Use of EURO VI engines for IWT vessels
- NOx – PM | Euro VI – Stage V – CCR1 – CCR2
- Comparison Modalities - Emissions per container per km
- Why the Equivalance route Euro VI to IWW stage V?
- The road towards IWW Stage V
- Features IWW Stage V DAF Paccar engine platform

Mr. Detlef Plachta (ScanDiesel) provided an outlook on Scania propulsion and auxiliary solutions for inland waterway vessels**:**

- Facts on EU Stage V Regulation and on partners
- As solution partner for Scania Power Solutions, ScanDiesel got the permisson to marinise EU Stage V NRE engines according to ES-TRIN and CESNI rules for the European market sale.
- Details:
    - Update of documentation by ScanDiesel
    - Type approval EU Stage V is valid.
- Equipment
- Application equipment
- EU Stage V inland waterway propulsion table
- EU Stage V inland waterway auxiliary table

Discussion

Some of the topics / questions discussed between speakers and participants were:

- The usage of HVO, eventual related modifications of the tank and pipe systems and the cost of HVO per m^3 for NPS Diesel engines and Scan Diesel engines
- The fulfillment of the ES-TRIN requirement for dual skin fuel lines (art. 8.02) for distributors who make modification on the engine of engine manufacturer
- Question for engines above 1 000 kW and related solutions
- The zero emission challenge as a long way forward

3 Powertrain technology outlook & transition pathway towards (near) zero emissions

The scope of the next presentation is to see the pathways of technological development for propulsion and power systems which would let arrive gradually to close to zero emission solutions.

Mr. Thomas Kammerdiener (AVL List) developed the future powertrain technology options for inland waterway transport:

- Motivation & Drivers:
  - Emission regulatory & GHG reduction targets
  - Zero impact emissions & IWW transport business models
  - Short term challenges
- Technology pathways for IWW propulsion:
  - Net and zero carbon fuels
  - Energy density of fuels and installation space on board
  - Engine technology options including exhaust gas aftertreatment requirements
  - Alternative propulsion and power generation on board
  - Fuel cell
- Summary and conclusions:
  - Fuels & Hydrogen
  - Transition draft for propulsion & power technology
  - AVL services

4 Clean carbon neutral (alternative) fuels

Mrs. Friederike Dahlke-Wallat (DST) provided an overview of alternative energy carriers for inland navigation:

- Energy Carriers
- Diesel and diesel-electric propulsion
- Aftertreatment
- Euro VI and NRE engines
- Drop-In (Bio) Fuels
- Gas and gas-electric propulsion
- Fuel Cells
- Battery-Electric propulsion
- Conclusions:
  - Aims for 2035 and 2050 --> Price development of technologies
  - Preparations for energy turnaround on the Danube should start now
  - Creation of financial instruments
  - Selection of regionally appropriate measures

Mr. Sebastian Dörr (Lubtrading) presented the best practices and possible outlook for alternative fuels in the inland waterway sector:

- What can be used for marine
- What can be used for marine till 2030
- „The Carbon Journey“ – How to reduce GHG
- Biofuels from crops and waste are available
- Advanced refinery – reduced GHG

- Liquified Natural Gas from biomass
- Renewable Hydrogen
- Any new fuel needs a defined standard, availability in large scale
- Introduction of new technology
- xTL EN 15940 - Standard from several processes
- PTL Demand over time and application
- Strategy for more xtl fuel
- Development car fleet till 2030
- Learning from road transportation
- Concept of Diesel R33
- What we can do now – Example Diesel R33
- New fuels will be blends – fuel roadmap

Discussion

Several questions were discussed between speakers and participants on the following topics in particular:

- The hydrogen situation, perspective and existing timeline for making it available for inland vessels
- There is not only one right technology. Other criteria have to be considered as for example land use, possibility to produce according to the energy demand, etc.
- The fleet is diverse. There are niches for many alternatives.
- For inland waterways, it is also important to focus on the demand from the logistics and ports point of view.

Mr. Seitz underlined the need to work in different ways and to move forward with the technologies gradually.

5 Increasing resilience and energy efficiency

Mr. Benjamin Friedhoff (DST) described the (hydrodynamic) solutions to increase resilience and energy efficiency:

- Motivation:
  - Many levers to improve economic and environmental performance of IWT
  - Fuel is usually even more money than time.
  - Energy costs will increase.
  - Less energy demand means less costs and less emissions.
- Energy efficient navigation:
  - Power demand rises disproportionate with speed.
  - Power demand is increased by shallow water effects.
  - Speed is reduced at small water depth.
  - Awareness
  - Optimized choice of speed and track

    - Voyage planning with minimized waiting times (Slow Steaming)
    - Increased utilization by better logistics
- Design for operation
- Hydrodynamic optimisation:
    - Widely used for newbuilds
    - What can be done for the existing fleet
- Coupled convoys
- Retrofit optimisation
- Resilience:
    - Efficiency calls for maximizing propeller diameter.
    - Ventilation needs to be prevented for low draughts.
    - Optimization allows draughts as low as 75% of prop. diameter.
    - Stopping may require a powerful thruster.
- Flextunnel
- NOVIMOVE:
    - Innovative Vessel Concepts
    - Increase the resilience of IWT
    - Focus on low water scenarios → add buoyancy
    - Concept → Techn. Verification → Operational Ver. → Economic Validation

Following this presentation, Mr. Seitz pointed out that when talking about greening the inland fleet, the hydrodynamics improvements and adaptions also have to be addressed together with the efficiency management of on-board systems and the entire integration of IWT into logistics chains.

6 Discussion & Closing of the day

The presentations of the session on "Digitalisation of transport processes in inland waterway transport" and on "Funding and financing for modernisation of inland vessels" had been made available on beforehand to all participants for questions during the current part of the event and allowed in particular to:

- offer consolidated expertise on how to improve logistics & transport management processes of Danube fleet operators
- offer advice in a comprehensive way regarding available financing options and existing funding opportunities and address the elaborated GRENDEL model state aid scheme.

The following topics were addressed by the session dedicated to "Digitalisation of transport processes in inland waterway transport":

- Automation of Inland Navigation to Increase Safety and Energy Efficiency **(Mr. Alexander Lutz, Argonics GmbH)**
- NOVIMAR – The vessel train concept **(Mr. Erwin van der Linden, EICB)**
- River Information Services Corridor Approach – RIS COMEX and intended systems **(Mr. Mario Kaufmann, via donau)**
- Introduction of new services for vessel management - VEMASYS **(Mr. Tony Ameryckx / Mr. Willem De Braal, Bluecentury)**

The following topics were addressed by the session dedicated to "Funding and financing for modernisation of inland vessels":

- Funding and financing of modernisation of inland vessels – outlook **(Mr. Markus Eppich, Pro Danube Management)**
- State Aid model for Modernisation of Danube fleet **(Mrs. Charlotte Siot, Pro Danube International)**

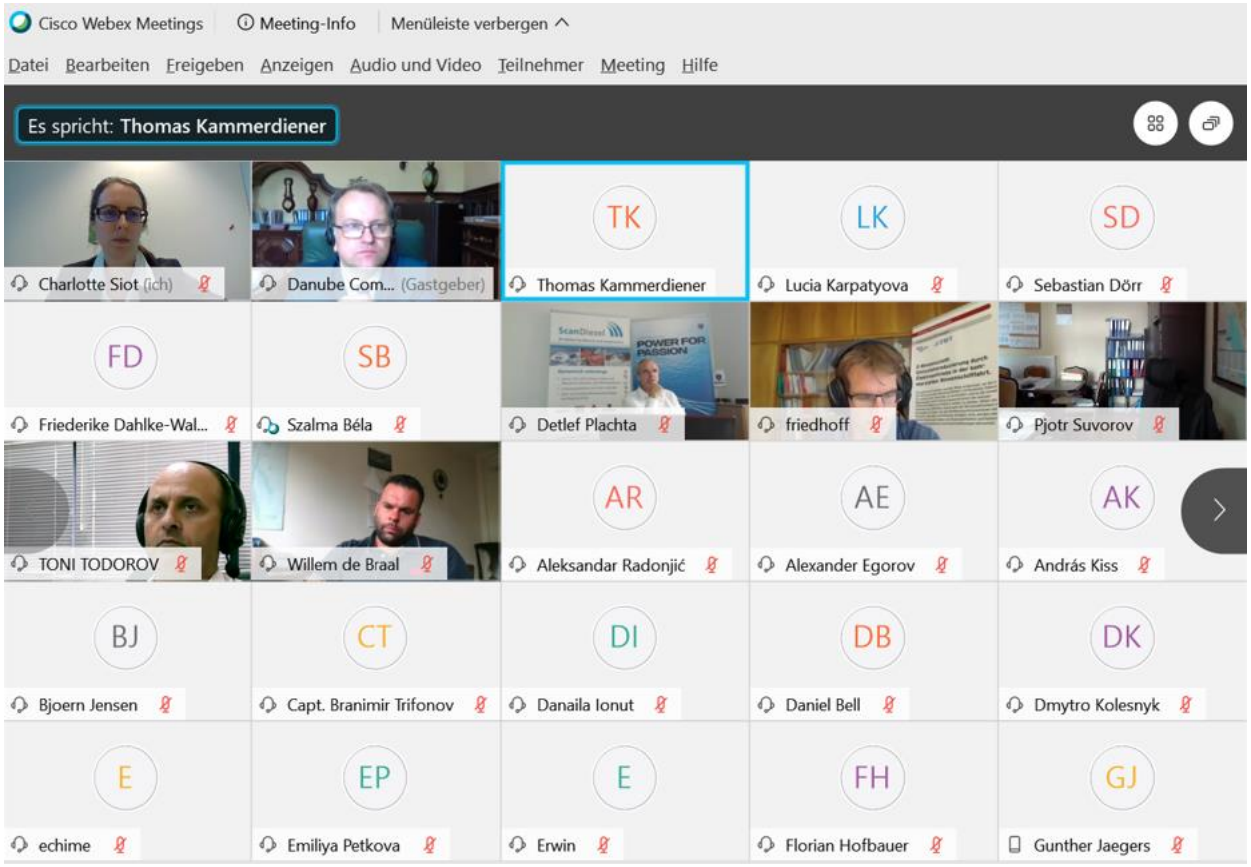
All the speakers, in particular those of the sessions "Digitalisation of transport processes in inland waterway transport" and "Funding and financing for modernisation of inland vessels" were present in this discussion part of the event.

Some of the topics / questions discussed between speakers and participants were:

- On a labeling system of vessels.
- On the use of the Automatic Track-keeping system of Argonics GmbH in the Danube region. The use of this system in the Danube region means that it can be relevant to add it as eligible item in national state aid schemes by the Danube states.
- Information on the VEMASYS system which is an interesting system for barge operators with high return of investment
- The development of RIS information services is going on, significant progress has been made with the help of the RIS COMEX project – an update was provided by Mr. Kaufmann
- **Mr. Robert Rafael (Pro Danube International)** also mentioned as relevant topic to tackle the fact that there might be some potential for digital market places on the Danube. Its pre-conditions, barriers, etc. could be discussed. This is an important topic which might be connected to River Information Services and other follow-up measures or new ideas.
- Mrs. Siot added that in the framework of the GRENDEL project, PDI was currently working on the elaboration of the final version of the model state aid scheme for the Danube fleet which will be publicly available in November/December 2020 (publication on the GRENDEL website). This model covers the 5 most important aspects of fleet modernisation - (1) environmental performance, (2) integration into logistics chains, (3) increasing the safety of IWT, (4) renewal of actors in the sector and (5) innovative solutions. The model state aid scheme was developed to serve as a guideline for Danube riparian countries to develop national state aid schemes for fleet modernisation according to their individual needs.
- Mr. Rafael added that a Bulgarian partner of the project, BRCCI, was currently working on the elaboration of a draft state aid scheme based on this model (practical implementation of the model). Further information will be available during the Final event of the GRENDEL project taking place on 29 October 2020.

For more details, the presentations are available for consultation under the dedicated News on the GRENDEL website and on the Danube Commission website (following link). The record of the event is also available on the website of the Danube Commission.

Meeting ended at: 13:15


Cisco Webex Meetings
Meeting-Info
Menüleiste verbergen
Datei Bearbeiten Freigeben Anzeigen Audio und Video Teilnehmer Meeting Hilfe
Es spricht: Thomas Kammerdiener
Charlotte Siot (ich)
Danube Com... (Gastgeber)
TK
Thomas Kammerdiener
LK
Lucia Karpatyova
SD
Sebastian Dörr
FD
Friederike Dahlke-Wal...
SB
Szalma Béla
Detlef Plachta
friedhoff
Pjotr Suvorov
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