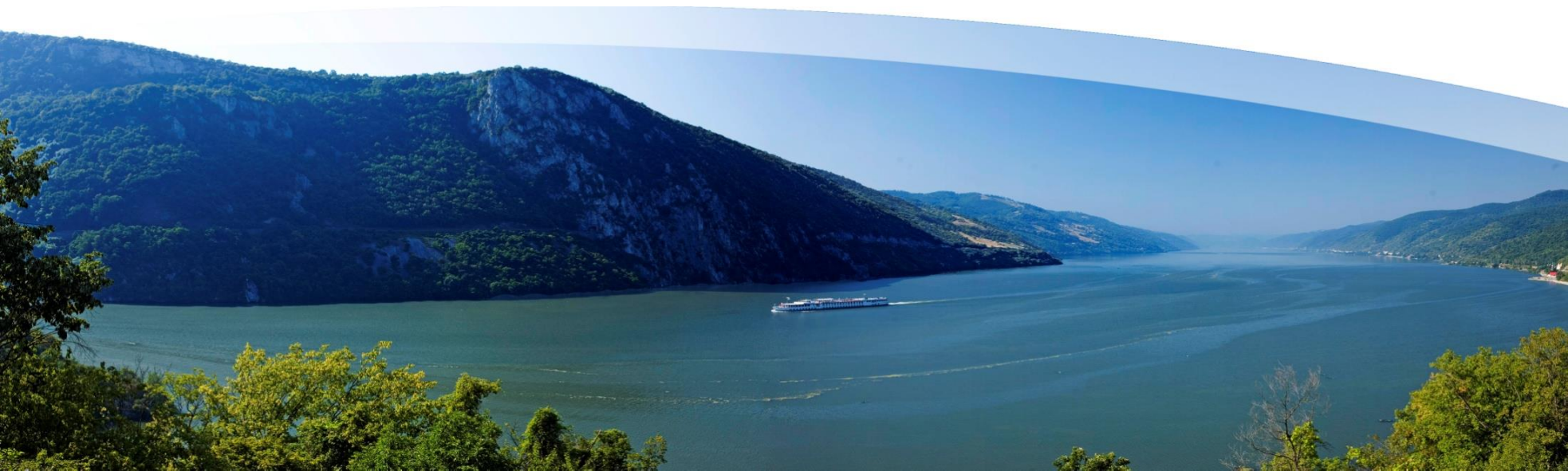


EUSDR PA1a 15th Working Group Meeting

Vienna | 7th March 2019



Welcome and introduction

PA1a coordinators



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PA 1a working group structure



WG 1 – Waterway infrastructure & management



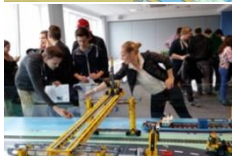
WG 2 – Ports & sustainable freight transport



WG 3 – Fleet modernisation



WG 4 – River Information Services



WG 5 – Education & jobs



WG 6 – Administrative processes

Status of Danube fleet

Where do we stand today?

Critical issues regarding fleet modernisation the Danube region

- Backlog in investments because of low margins and investment capacity
- Savings mainly in the field of external costs / no business case for many greening technologies
 - Technologies to reduce pollutants (NOx, PM) add costs rather than make inland navigation more competitive
- Stringent NRMM Stage V emissions norms for new vessels
 - No compliant engines available for the inland navigation market
 - Legacy fleet remains largely unaffected (no incentive to modernise)
- Long lifetime of investments cause low innovation rates

Objective of PA1a Working Group

- Identify specific issues and policy recommendations for Danube fleet, based on
 - previous and ongoing project work
 - inputs from public and private stakeholders
- Summarise Danube-specific policy recommendations on fleet modernisation to overcome the current back log
- Provide solid arguments to create funding opportunities in
 - Cohesion Funds
 - Horizon Europe
 - Connecting Europe Facility
 - National/regional instruments

Ongoing project initiatives

Relevant project activities (selection)

- LNG Masterplan for Rhine-Main-Danube (TEN-T)
- GreenDanube – Danube Transnational Programme
- PROMINENT – Horizon 2020
- GRENDEL – Danube Transnational Programme

Complete project overview:

www.danube-navigation.eu/projects

Presentation by Juha Schweighofer (viadonau)

Overview of future emission norms, regulations, and most promising fleet modernisation technologies

Juha Schweighofer (viadonau)

PA1a Working Group Meeting on Fleet Modernisation Vienna, 7th March 2019

Contents

- General overview of regulations relating to emissions and safety
- Summary of main results of the PROMINENT project
- Most recent topics considered in submitted innovation projects of the EU

Directive 2009/30/EC

L 140/88

EN

Official Journal of the European Union

5.6.2009

DIRECTIVE 2009/30/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 23 April 2009

amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC

- Since 1.1.2011: sulphur content ≤ 10 mg/kg fuel (10 ppm)
- => sulphur-free fuel

Other regulations relating to usage of fuel

- Directive 2014/94/EC - Clean Fuels Directive
 - Deployment of infrastructure for alternative fuels
 - Investigation of cold ironing: infrastructure till 2025 (if feasible)
 - LNG infrastructure till 2030 in place TEN-T core network
- Directive 2009/28/EC – Renewable Energy Directive
 - Promotion of energy from renewable sources

Directive 2016/1628 (NRMM) – Stage V

Category	Ignition type	Power range (kW)	Sub-category	Mandatory date of application of this Regulation for	
				EU type-approval of engines	Placing on the market of engines
IWP	all	$19 \leq P < 300$	IWP-v-1 IWP-c-1 IWP-v-2 IWP-c-2 IWP-v-3 IWP-c-3	1 January 2018	1 January 2019
		$P \geq 300$	IWP-v-4 IWP-c-4	1 January 2019	1 January 2020

- Engines >300 kW:
 - Type approval: 2019 – placing on the market: 2020

Directive 2016/1628 (NRMM) – Stage V

Emission stage	Engine sub-category	Power range	Ignition type	CO	HC	NO _x	PM mass	PN	A
		kW		g/kWh	g/kWh	g/kWh	g/kWh	#/kWh	
Stage V	IWP-v-1 IWP-c-1	$19 \leq P < 75$	all	5,00	(HC + NO _x ≤ 4,70)		0,30	—	6,00
Stage V	IWP-v-2 IWP-c-2	$75 \leq P < 130$	all	5,00	(HC + NO _x ≤ 5,40)		0,14	—	6,00
Stage V	IWP-v-3 IWP-c-3	$130 \leq P < 300$	all	3,50	1,00	2,10	0,10	—	6,00
Stage V	IWP-v-4 IWP-c-4	$P \geq 300$	all	3,50	0,19	1,80	0,015	1×10^{12}	6,00

- Gaseous-fuelled engines: particular provisions for emission of HC
- For powerful engines: SCR + DPF necessary

Regulations with impact on ship design

- Directive 2016/1629/EC
 - Technical requirements for inland waterway vessels
 - Repeals Directive 2006/87/EC starting from 7.10.2018
 - Minimum requirements: ESTRIN (CESNI)
- ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
 - Starting from 1.1.2019 only double hull

Regulations with impact on ship design

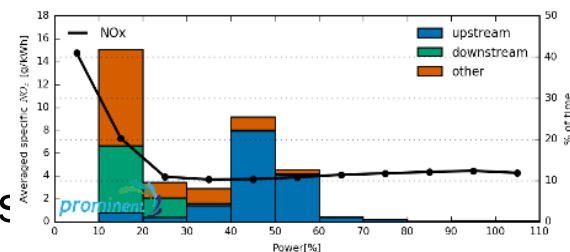
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Project description c :

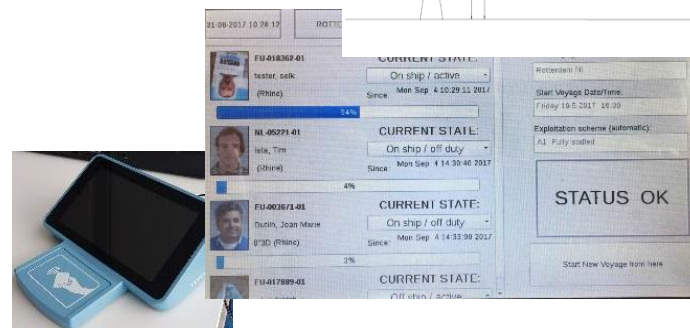
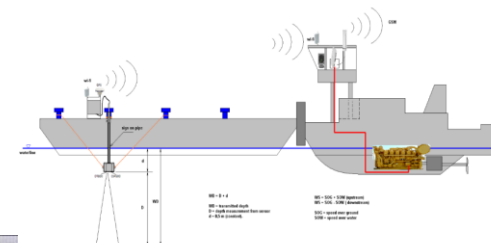
- Promoting Innovation in the Inland Waterways Transport Sector
- Funding EU H2020 (Budget: ca. 6.5 Mill EUR)
- Duration: 1.5.2015 – 30.4.2018
- 17 project partners
- Coordinator: STC-Group (NL)
- http://cordis.europa.eu/project/rcn/193260_en.html
- <http://www.prominent-iwt.eu/>
 - Wp1: 2015_09_11_PROMINENT_D 1.2. best available technologies_final
 - WP6: Final Pilot Review Report

Research areas of *prominent* :

- Monitoring and certification: exhaust gas emissions
- Standardized after-treatment solutions: SCR+DPF
- Energy-efficient navigation
- LNG applications: reduction of methane slip
- Hybrid propulsion systems
- Logistics educations
- E-service record book, e-logbook



B : Standard shapes / volumes and module # in function of exhaust flow rate



Promising fleet modernisation technologies

Type of measure	Area	Measure	NOx	PM	CO2 only	GHG (CO2 & CH4)	Applicability on the fleet	Economic feasibility (ship owner)	Technical maturity	Non-techn. maturity (barriers)
			%	%	%	%	% of fuel consumption in Europe	+++ / - - -	TRL level	+++ / - - -
Ship-related technical measures	Fuels, standardised solutions	Use LNG (Liquefied Natural Gas) - single fuel/ spark ignition	70-80	up to 95	20-25	0-10	10 - 50%	++	6	---
		Apply dual fuel (LNG and diesel)	50-65	50-90	20-25	0-10	10 - 50%	++	6	--
		Apply GTL fuel	10	20	0	0	> 50%	-	9	0
	Propulsion system, standardised solutions	Apply SCR	70-90	0-20	≈ 0	≈ 0	10 - 50%	--	8	-
		Wall flow DPF	0	90	≈ 0	≈ 0	10 - 50%	---	7	-
		Combine SCR and DPF	80-90	90	≈ 0	≈ 0	10 - 50%	---	7	-
		Exchange of main diesel engine (by Stage V engine)	65	80-90	0	0	> 50%	-	5	--
		Right sizing	0-10	0-10	0-10	0-10	100%	++	9	0
		Diesel-hybrid prop. (no buffer batt.)*	0-10	0-10	0-10	0-10	10 - 50%	+	9	0
		Diesel-hybrid prop. (+ buffer batt.)*	0-10	0-10	0-10	0-10	10 - 50%	+	9	0
Infrastructure	Waterway Information	Real time info on fairw. data	14 (3-25)				>50%	+	5/7	-
Ship-operational measures	Sailing behaviour	Speed adaption					>50%	+	5	-
		Optimised track choice					>50%	+	5	-

Further research topics

- (Full) electric propulsion systems
- Hydrogen – fuel cells – combustion engines
- Usage of synthetic (bio)-fuels: HVO
- Automated ship operation – autonomous sailing
- Digitalisation

Actions to be taken

- **Legal and policy actions**
 - Implementation of new technologies
 - Existing vessels: emission limits and certification procedures
- **Financing**
 - EU wide Greening Fund
- **Research and deployment**
 - H2020, FP, CEF
 - Propulsion technologies, energy efficient navigation, monitoring, digitalisation
- **Promotion, training, education**
 - Raise awareness and knowledge



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Statement by Manfred Seitz (Pro Danube International)

Presentation by Vera Hofbauer (Federal Ministry of Transport, Innovation and Technology)

Experiences with Fleet Modernisation Funding in Austria

EUSDR PA1a Working Group
„Fleet Modernisation“

Vera Hofbauer
Austrian Ministry for Transport, Innovation and Technology
Head of Department Shipping – Technology and Nautics
Vienna, March 7 2019

Funding for inland waterway vessels

- **Duration of the funding programme:** 1 July 2014 – 31 May 2017
- **Number of calls:** 6
- **Total budget:** 2,000,000 €
- **Eligible items**
 - *Modifications of the hull*
 - Improvement of hydrodynamics and energy efficiency of vessels
 - Reduction of draught of pushing vessels

Funding for inland waterway vessels

- Eligible items
 - *Environmentally friendly vessel equipment and adaption*
 - Optimised propulsion and steering systems
 - Environmentally relevant telematics
 - Environmentally relevant adaptation for the transport of dangerous goods
 - Exhaust aftertreatment facilities
 - Sloptanks
 - Environmentally relevant electrotechnical equipment, fire protection
 - Bow Thruster
 - Application of new technologies

Résumé of the funding programme

- No. of applications: 9 → approved: 9 → realised: 4
- No. of vessels: 23 → approved: 23 → realised: 15
- Calculated project costs: 10.2 mil. € → eligible costs: 4.3 mil. €
- Approved funding: 900,000 € → Average funding rate: 20 %
- Submitted costs: 1.5 mil. € → approved costs: 1.4 mil. €
- disbursed funding: 400,000 € → i.e. 20% of the budget!

Funded measures

Supported actions	Detail	Applications (no. of vessels)	Realised (no. of vessels)
Env. friendly vessel equipment & adaption	Optimised propulsion & steering systems	2 (2)	1 (1)
	Env. relevant adaption for the transport of dangerous goods	3 (6)	0 (0)
	Env. relevant electrotechnical equipment, fire protection	2 (9)	1 (8)
	Bow thruster	1.5 (4)	1.5 (4)
Modifications of the hull		0.5 (2)	0.5 (2)

Underexploitation of the programme due to ...

- Sector of economy with low rates of investments, esp. since 2008/2009
- Low expected funding rate
- Low innovation rate, no „environment only“ measures
- Proof of environmental effects difficult
- Requirement of 10 journeys on the Austrian Danube can be difficult to be fulfilled

Recommendations for a funding programme in the future

- More flexibility within the selected measures to achieve given objectives
- Funding of engines
- Focus on energy efficiency measures (environmental & economic effects)
- Lump-sums (where possible) to avoid bureaucracy

Thank you for your attention!

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Large group discussion

Greening technologies

- Which types of technologies do you perceive as most promising and effective?
- For which of these innovations could a positive business case be imaginable?

Barriers

- Which specific challenges does the modernisation of the Danube fleet face and how can they be overcome?
 - What would need to change in order for positive business cases to emerge?
 - Would you invest in any of the discussed greening technologies, even if you received a 100% subsidy?
 - Or are remaining implementation barriers to be expected?

Public greening policy

- What are the most important lessons learnt from previous fleet modernisation programmes?
- Which types of public programmes are considered as most effective?
- What to do first under practical and financial limitations?

Conclusions and next steps