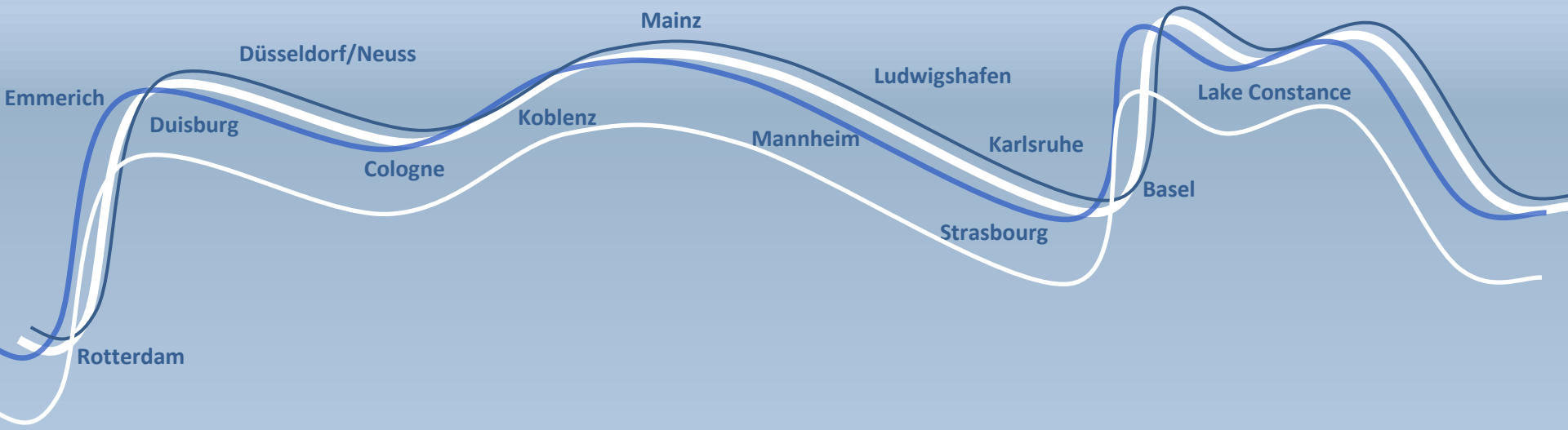


LNG AS FUEL IN INLAND NAVIGATION: – the Regulatory Framework

Hans van der Werf, CCNR

24/25 January 2013, Constanta, Rumania

Agenda

1. Introduction: Greening inland navigation through LNG
2. Approval of LNG as fuel for inland navigation vessels in Europe
3. Scenarios: LNG as a fuel in IWT 2010-2020-2030
4. Action: A framework for facilitating the use of LNG
5. Conclusions: Next steps

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Greening of inland navigation

- **Legislation | Greening initiative by the EU Commission**
  - Policy objective: *"...achieving by 2020 an overall performance regarding emissions levels for inland waterway transport that is better or at least comparable to the performance of road transport."*
  - Policy instrument: Revision of Directive 97/68/EC on emissions of Non Road Mobile Machinery (NRMM)

- **Acceptance | Environmental sustainability increasingly important**
  - External costs of a transport mode increasingly influence its ability to obtain support from the public as well as public authorities

LNG in macro level perspective

- **Use of LNG as a fuel for inland water vessels leads to substantial emission reductions**

Air pollutant / greenhouse gas	Emission reduction factor
NOx	-75%
PM	-97%
CO2	-10%

Source: NEA 2011

- **Impact of LNG at large vessels** (110 m, 135 m, push boats)

Option	Share external cost reduced of total EU 27 IWT external costs
New engines LNG	32%
Retrofit LNG	34%

Source: Informal Report by Panteia / NEA / PLANCO / SPB / via donau / CCNR, Common Expert Group on Greening 12/2012

LNG in a micro level perspective

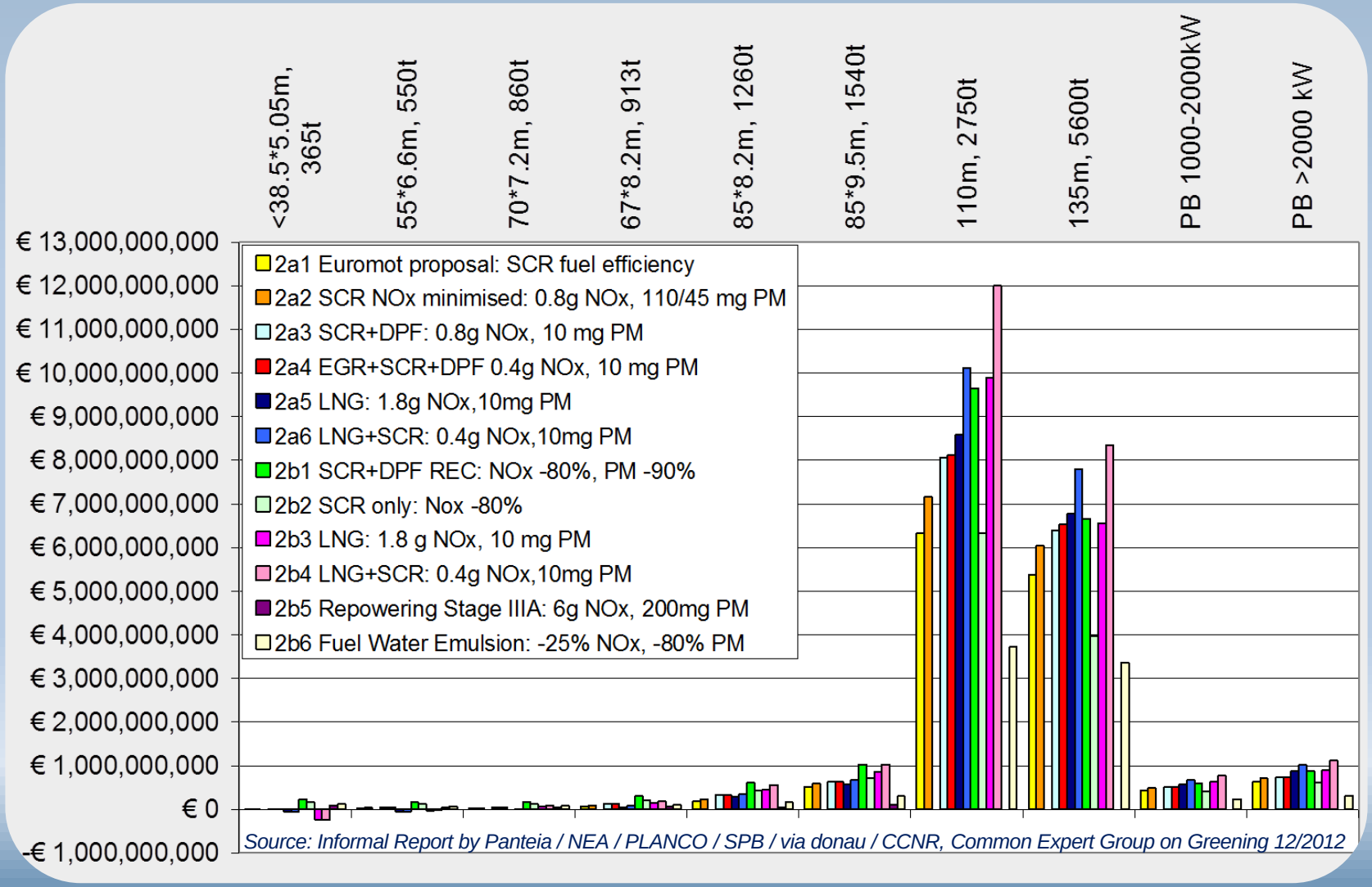
- **Annual operation cost savings**

Vessel type	Existing vessels		New vessels	
	Annual savings	Net Present Value	Annual savings	Net Present Value
38.5*5.05m, 365t	-26.9%	€ (464,469)	-10.3%	€ (367,845)
55*6.6m, 550t	-22.5%	€ (465,864)	-8.0%	€ (348,765)
70*7.2m, 860t	-19.1%	€ (468,292)	-6.8%	€ (337,143)
67*8.2m, 913t	-16.4%	€ (438,843)	-5.3%	€ (285,284)
85*8.2m, 1260t	-8.7%	€ (360,204)	-2.1%	€ (147,390)
85*9.5m, 1540t	-7.1%	€ (357,682)	-1.4%	€ (112,506)
110*11.4m, 2750t	-1.5%	€ (143,629)	1.5%	€ 270,745
135*14.2m, 5600t	1.4%	€ 423,267	2.7%	€ 766,968
2 pushed barges, 4600t	0.6%	€ 172,416	2.5%	€ 733,050
4 pushed barges, 9200t	4.0%	€ 2,092,102	5.3%	€ 2,539,001

Source: Informal Report by Panteia / NEA / PLANCO / SPB / via donau / CCNR, Common Expert Group on Greening 11/2012

LNG in macro and micro level perspective

- **Net present value for society (NPV external cost savings + IWT industry)**



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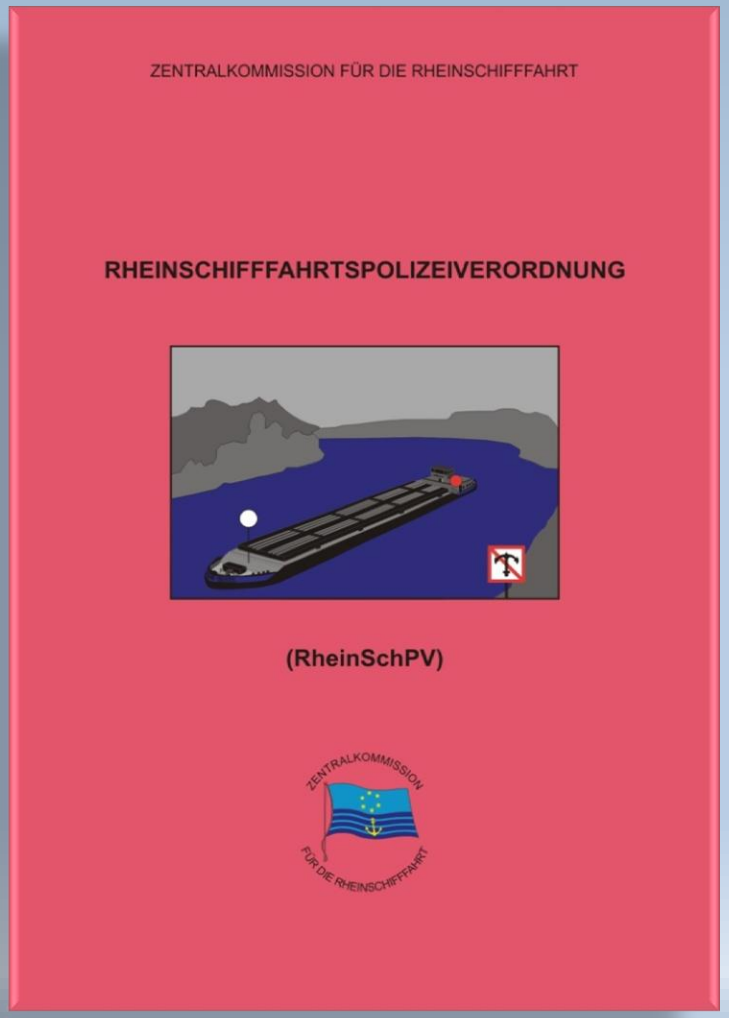
5 Conclusions: Next steps

Safety regulations for ships – simplified overview

Area	Regulations	Certificates	Organisation
General requirements, operations	RPR	multiple	CCNR
	Others, national	multiple	Others, states
Design and Equipment	RVIR	Rhine “Attest”	CCNR
	2006/87/EC	Community Certificate	EU
Transport of Dangerous Goods	ADN	Certificate of approval	UNECE, CCNR
	2008/68/EC		EU

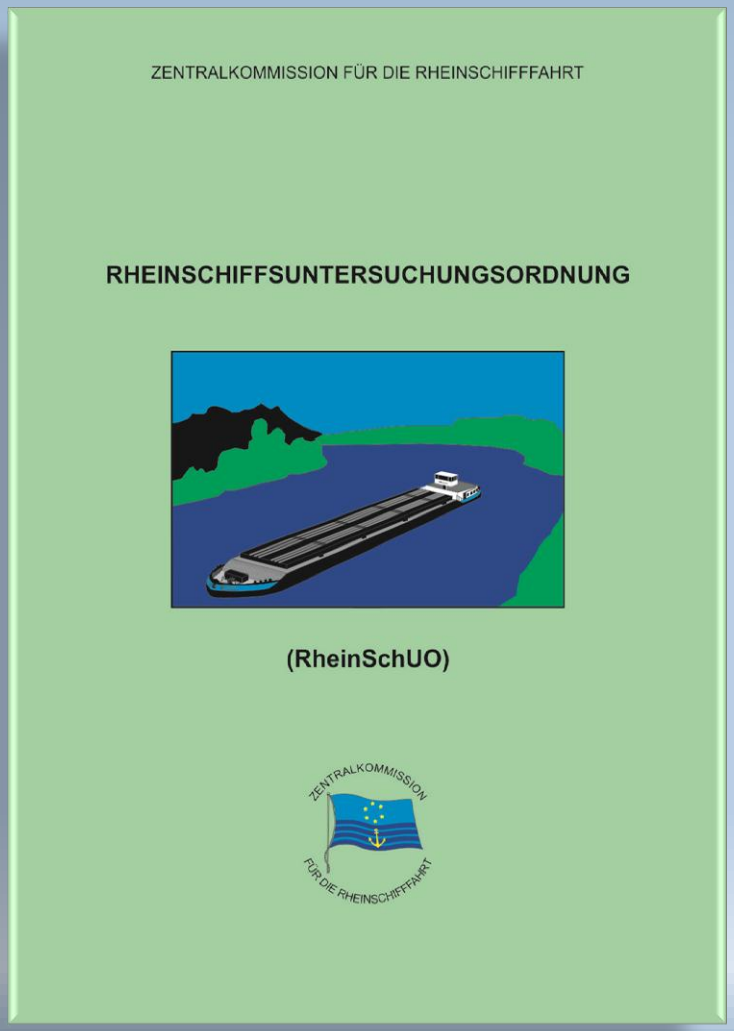
Rhine Police Regulations (RPR)

- General requirements for ship design, equipment and manning
- Documents to be carried on board
- Ships‘ operations incl. mooring, bunkering
- Markings (signs) etc.
- …



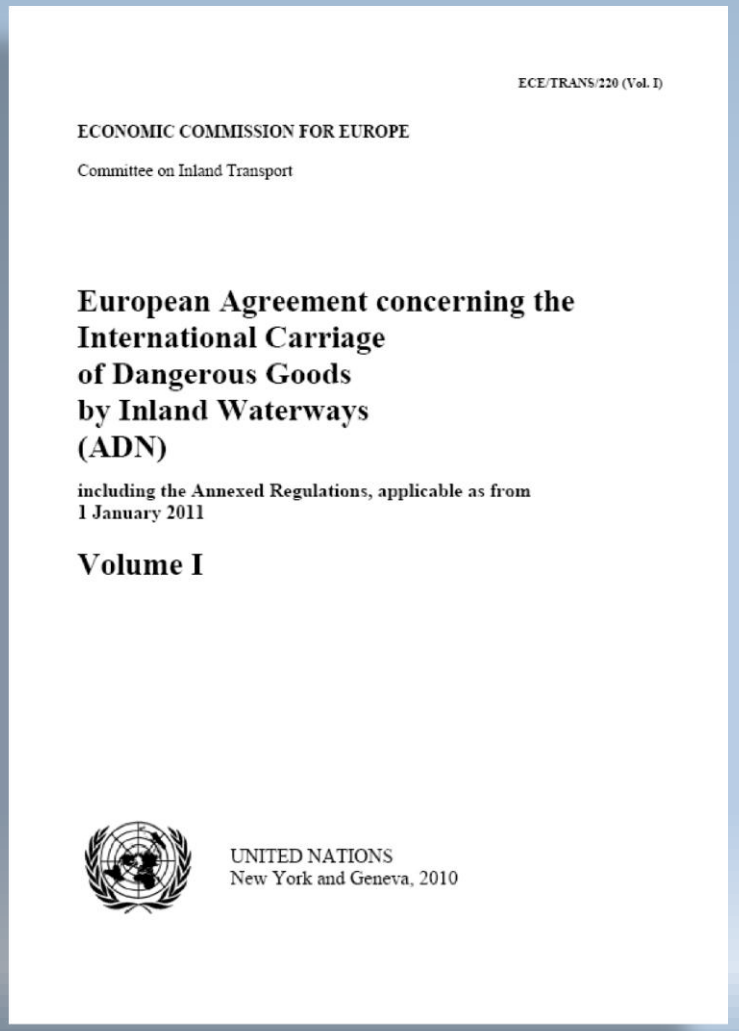
Rhine Vessel Inspection Regulations (RVIR)

- Ship design requirements
- Equipment
- Manoeuvrability
- Engine design incl. fuels
- Work safety
- Environmental protection



Regulations annexed to the ADN

- Classification of substances
- Packaging (containers)
- Handling of cargo
- Crew (experts)
- Equipment, operations
- Special technical requirements



ECE/TRANS/220 (Vol. I)

ECONOMIC COMMISSION FOR EUROPE

Committee on Inland Transport

European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN)

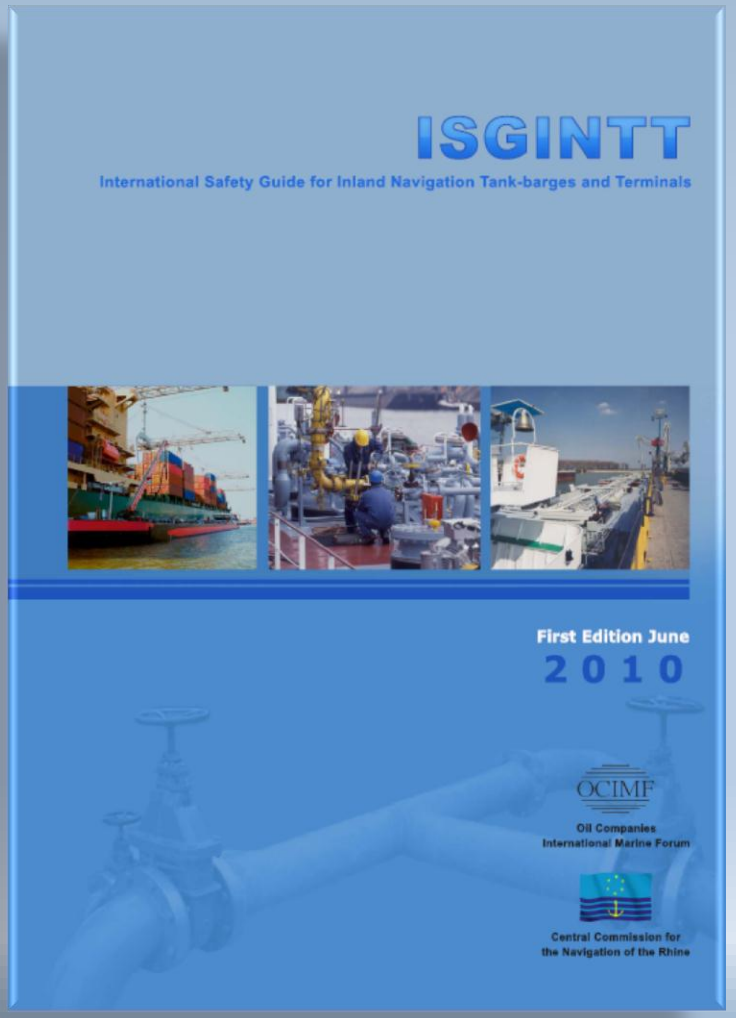
including the Annexed Regulations, applicable as from 1 January 2011

Volume I

UNITED NATIONS
New York and Geneva, 2010

International Safety Guide for Tank-barges & Terminals (ISGINTT)

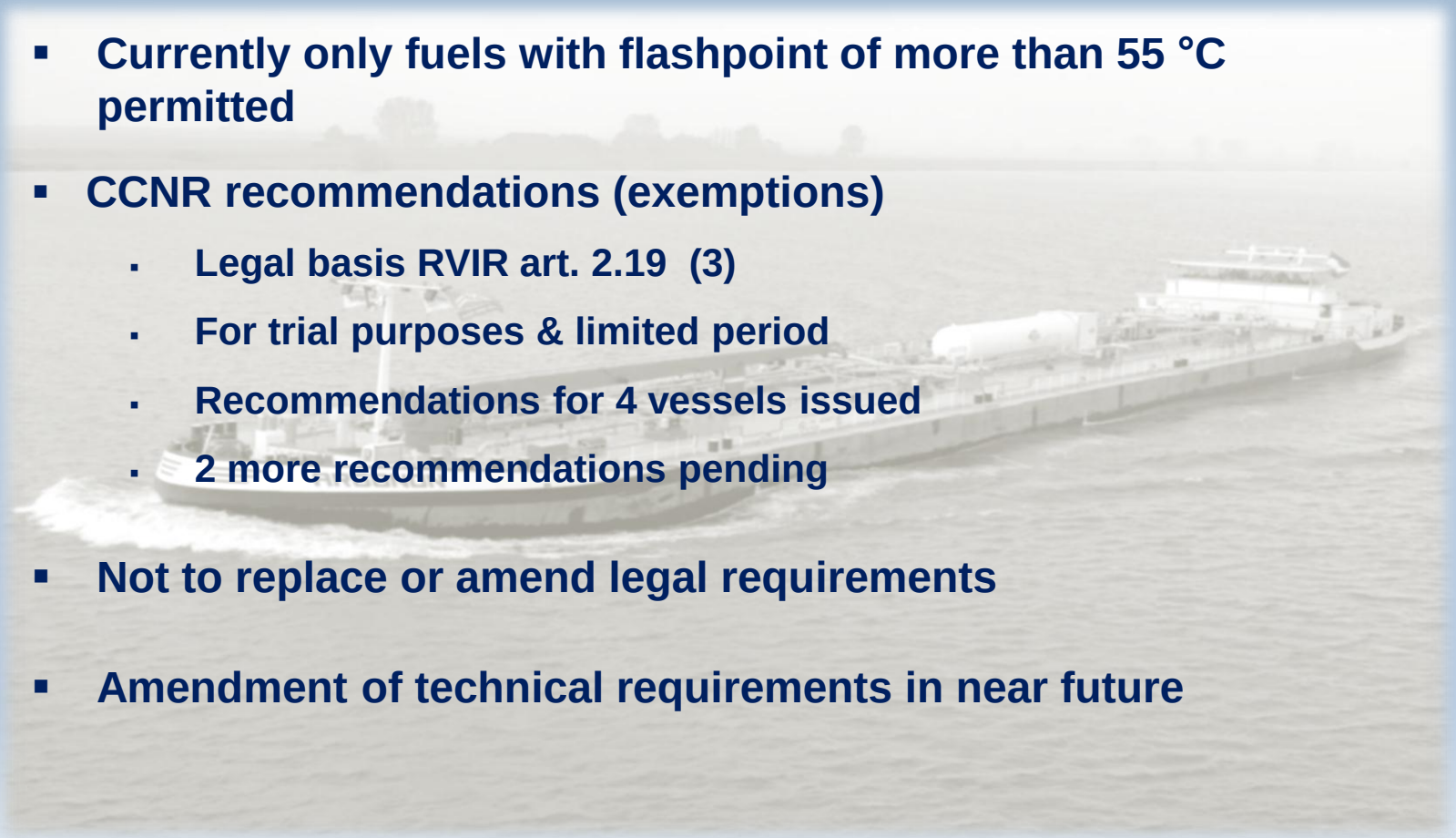
- To improve safety at interface of inland tank barges with other vessels or shore facilities
- Not to replace or amend legal requirements
- Best practices, recommendations
- Incl. gaseous products



Approval of LNG as fuel for inland navigation vessels in Europe



Approval of LNG as fuel for inland navigation vessels in Europe



- Currently only fuels with flashpoint of more than 55 °C permitted
- CCNR recommendations (exemptions)
  - Legal basis RVIR art. 2.19 (3)
  - For trial purposes & limited period
  - Recommendations for 4 vessels issued
  - 2 more recommendations pending
- Not to replace or amend legal requirements
- Amendment of technical requirements in near future

Content of CCNR recommendations for use of LNG as fuel

- **Description of exemptions from regulations & additional requirements**
- **Annexes**
  - **Hazard identification (HAZID) study**
  - **List of deviations from IMO IGF Code**
  - **Procedure for LNG bunkering**
  - **Crew training for LNG handling**
  - **General information for LNG system on board**
  - **Assessment of HAZID study (risk analysis)**

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Assumptions for LNG Scenarios

1. Market volume of all new engines:

- forecast for new buildings in the future
- Age structure of the inland fleet in Western Europe: IVR database
- Average lifetime of an engine is about 25 years. Average lifetime of an inland vessel is 50 years: this implies 2 engines during the vessels lifetime

2. Probability to choose LNG instead of Diesel: 2 extreme cases

- For Small vessels, LNG is no option at the moment, due to :
  - Space problem: for small ships, the LNG tank reduces the loading capacity to a significant extent
  - low Return on Investment: small ships do have less operating hours, hence less fuel cost savings if they switch to LNG
- For Push Boats, LNG is most profitable, due to many reasons:
  - very high fuel costs, therefore also significant fuel cost savings if the switch to LNG is made. No space problem.

Ship types and their LNG suitability

Criteria	Operating hours and fuel cost savings	Space requirements for the LNG tank	Safety issues
Tanker Ship	+	+	+
Push Boat	+	+	+
Dry Cargo Ship	0	0	0
Container Ship	+	+	0
Small Vessels	-	-	-

+ = very well suited for LNG; 0 = average suitability for LNG / dependant on specific case;

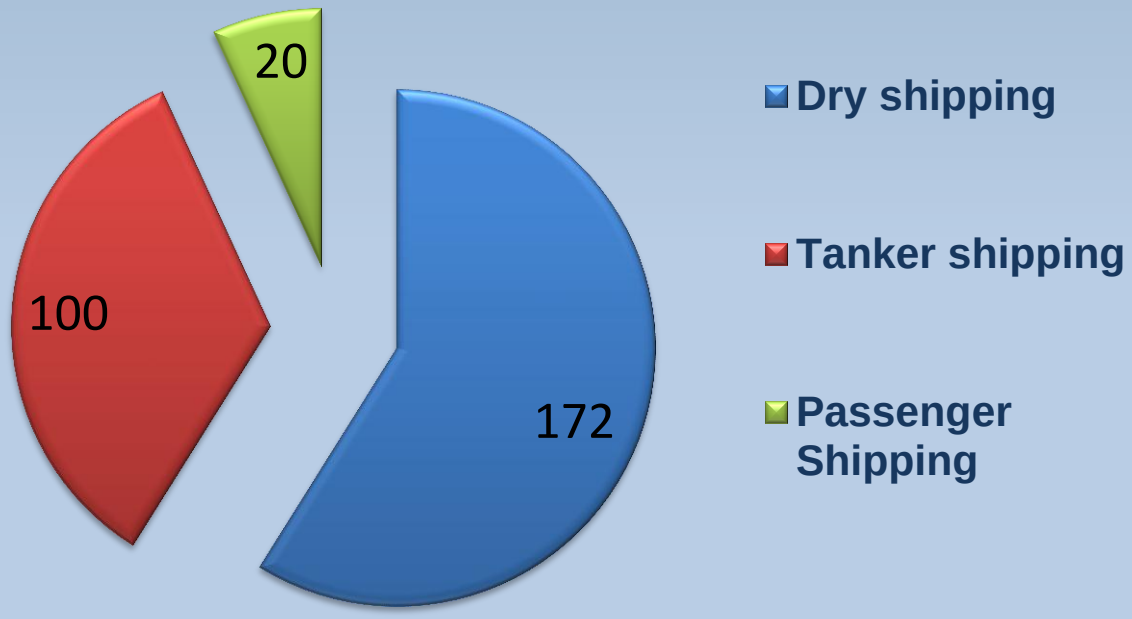
- = badly suited for LNG

Source: CCNR, based on assessments of classification societies and research institutes (DST; EICB)

Total yearly market volume new engines 2012 - 2020

- **Sum of renewals and new constructions**
- **Total volume = 300 engines per year**
- **<u>In total :</u>**

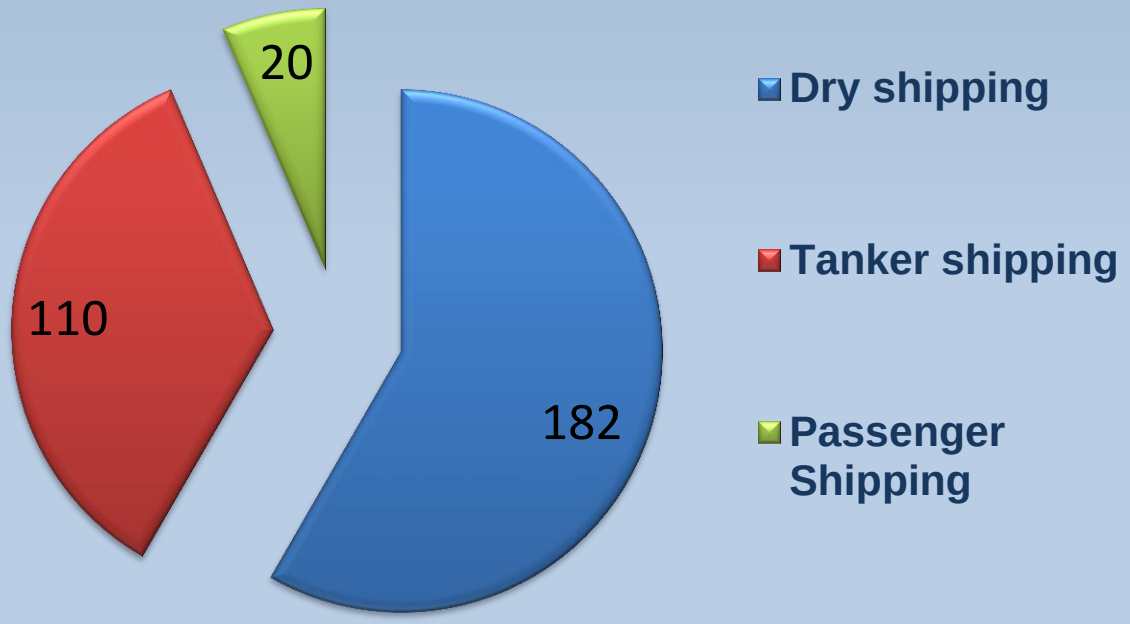
  2.300 engines during 2012 - 2020



Source: CCNR calculations, based on IVR database and average vessel life time 50 years, renewal rate = 2 engines per life time

Total yearly market volume new engines 2020 - 2030

- **Sum of renewals and new constructions**
- **Total volume = 312 engines per year**
- **<u>In total:</u>**
  3.120 engines during 2020 - 2030



Source: CCN calculations, based on IVR database and average vessel life time 50 years, renewal rate = 2 engines per life time

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Areas of activity

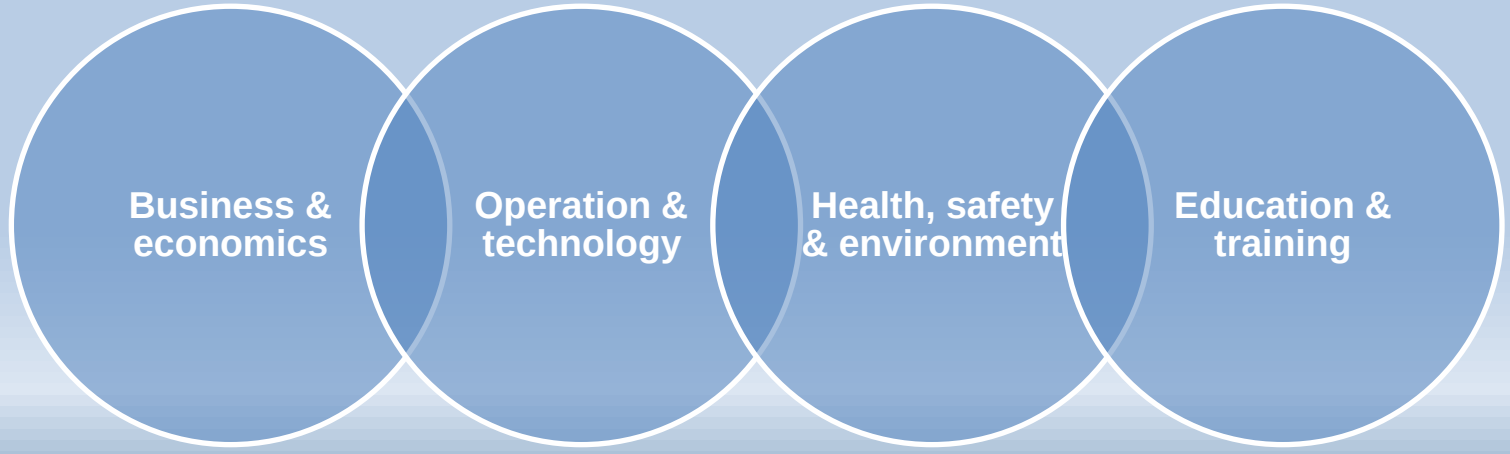
LNG supply

LNG storage & bunkering

LNG on-board

Establishment of LNG infrastructure, supply chain and increasing use of LNG as a fuel need to go hand in hand

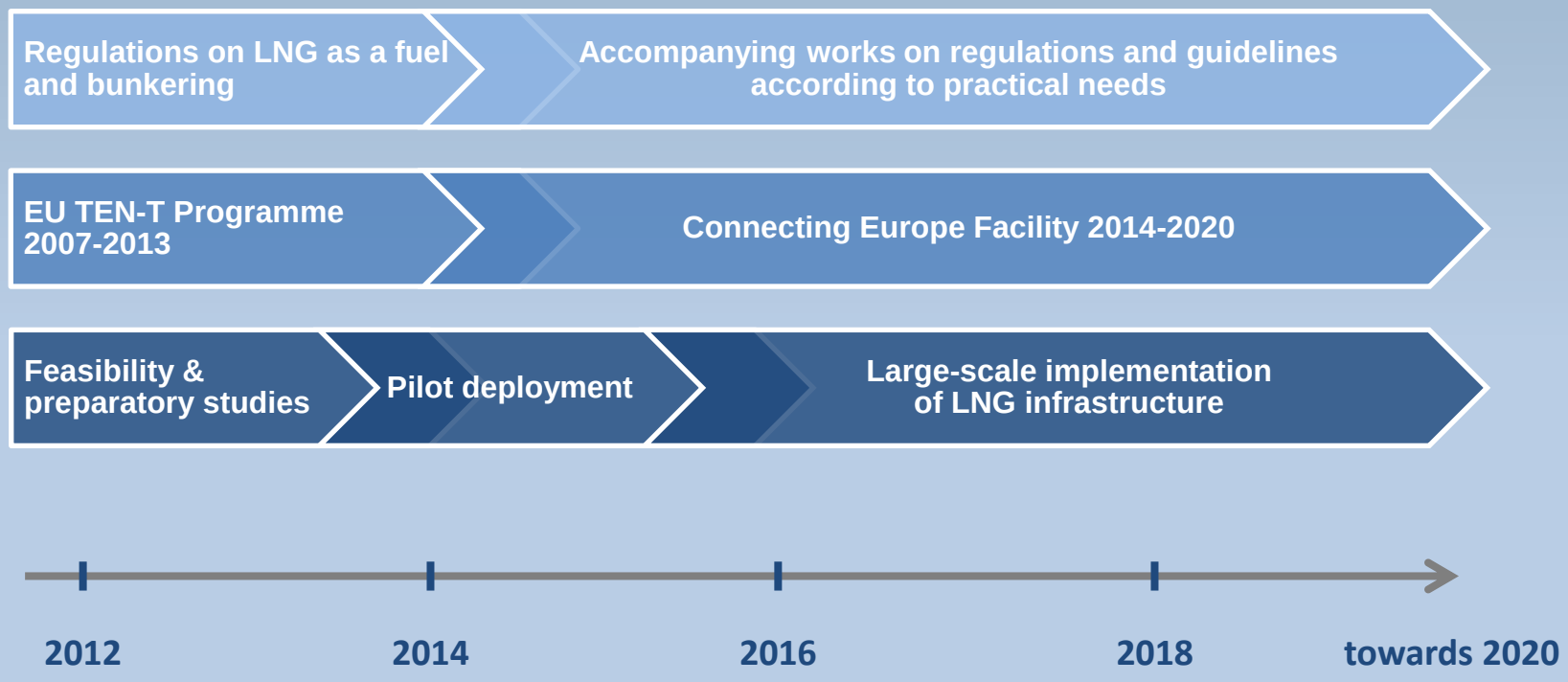
4 dimensions to be taken into account:



3 lines of activity

- Regulation & guidelines
- Financing
- Infrastructure development

Activities on an *indicative* timeline



Priorities

- Develop regulations on LNG as a fuel in IWT (technical, operational and training)
- Develop regulations/guidelines on bunkering (ship-to-shore, ship-to-ship interface)

?

- Submit an infrastructure project under the TEN-T Multi-Annual Call 2012
- Prepare for new funding opportunities (Connecting Europe Facility)

?

?

- Develop a strategic concept for the introduction of LNG in IWT
- Start preparatory works and pilot deployment of LNG infrastructure

→ Move towards implementation

?

The CCNR can:

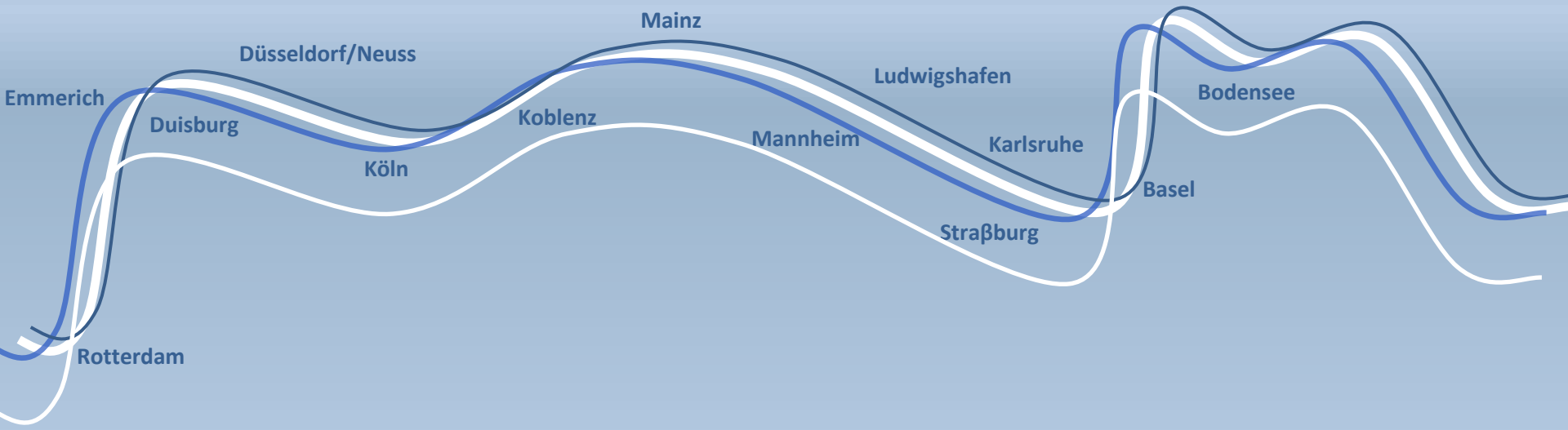
- deliver effective regulations & guidelines
- develop a strategic concept
- facilitate cooperation and exchange

THE REST IS UP TO OTHER KEY ACTORS
(IWT industry, ports and terminal operators, shipyards, public administrations,…)

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Next steps

- **Join forces to use existing EU funding opportunities**
  - Application deadline of TEN-T Multi-Annual Call: 28.02.2013
- **CCNR continues to work on regulations for LNG as a fuel**
  - Until completion continued issuing of recommendations
- **New CCNR informal “corresponding group” for LNG**
  - Facilitate exchange of information
- **CCNR Round Tables on LNG**
  - Early 2013: Establishment of bunkering facilities
  - Mid-2013: Focus on specific aspects of the LNG chain



THANK YOU FOR YOUR ATTENTION!

Hans van der Werf, CCNR

Secretary General

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