Key activities of the Central Commission for the Navigation of the Rhine related to

the safety, the greening and digitalization of the Rhine fleet

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Zagreb, September 2023

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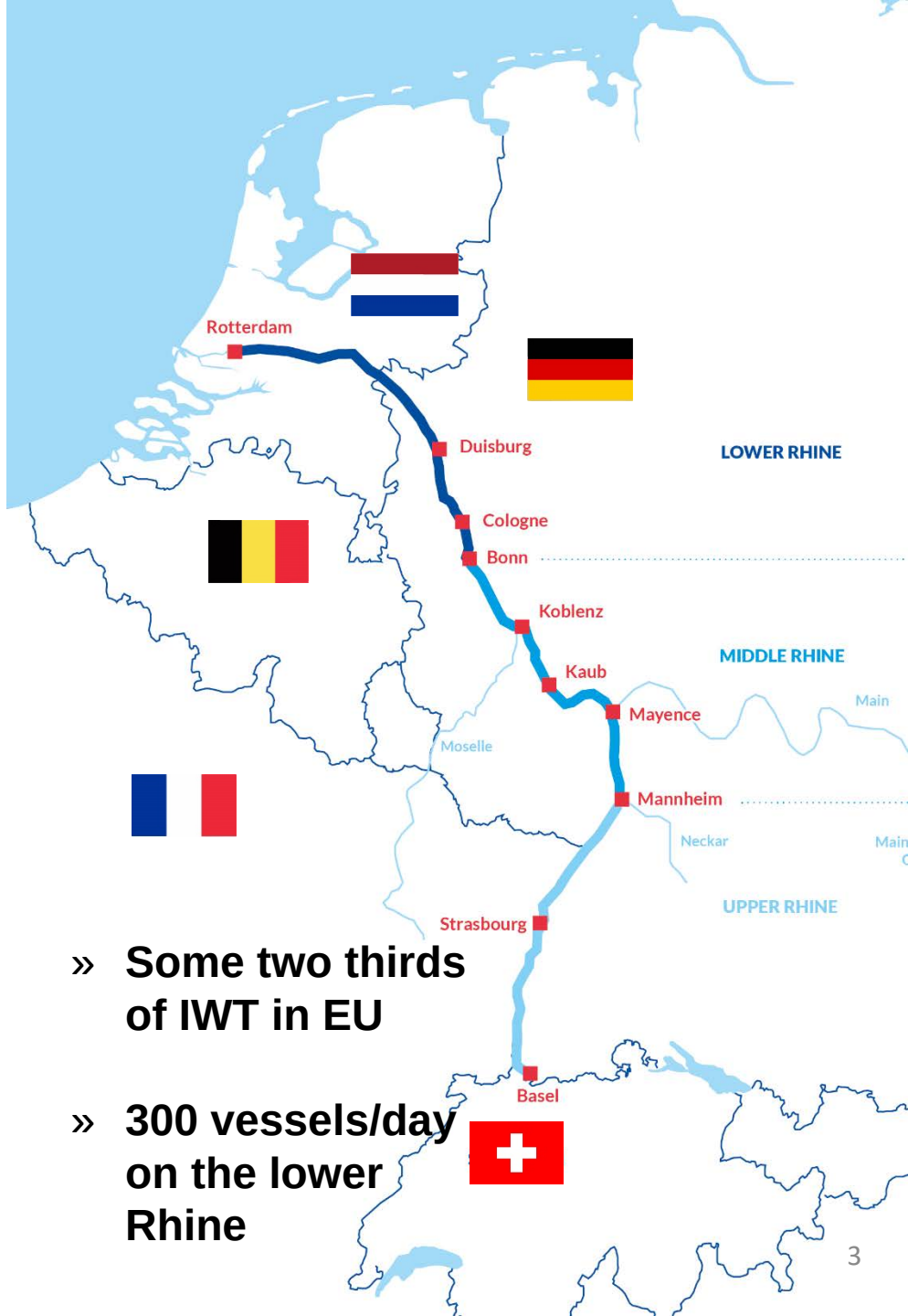
CCNR
COMMISSION CENTRALE
POUR LA NAVIGATION DU RHIN

1. **CCNR and policy objectives**
2. Appropriate regulatory framework and CESNI
3. Energy transition of the fleet
4. Automated navigation
5. Key messages

The organisation
CCNR

- **Oldest international organisation** in operation (1815)
- **5 Member States**, 11 Observer States
- **Cooperation** with other international organisations, such as EU and UNECE
- Intensive participation by industry
- Governs navigation on the Rhine: **freedom, safety** and **promotion** of navigation
- **Binding regulations** from Basel to the sea
  - Police/operational rules
  - Vessel technical requirements
  - Crew (qualification and manning)
- Other competencies relating to **infrastructure, economics, legal issues and dangerous goods**



- **Some two thirds of IWT in EU**
- **300 vessels/day on the lower Rhine**

Mannheim Declaration
Policy objectives

In the Mannheim Declaration (2018),
Ministers in charge of transport of the CCNR Member States:

"support constructive collaboration between the CCNR and the European Union, the other river commissions, the UNECE, the associations recognised by the CCNR and all other inland navigation players.

"emphasise the need for up-to-date, workable and harmonised environmental and safety regulations in Rhine and inland navigation".

"task the CCNR to develop a roadmap in order to ***largely eliminate greenhouse gases and other pollutants by 2050****"*

"call on the CCNR to press ahead with development of digitalisation, automation and other modern technologies, thereby contributing to the competitiveness, safety and sustainability of inland navigation".

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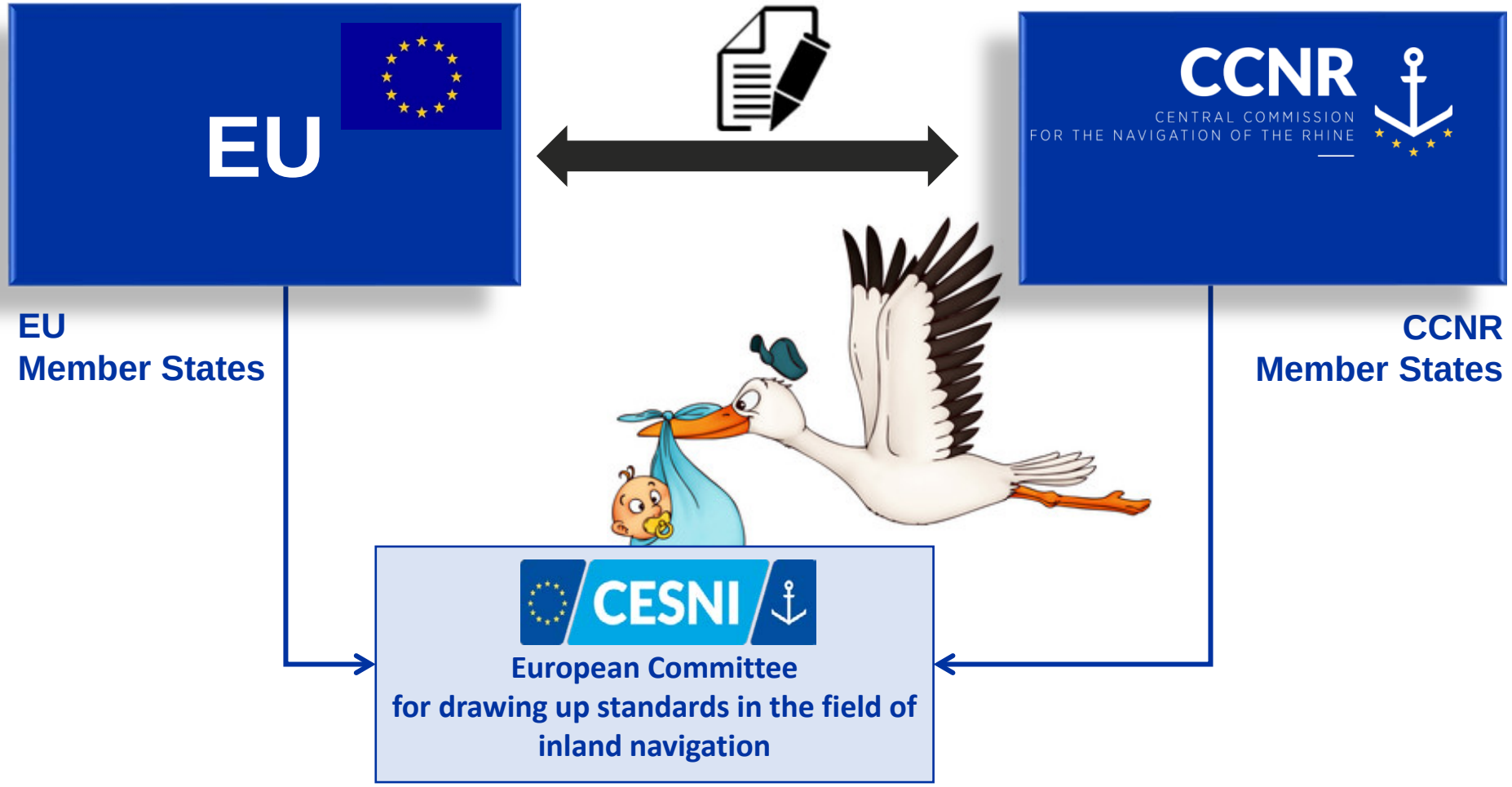
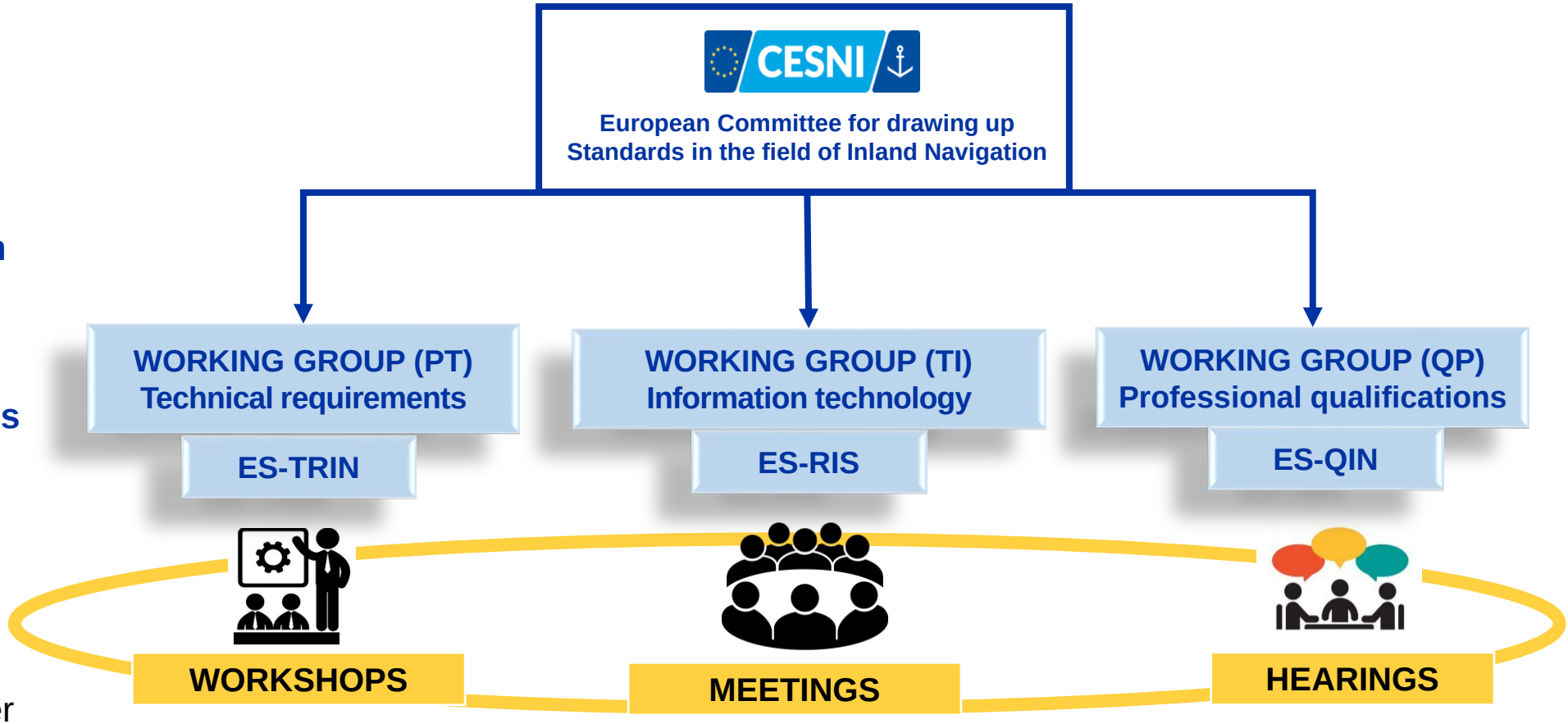
An appropriate regulatory framework

Role of CESNI



An appropriate regulatory framework
Role of CESNI

- **adopting technical standards** in various fields
- deliberating on their **uniform interpretation and application**
- **deliberating on derogations and equivalences** of technical requirements for specific crafts
- **deliberating on priority topics** (safety of navigation, environment protection, other areas).



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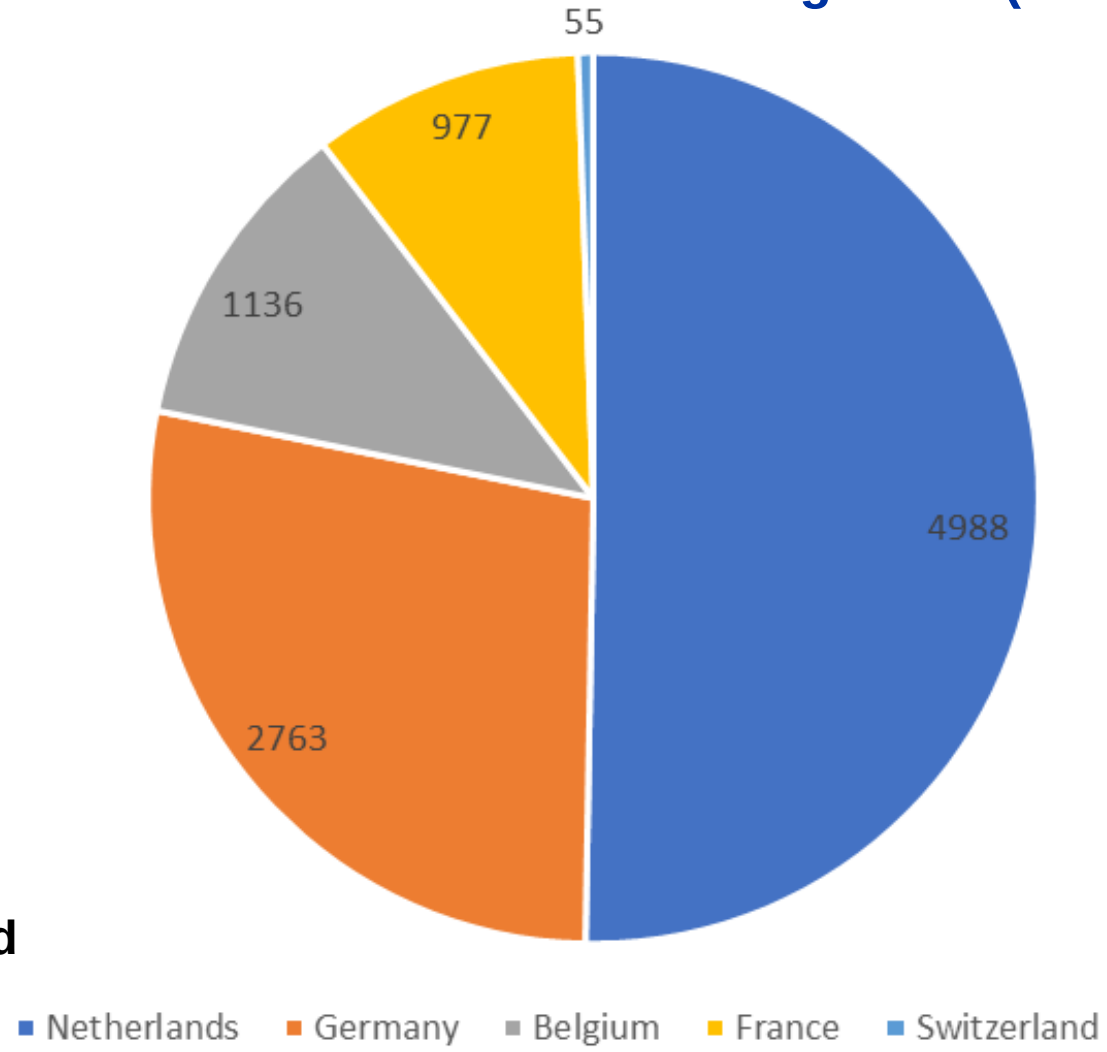
The fleet
Figures and challenges

- Energy transition seen as a **crucial challenge** for inland navigation

- Innovations to reduce emissions from **existing and new vessels** have increased but are limited to pilot projects

- Pilot projects are of **utmost importance** to:
  - gain knowledge of new technologies
  - addressing **economic, financial, technical and regulatory obstacles** to their deployment
  - Active role of the CCNR with recommendations to the inspection bodies (RVIR, Article 2.20)

Size of the CCNR states cargo fleet (2022)*



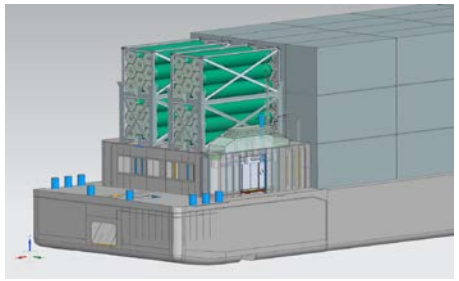
Sources: CCNR Market observation (2023), VNF (France), CBS/Rijkswaterstaat (Netherlands), ITB (Belgium), German Waterways and Shipping Administration (WSV), Swiss Waterway Administration
**cargo = liquid and dry vessels, push and tugs*

In addition, 410 river cruise vessels on European waterways (almost 50% registered in CH, >100 in DE, NL and FR)

The fleet

Pilot projects for greening and digitalisation

Compressed hydrogen



CNG

Méthanol

Batteries

» Recommendations published on https://www.ccr-zkr.org/13020500-en.html#05

The fleet
Transition pathways 2035 / 2050

Two transition pathways – why?

- **Many technological solutions available** but with different levels of maturity
- **No “one-size-fits-all” solution**
- Many **uncertainties** as to technology development, prices, availability of fuels
- Technology **neutral and open approach**
- **Reality in the middle** of the two pathways

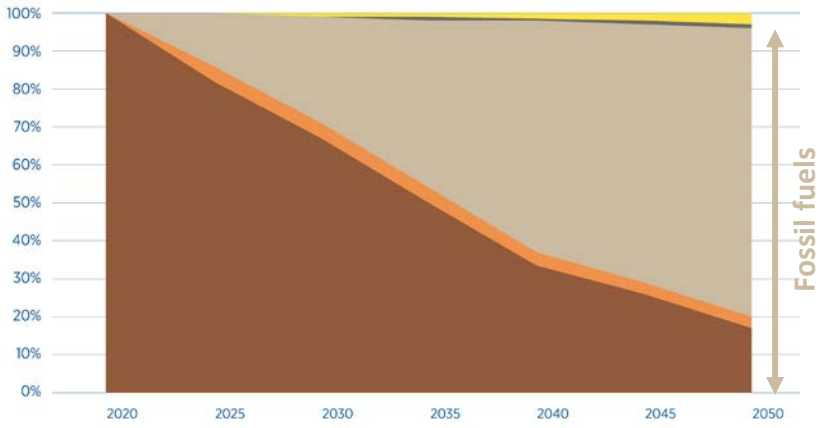
The fleet

Transition pathways 2035 / 2050

CCNR 2 or below
CCNR 2 + SCR
Stage V, Diesel
LNG
Stage V, HVO
LBM
Battery
H_2 , FC
H_2 , ICE
MeOH, FC
MeOH, ICE

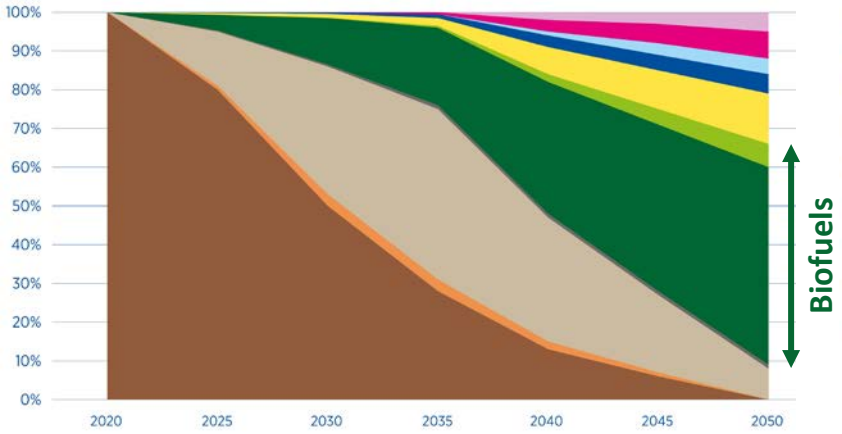
The graphs below describe the development of fuel share (in %) within the fleet (new and existing vessels) towards 2050…

… in the “business-as-usual” scenario



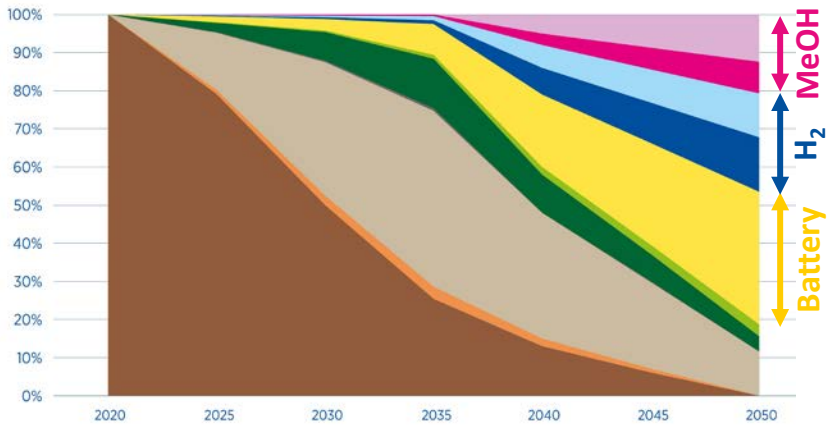
GHG: -22% by 2050
NOx: -76% by 2050
PM: -83% by 2050

… in the “conservative” pathway



GHG: -91% by 2050
NOx: -90% by 2050
PM: -96% by 2050

… in the “innovative” pathway



GHG:-91% by 2050
NOx: -94% by 2050
PM: -98% by 2050

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CCNR's vision on Automation

- **Automation implies a profound transformation of inland navigation**
  - New opportunities and challenges
  - Improving competitiveness and promoting modal shift
  - Guaranteeing an at least equivalent level of safety

- **Holistic approach** Operational rules regulations, communication,crew qualification and composition, vessel technical requirements, infrastructure, legal issues (liability, data protection), cyber security.

- CCNR work done in a **dedicated international committee (RN)**

- **First international definition of automation levels in inland navigation**
(2018, revised in 2022)

	Level of automation[1]	Designation	Craft command (steering, propulsion, wheelhouse, etc.)	Monitoring of and responding to navigational environment	Fallback performance of dynamic navigation tasks
BOATMASTER PERFORMS PART OR ALL OF THE DYNAMIC NAVIGATION TASKS	0	**NO AUTOMATION** the full-time performance by the boatmaster of all aspects of the dynamic navigation tasks, even when supported by warning or intervention systems			
	1	**STEERING ASSISTANCE** the context-specific performance by a steering automation system using certain information about the navigational environment and with the expectation that the boatmaster performs all remaining aspects of the dynamic navigation tasks			
	2	**PARTIAL AUTOMATION** the context-specific performance by a navigation automation system of both steering and propulsion using certain information about the navigational environment and with the expectation that the boatmaster performs all remaining aspects of the dynamic navigation tasks			
SYSTEM PERFORMS THE ENTIRE DYNAMIC NAVIGATION TASKS (WHEN ENGAGED)	3	**CONDITIONAL AUTOMATION** the sustained context-specific performance by a navigation automation system of all dynamic navigation tasks, including collision avoidance, with the expectation that the boatmaster will be receptive to requests to intervene and to system failures and will respond appropriately			
	4	**HIGH AUTOMATION** the sustained context-specific performance and fallback performance by a navigation automation system of all dynamic navigation tasks, without expecting a boatmaster responding to a request to intervene[2]			
	5	**AUTONOMOUS = FULL AUTOMATION** the sustained and unconditional performance and fallback performance by a navigation automation system of all dynamic navigation tasks, without expecting a boatmaster responding to a request to intervene			

[1] Different levels of automation may make use of remote control but different conditions to be defined by competent authorities might apply in order to ensure an equivalent level of safety.
[2] This level introduces two different functionalities: the ability of "normal" operation without expecting human intervention and the exhaustive fallback performance. Two sub-levels could be envisaged.

CCNR's vision on Automation

Vision relying on pilot projects

» open to pilot automated or remotely controlled vessels on the busiest inland waterway in Europe

» design and implement an international procedure on the Rhine

» **Next steps**

  » In close cooperation with CESNI Develop requirements and/or recommendations for track guidance assistance systems in inland navigation (TGAIN)

  » Identify gaps and obstacles to automated navigation in existing regulations

  » Examine pilot projects !

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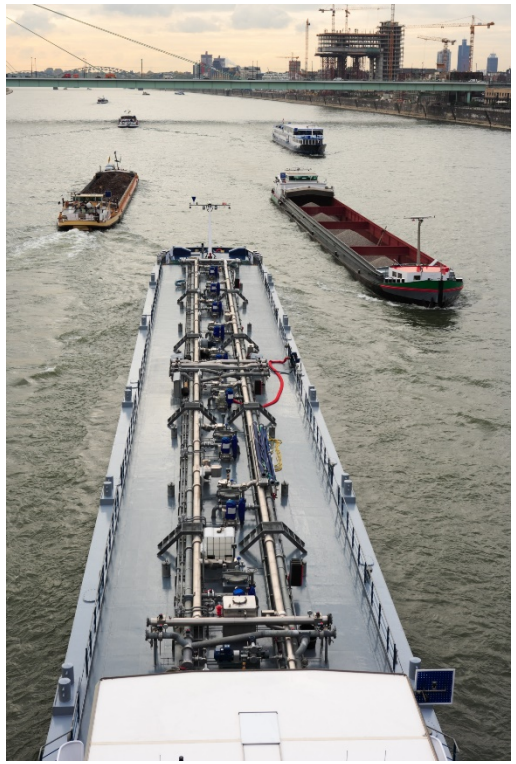
Key messages



- **European standard laying down technical requirements for inland navigation vessels (ES-TRIN)** = key instrument to
  - guarantee high level of safety on European waterways
  - limit the environmental impact
  - ensure fair inland navigation conditions
  - promote the convergence of regulatory frameworks at European level, including on the Rhine and Danube,
  - support the greening and digitalization of inland fleet

- **Essential role of the inspection bodies**
  - in the implementation of ES-TRIN and in the feedback to identify difficulties
  - to rise the forthcoming challenges for a safe and sustainable inland navigation

- **Thanks to Croatia** for hosting this CESNI meeting. Wishing a fruitful conference!

THANK YOU FOR YOUR ATTENTION

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