Hundreds of vessels.

Thousands of inspections.

One Classification Society.

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Croatian Register of Shipping

Zagreb, 02 June 2022

The Future of Inland Navigation in the Danube Region

IVR Congress 2022

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About CRS

- Austrian Veritas was founded in this area as early as 1858, as the third classification society in the world, since 1949 acts as Yugoslavian Register of Shipping until 1992 when CRS has been established
- CRS is IACS member and RO; CRS Inland is a competent authority and inspection body according to Directive (EU) 2016/1629 and is authorised to carry out all statutory surveys and inspections requested in accordance to valid EU regulations
- ADN recommended classification society and recognised classification society according to Directive (EU) 2016/1629
- More than 600 craft under supervision

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General

- The Danube (2860 km); The world's most international river, crossing through 10 countries and extending into 19 countries
- 9 EU Member States
- 5 non-EU countries
- Danube covers an area which is home to 112 million people or one-fifth of the EU's population
- The source is in Germany (Baden-Württemberg)

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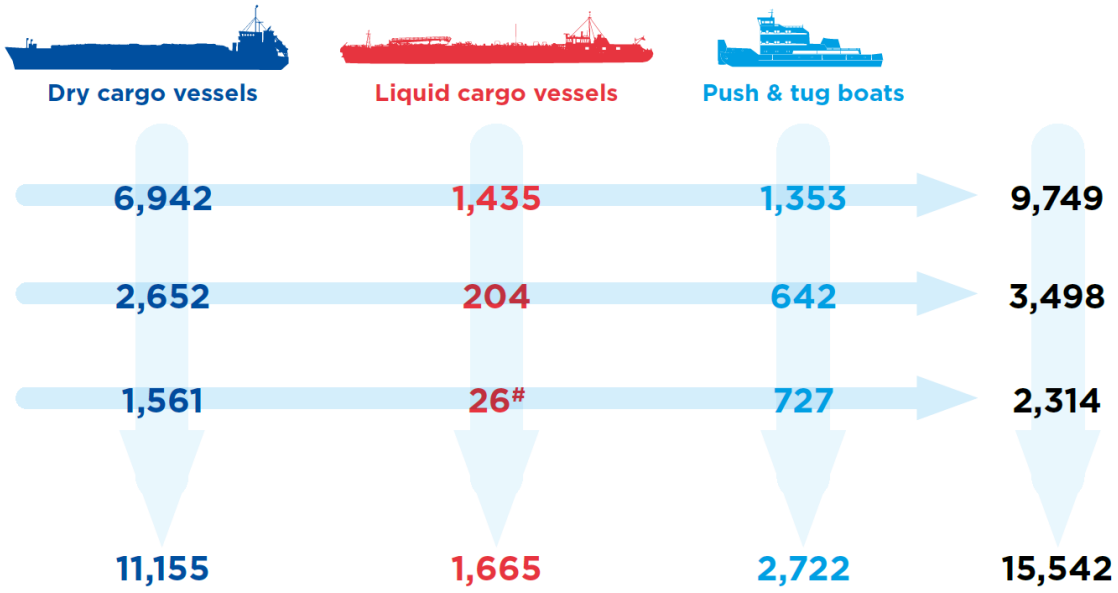
General

- Importance of river Danube for all Danube Region countries
- Importance of inland waterways transport (IWT) and inland navigation at all
- The total Danube fleet - around 3.500 inland navigation vessels (European IWT market 15.500 vessels)



*Sources: 1) Rhine countries: VNF (France), CBS/Rijkswaterstaat (Netherlands), ITB (Belgium), Waterway Administration of Germany, National fleet register of Luxembourg, Swiss Waterway Administration. 2) Danube countries: Danube Commission. 3) Other countries: Eurostat [iww_eq_ loadcap], [iww_eq_age], Czech Ministry of transport, Statistics Poland, Statistics Lithuania. * Other countries = Poland, Czech Republic, Italy, United Kingdom, Finland, Lithuania*
 # comprises 9 tanker vessels in Poland, 1 in the Czech Republic and 16 in Lithuania, but an unknown number in the other countries.

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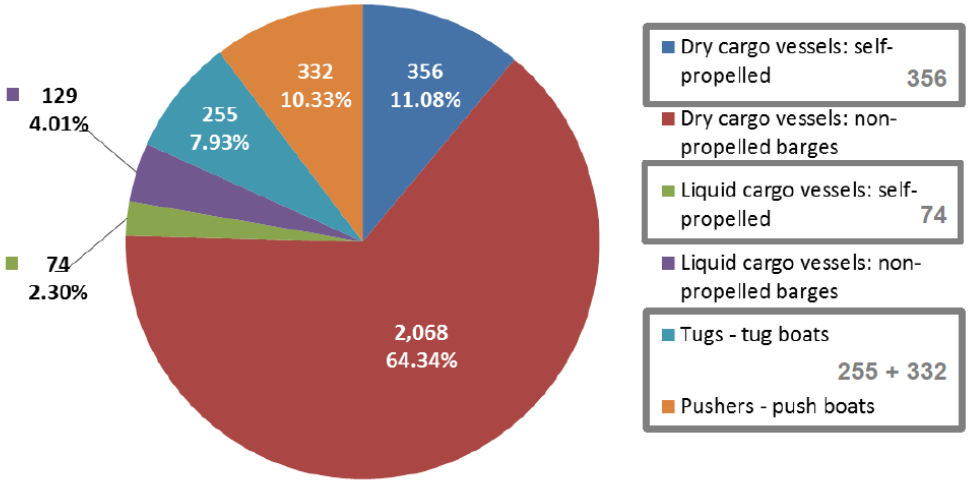
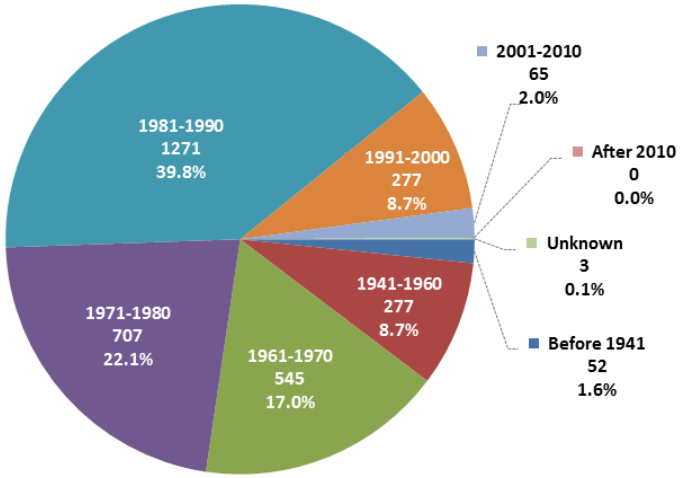
General

- Self-propelled dry cargo vessels: 356
- Self-propelled tank vessels: 74
- Tugs: 255
- Pushers: 332

Types of Danube Inland Vessels



Age of Danube Inland Vessels



Sources: 1) Danube Commission

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The Future

- The target is to make IWT transport more energy efficient and more climate and environmentally friendly through modernisation and greening of IWV and to shift more goods from roads to inland waterways in order to achieve European (and world-wide) climate protection and environmental goals
- IWT still the most environmentally friendly mode of transport in terms of transported volumes (tonne-kilometre); however need to catch up with air pollutant emissions and logistics challenges
- IWT in Danube Region will significantly increase
- Further Development of the Danube Countries
- Research and innovation projects (LNG Masterplan, PROMINENT, PLATINA, EIBIP,…) as well as the policy initiatives (NAIADES) which looked into modernisation of inland vessels
- EU-Wide Strategy for Innovation Uptake in Inland Waterway Transport (EIBIP & www.INDanube.eu)
- Legislation was taken into account (ES-TRIN, ADN, NRMM, etc.)
- Lessons learned from the preparation of the new State Aid schemes, incl. past and existing in various EU Member States (Germany, Croatia, France, Belgium, Netherlands, Czech Republic, etc.)

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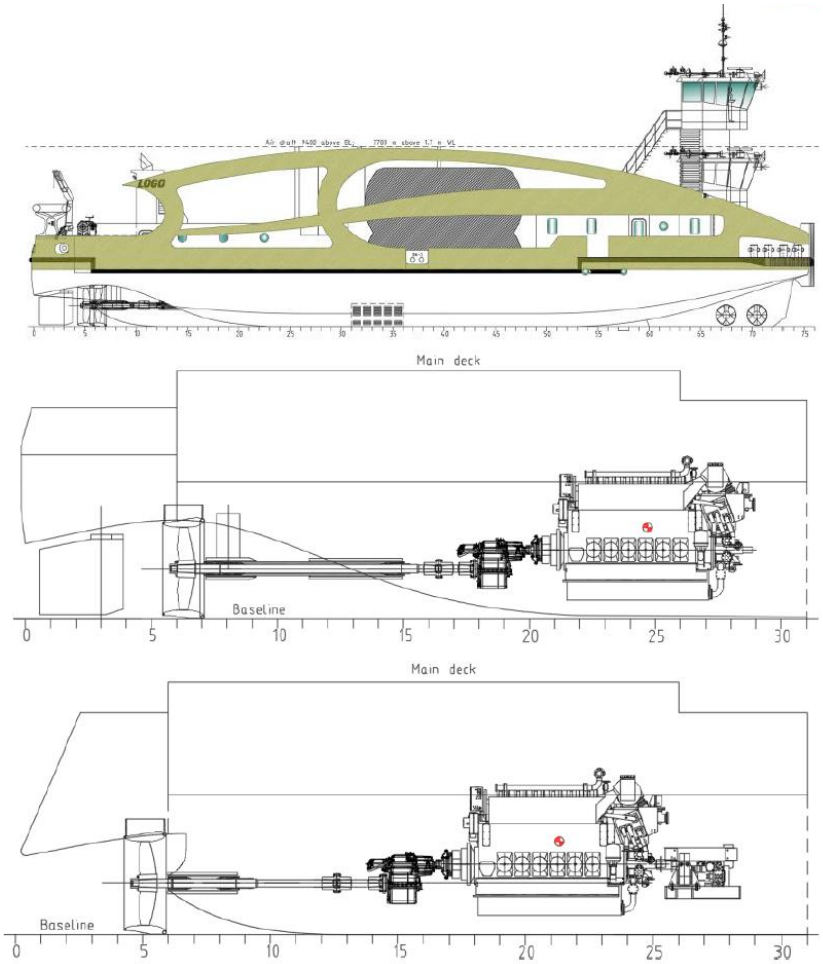
Further Developing

- Autonomous Shipping
- Gas and Gas-Electric Propulsion
- Diesel-Electric Propulsion
- After Treatment
- Fuel Cells Propulsion
- Battery Electric Propulsion
- Drop-In Fuels
- EURO VI Truck and NRE Engines
- Energy Efficient Navigation

FOCUS

Sources: Interreg / GRENDEL



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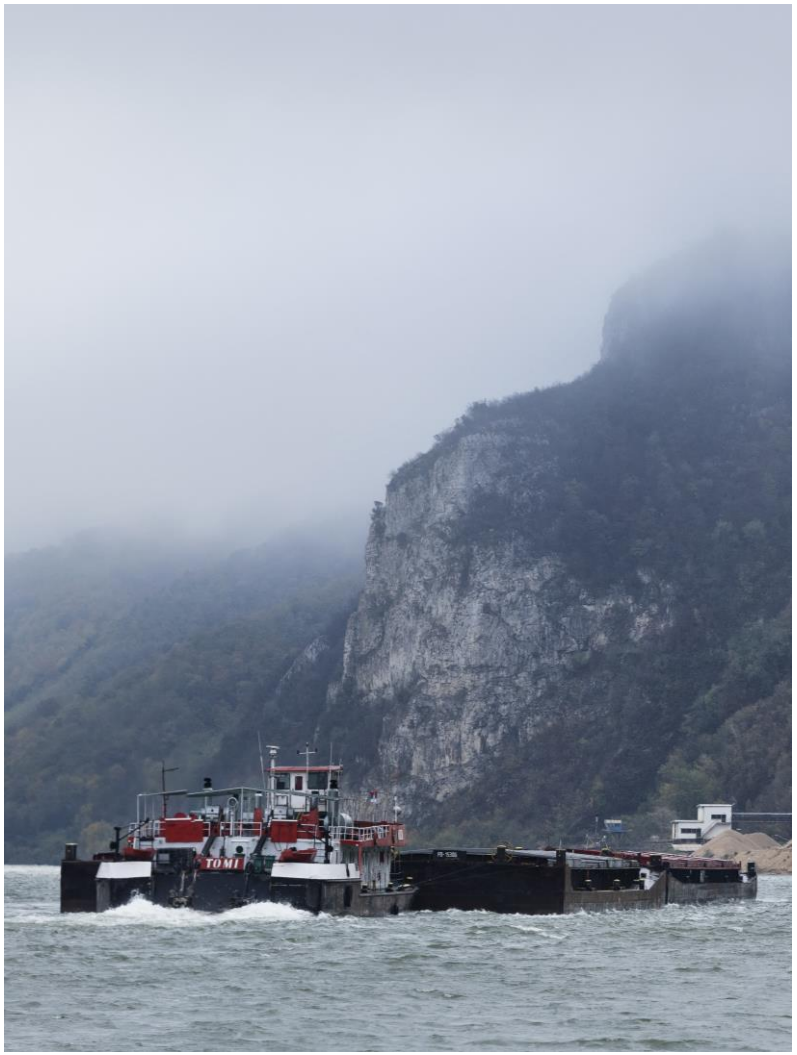
Transitional Pathways for IWT by 2035 and 2050

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, etc.
- Technology neutral and open approach

Purpose of the transition pathways

- Describe the expected evolution of the fleet (new and existing vessels) and the technologies and fuels used to achieve the 2035 and 2050 goals.
- Ease the dimensioning of policy measures (financing, regulatory, logistics, infrastructure…)



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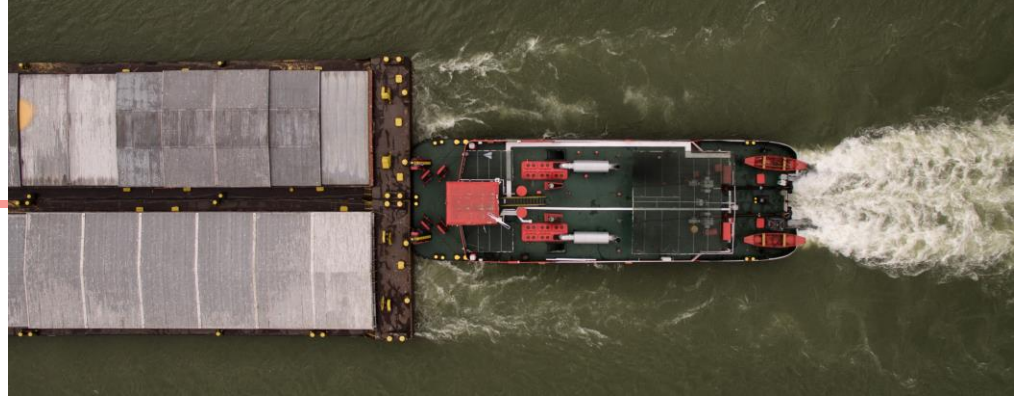
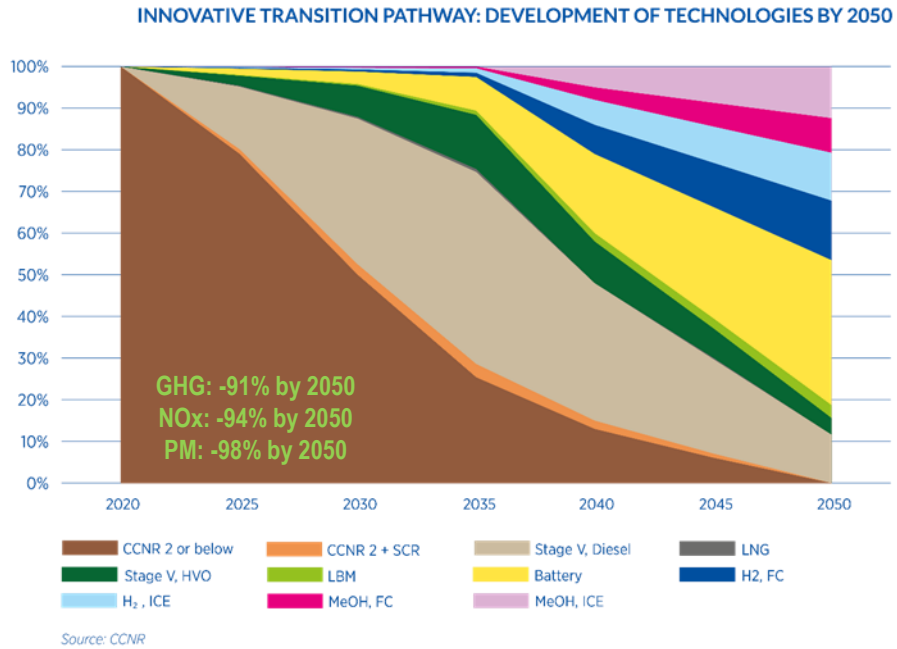
Transitional Pathways for IWT by 2035 and 2050



Fossil fuels	CCNR 2 or below, Diesel	Fossil diesel in an internal combustion engine which complies with the emission limits CCNR 2 or older engine.
Fossil fuels	CCNR 2 + SCR, Diesel	Fossil diesel in an internal combustion engine which complies with the emission limits CCNR 2 and equipped with an additional Selective Catalytic Reduction system.
Fossil fuels	Stage V, Diesel	Fossil diesel in an internal combustion engine which complies with the emission limits EU Stage V.
Fossil fuels	LNG	Liquefied Natural Gas in an internal combustion engine which complies with the emission limits EU Stage V.
Biofuels	Stage V, HVO	HVO in an internal combustion engine which complies with the emission limits EU Stage V. HVO stands for hydrotreated vegetable oil itself (without blending with fossil fuels) and all comparable drop-in biofuels (including e-fuels) as well as synthetic diesel made with captured CO_2 and sustainable electric power.
Biofuels	LBM	Liquefied Bio Methane (or bio-LNG) in an internal combustion engine which complies with the emission limits EU Stage V.
Battery	Battery	Battery electric propulsion systems, with fixed or exchangeable battery systems.
Hydrogen	H_2, FC	Hydrogen stored in liquid or gaseous form and used in fuel cells.
Hydrogen	H_2, ICE	Hydrogen stored in liquid or gaseous form and used in internal combustion engines.
Methanol	MeOH, FC	Methanol used in fuel cells.
Methanol	MeOH, ICE	Methanol used in internal combustion engines.

Technologies considered in the roadmap

- **Focus on a set of technologies with a technology readiness level (TRL) of 5**
  (Technology validated in relevant environment)



Sources: 1) CCNR

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Transitional Pathways for IWT by 2035 and 2050

Ferries and day-trip vessels
Vessels operating locally (especially, in densely populated areas) with a limited energy demand

→ **Investment in ELECTRIC DRIVETRAINS WITH BATTERIES**

Large push boats with internal combustion engines (ICE). Carbon footprint reduced by using use drop-in fuels (HVO, LBM) and after treatment systems

→ **Investment in CLEAN & EFFICIENT ICE**

New or retrofitted ships, only if the operational profile suitable

→ **Investment in ELECTRIC DRIVETRAINS (modular approach)**

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Sources: 1) CCNR

How to act?

State Aid Programme for Promoting Sustainable Modernisation of Inland Waterway Vessels in the Danube Region – Five Pillars (Priorities)

1 Environmental Performance

Reducing emissions of gaseous and particulate pollutants from internal combustion engines and auxiliary motors installed on vessels and by implementing other measures with direct environmental benefits.

2 Integration into logistics chains

Increasing the involvement of inland waterway transport in multimodal transport chains by making the vessels more competitive, operationally flexible and secure in the context of multimodal transport chain.

3 Increasing safety of IWT

Focusing at safety equipment, safety at work, adaptations to wheelhouse, steering system and manoeuvrability of a vessel, all to support a skipper in navigational and operational aspects / decisions → increase safety.

4 Renewal of actors in the sector

Encourage the acquisition of the first boat for new river transport companies and new entrants.

5 Innovative solutions

Development and experimentation with innovative solutions:

- ► experimentation w. existing or new technology, unproven for IWT
- ► R&D: design of new technologies to respond to specific needs of IWT
- ► feasibility studies

The work already done in GRENDEL (Green and Efficient Danube Fleet) delivers the input for the national operational programmes

Sources: 1) interreg Danube Transnational Programme

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Our role as a Classification Society?

- 50 years of experience of CRS Inland with battery electric inland vessels (at the moment 17 electric propelled passenger day trip vessels in national parks)
- The need of pilot projects in the future – Important for further development
- Technology is always ahead of Regulations!
- The need of further development of technical requirements

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Our role as a Classification Society?

- Classification Societies plays important role in the further development of sustainable inland waterway shipping
- As the use of alternative fuels is rather new in the inland waterway business sharing of knowledge and cooperation is the key!

- All CS work together on further developments and on new technical requirements
- Strong cooperation between CS within their working groups (GERC, ADN Recognised CS) and together with national delegations within CESNI

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Thank you very much for your attention!

Any questions? For more information, please check our website inland.crs.hr

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