Inland Navigation Week

EU PROJECT: NEEDS

simulation model for sustainable inland waterway transport

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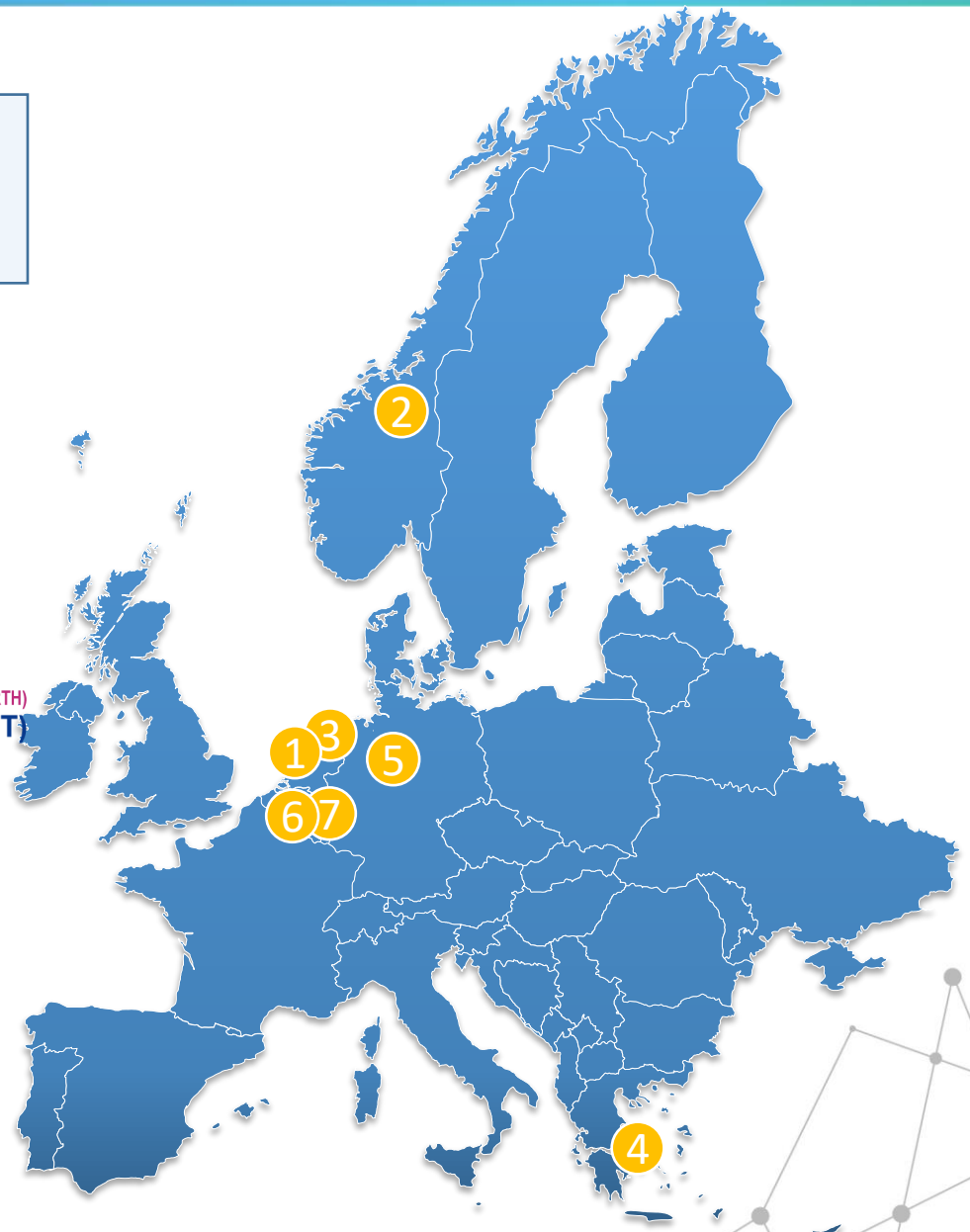
Needs

Project identity

1. MARIN — BETTER SHIPS, BLUE OCEANS — **Project Coordinator**
2. SINTEF
3. Expertise- en InnovatieCentrum Binnenvaart — EICB
4. CENTRE FOR RESEARCH AND TECHNOLOGY HELLAS (CERTH) — Hellenic Institute of Transport (HIT)
5. BALance® Technology Consulting
6. WATERBORNE
7. SEA Europe — Shipyards' & Maritime Equipment Association



- **NE**w sustainabl**E** fuel **D**eployment **S**cenarios (NEEDS)
- Horizon Europe CSA project to coordinate/support research activities and policies
- 1 May 2022 – 31 October 2023
- Estimated project cost €523.437
- Requested EU contribution €523.437

Policy background

THE EUROPEAN GREEN DEAL

SUSTAINABLE & SMART MOBILITY STRATEGY

TEN-T Trans-European Transport Network

FIT FOR 55

Impact on energy infrastructure

- Energy transition towards a zero-emission IWT
- Enable this transition through the creation of a clean energy infrastructure

Objectives

- The realisation of the clean energy infrastructure faces economic, legal and technical challenges.

- Objective NEEDS: Develop a quantified and dynamic **techno-economic model** and an associated methodology for defining and **assessing the most efficient clean energy deployment strategies** in different countries and regions across Europe.

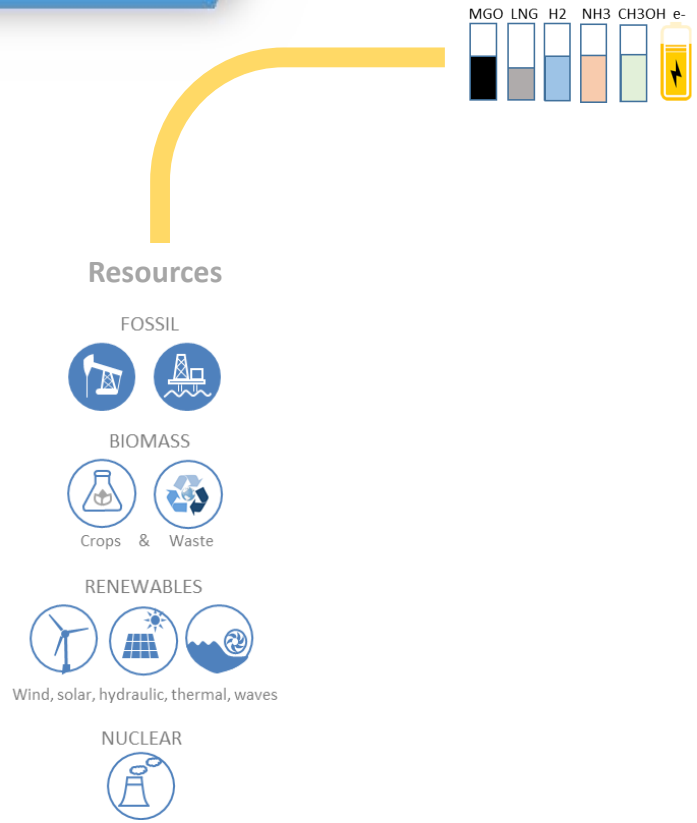
Objectives

- Simulate different scenarios of clean energy deployment, containing regional information (i.e. Rhine IWT and maritime shipping Greek islands)

- The goal is to build a good model, eventually (after the project) analyses can be performed for multiple regions, fleet families, trajectories, etc.

- Simulation model will help the commission, the member states, the regional waterborne community and ports in evaluating the most efficient transition pathways.

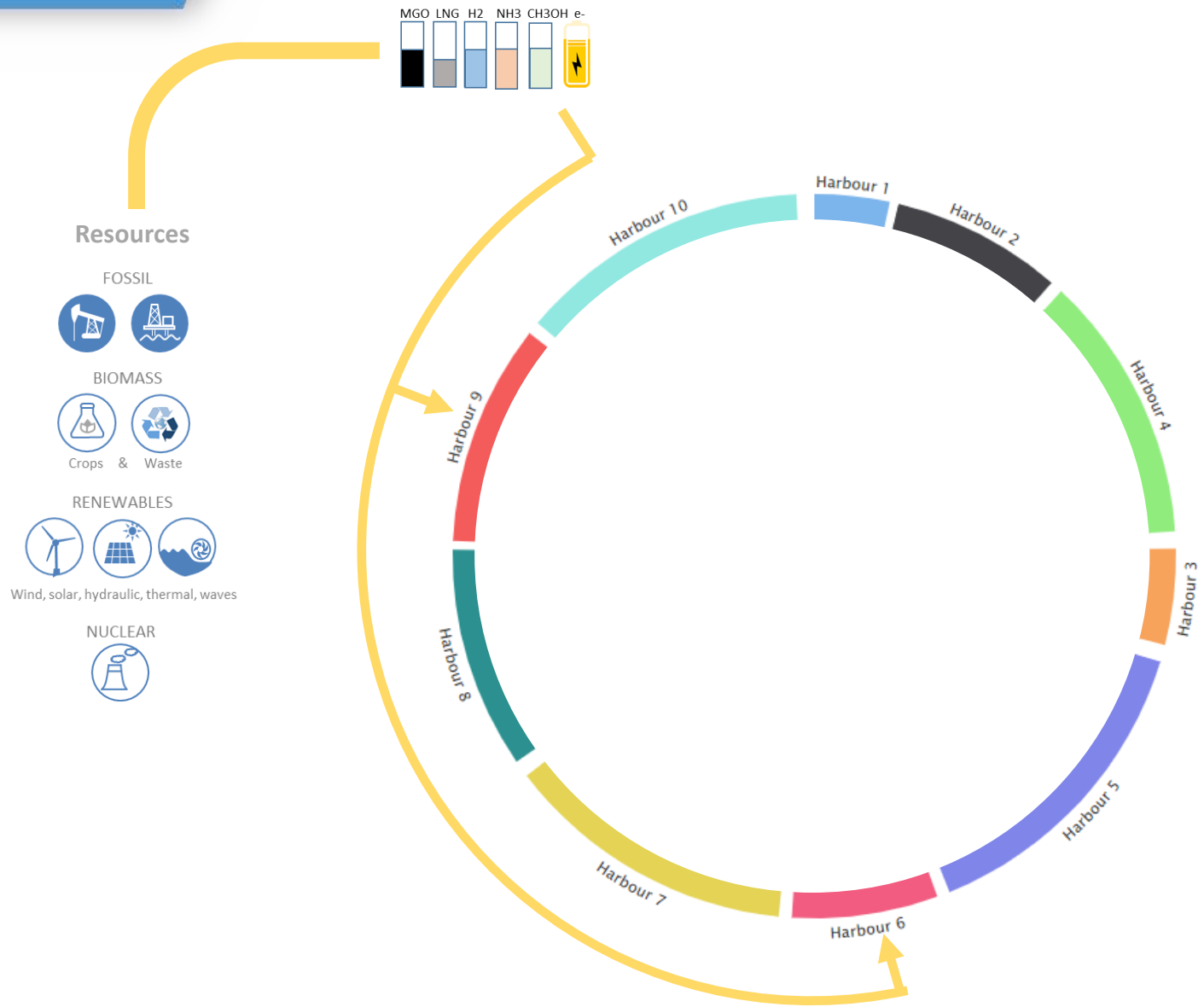
Generic techno-economic model



Energy carriers

- Type
- Properties
- Production emissions
- Distribution

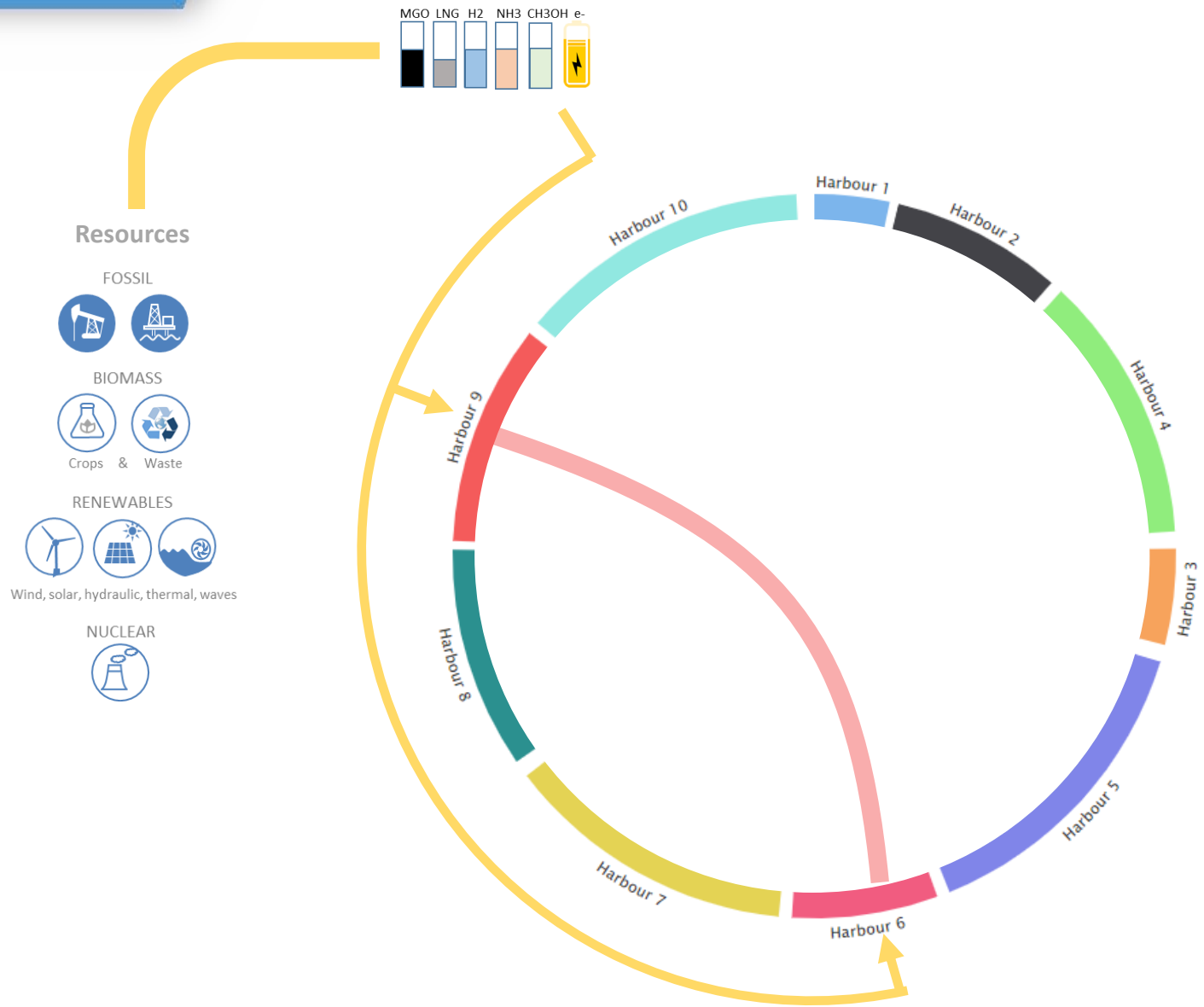
Generic techno-economic model



Ports

- Storage
- Supply

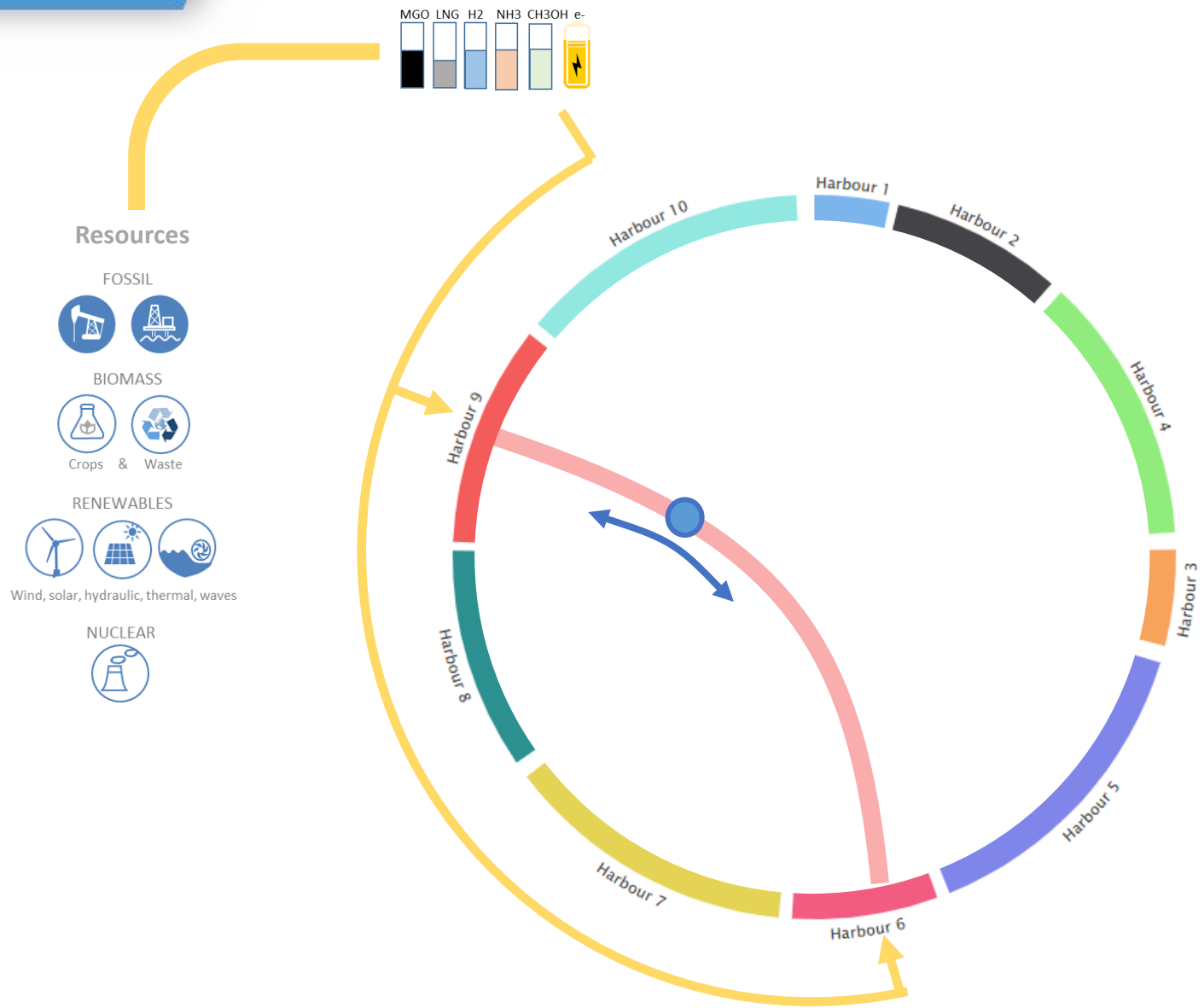
Generic techno-economic model



Routes

- Type
- Distance
- Weather statistics and data

Generic techno-economic model

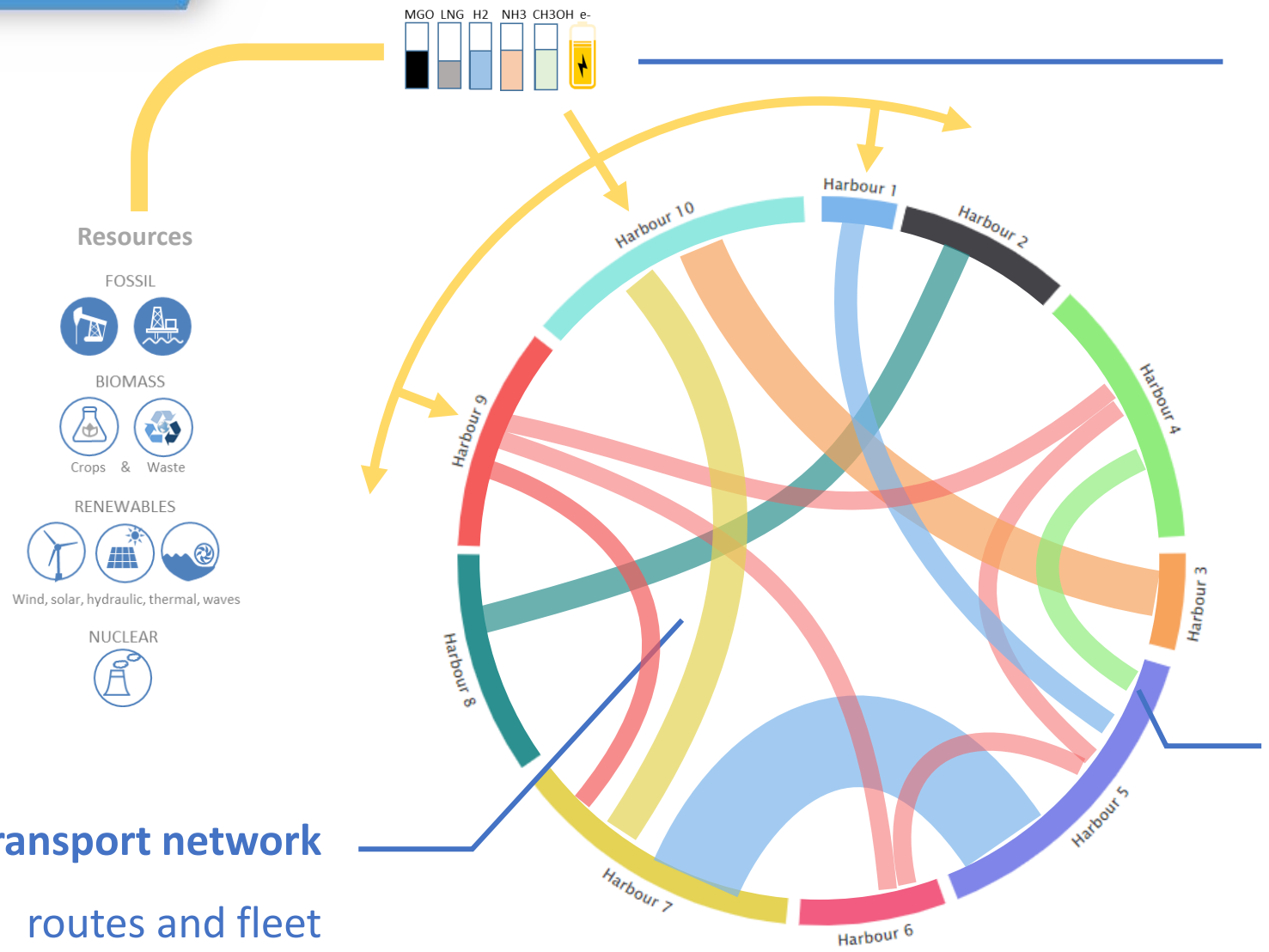


Ship (or fleet)

- Type of ship
- Transport capacity
- Range
- Operational profile
- Current energy carrier and compatible future alternatives
- Operational emissions
- OPEX

Needs

Generic techno-economic model



Energy carriers

production and distribution

Port infrastructure

energy storage and supply

Transport network

routes and fleet

Regional information IWT case

Categorisation of inland vessel types and operational profiles for IWT

- Top 25 representative freight journeys from the PROMINENT project
- Greening technologies and corresponding TCO information from the CCNR studies
- Existing technical information on waterways and vessels in MARIN database
- Additional information collected related to e.g. fuel tank capacities per fleet family and bunkering/charging/swapping speed.

Technologies

- Fossil diesel
- HVO
- LBM
- Batteries
- H2 FC
- H2 ICE
- MeOH FC
- MeOH ICE

Vessel types and transport journeys

Nr	Port A	Port B	vessel type	Commodity
1	Rotterdam	Duisburg	Push B4	Ore
2	Rotterdam	Antwerp	C3L/B	Containers
3	Rotterdam	Karlsruhe	MTS 135m	Crude oil
4	Amsterdam	Karlsruhe	C3L/B	Coal
5	Rotterdam	Basel	C3L/B	Containers
6	Antwerp	Thionville	MVS110m	Coal
7	Amsterdam	Antwerp	C3L/B	Containers
8	Rotterdam	Krotzenburg	C3L/B	Coal
9	Amsterdam	Rotterdam	MTS 135m	Oil
10	Antwerp	Mainz	MVS 135m	Containers
11	Breisach	Cuijk	MVS 110m	Sand&gravel
12	Antwerp	Duisburg	C3L/B	Containers
13	Rotterdam	Duisburg	MVS 110m	Containers
14	Rotterdam	Ludwigshafen	MTS 86m	Chemicals
15	Rotterdam	Kampen/Zwolle	MTS 110m	Oil
16	Rotterdam	Strassbourg	MVS110m	Agribulk
17	Amsterdam	Heilbronn	MVS 105m	Animal Fodder
18	Duisburg	Antwerp	MVS 110m	Metal products
19	Rotterdam	Alphen a/d Rijn	MVS 105m	Containers
20	Terneuzen	Rotterdam	MTS 110m	Chemicals
21	Wesel	Enkhuizen	MVS 67m	Sand&gravel
22	Rotterdam	Herne	MVS 86m	Metal (scrap)
23	Dusseldorf	Antwerp	MVS 110m	Agribulk
24	Antwerp	Gent	MVS 110m	Coal
25	Rotterdam	Duisburg	MVS 86m	Agribulk

Regional information IWT case

Additional qualitative research into:

- Determine the applicability of different energy carriers and solutions
- Potential upscale of renewable energy production in the region
  - potential from wind, solar, hydro, nuclear plants, etc.
- Port infrastructure and likely impact of energy transition in the relevant region
  - Potential of adapting to a rapid pace of change in infrastructure

Expected results

- Once the model is fully developed and all the necessary input data is collected, the simulations can be run.
- Simulation model will be applied for different scenarios
- Outcomes for the detailed transport journeys will help to further analyse TCO from fleet perspective but also infra requirements.
- Discuss results with stakeholders and experts by means of workshops and meetings with the STEERER network (IWT related experts).
- There will be a dashboard visualising an evolution of indicators over time for ships, routes and ports.

First simulations