

Rhine Barge Markets and Price Drivers

Price formation models in inland
navigation freight transport

CCNR

November 2023

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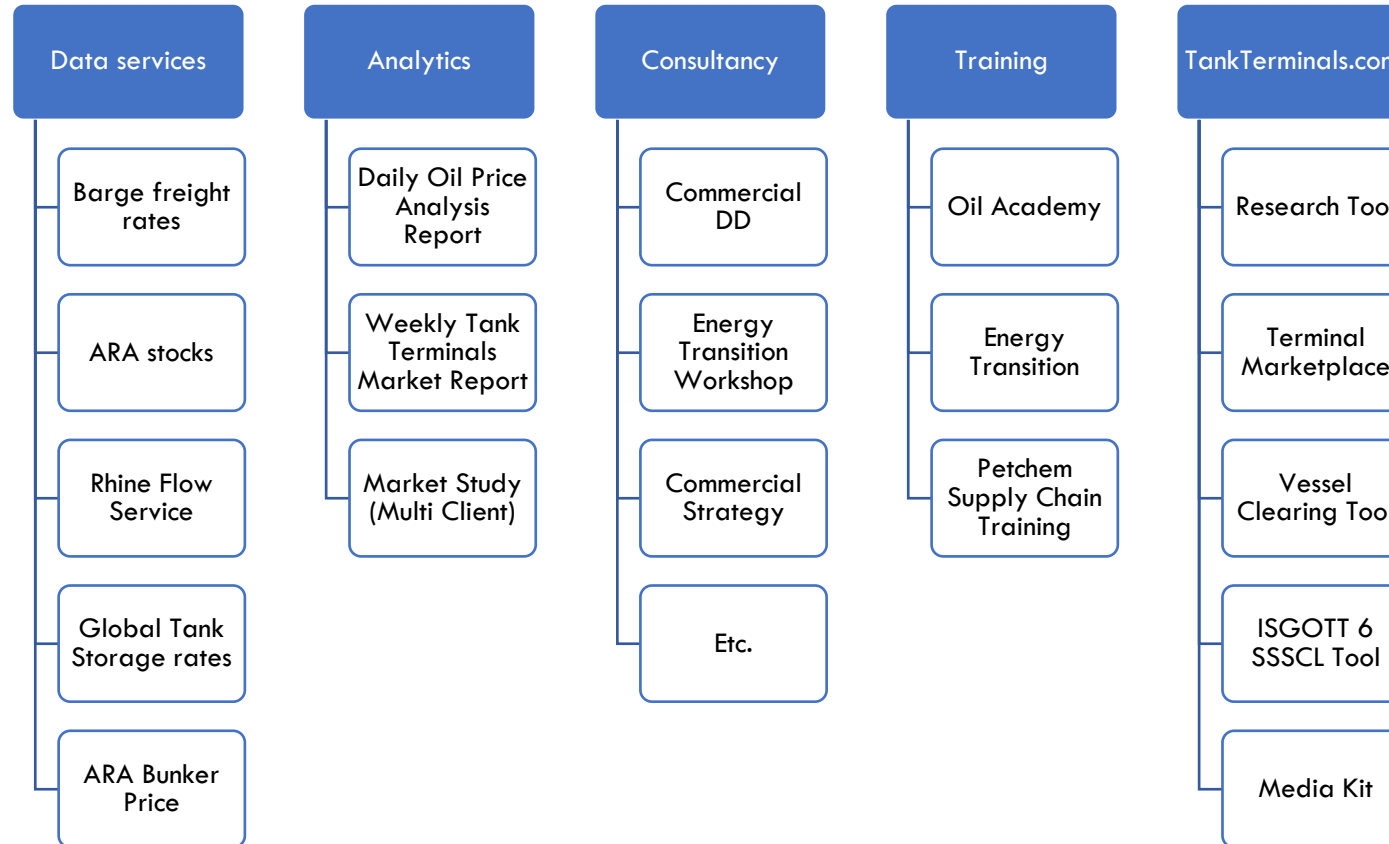
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Vessel Clearing & ISGOTT 6 SSSCL Tools

The screenshot shows the 'Vessel Clearing & ISGOTT 6 SSSCL Tools' interface. It features several sections:

- Vessel Terminal:** Search filters for Country, City, and Vessel Name.
- Vessel Information:** A map showing the vessel's location and details.
- Vessel Details:** A 3D model of a ship with dimensions and specifications.
- Vessel Assets:** A table listing various assets with columns for Name, Status, and other details.



Market Research Tool

The screenshot displays the 'Market Research Tool' interface. It includes:

- Search Bar:** A search bar at the top with filters for country, region, state, or terminal.
- AVAILABLE ACTIONS:** A list of terminal actions on the left, such as 'Noord Natie Terminals N.V.', 'TTC Hubis Terminal Antwerp N.V.', and 'Yvesa Terminal Antwerp N.V.', each with a star icon and details.
- Map:** A map of Europe showing terminal locations marked with colored dots.

Terminal Marketplace

The screenshot shows the 'Terminal Marketplace' interface. It features:

- Filter Your Results:** A sidebar with filters for 'Ad view', 'Geo location filter', 'Tank types', and 'Cargo types'.
- AVAILABLE ACTIONS:** A list of terminal assets for sale or lease, including 'CLH S.A. (Algeciras)', 'LCB Antwerp N.V.', and 'Strait of Gibraltar'.
- Terminal Matrix:** A detailed table showing asset specifications, including 'Name', 'Capacity', 'Status', and 'Price'.
- Map:** A map of the Strait of Gibraltar showing the location of the assets.

Table of Contents

1. Introduction
2. Tanker Barge transport in Northwest Europe
3. Tanker Barge transport markets
4. Tanker Barge freight rates
5. Economics and drivers

Introduction



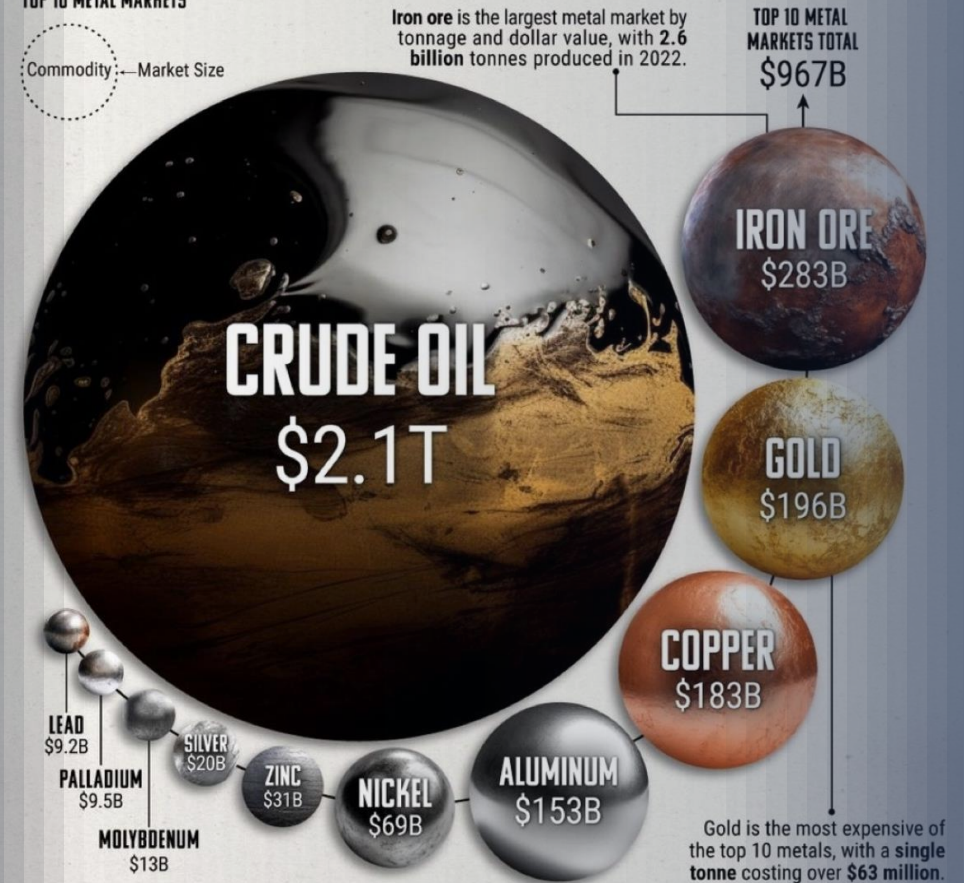
Global oil is biggest commodity market

HOW BIG IS THE OIL MARKET?

The oil market is bigger than the top 10 metal markets combined in terms of production value, surpassing \$2 trillion in 2022.

CRUDE OIL MARKET SIZE VS TOP 10 METAL MARKETS

Commodity: Market Size



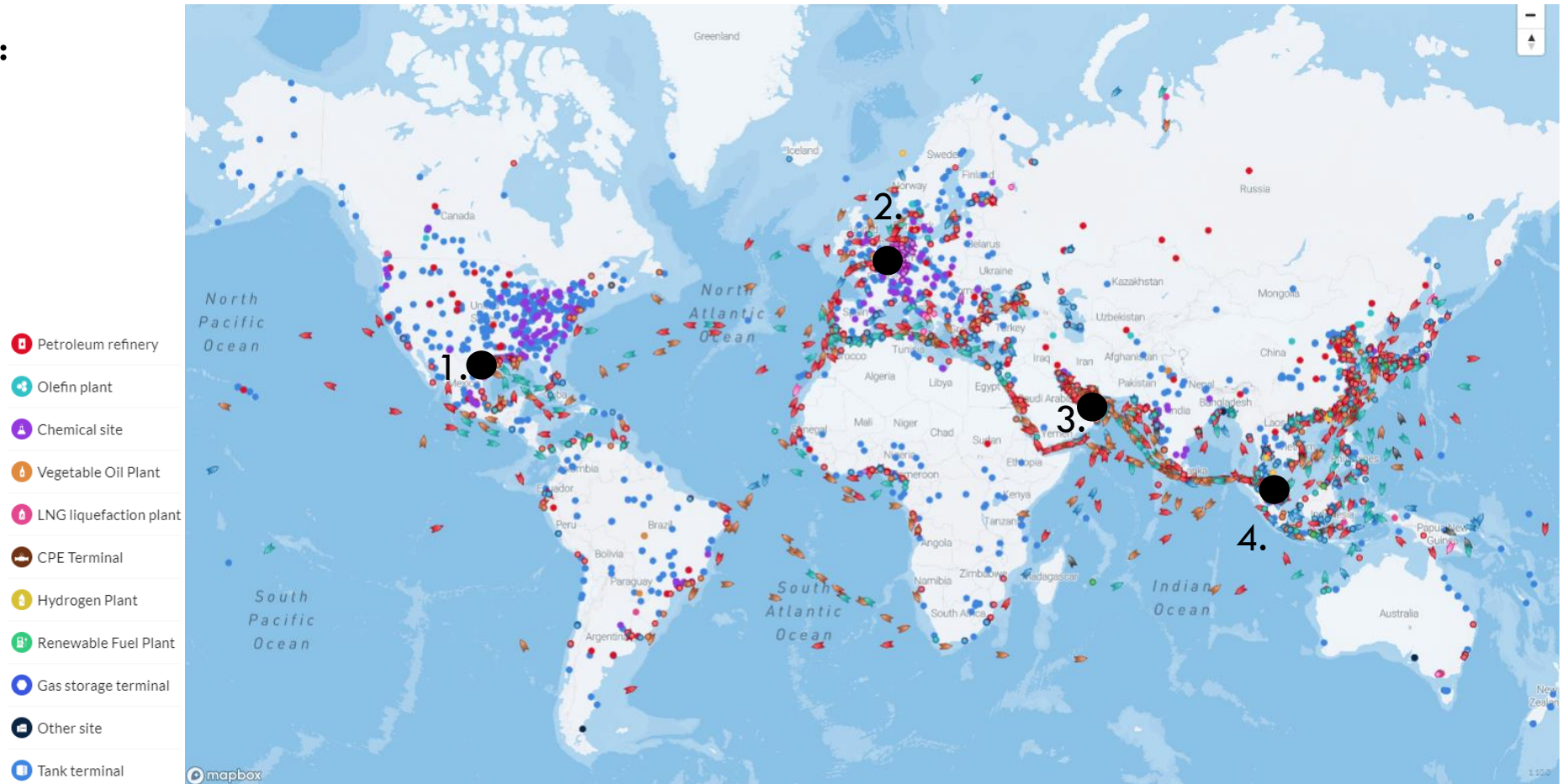
Source: USGS Mineral Commodity Summaries 2023, TradingEconomics, Cameco, FastMarkets
Market sizes are calculated by multiplying annual production in 2022 with spot prices as of June 7, 2023.



Global Oil & petrochemicals trade & transport

Main oil trading hubs:

1. Houston (USA)
2. ARA-region (EU)
3. Fujairah (UAE)
4. Singapore



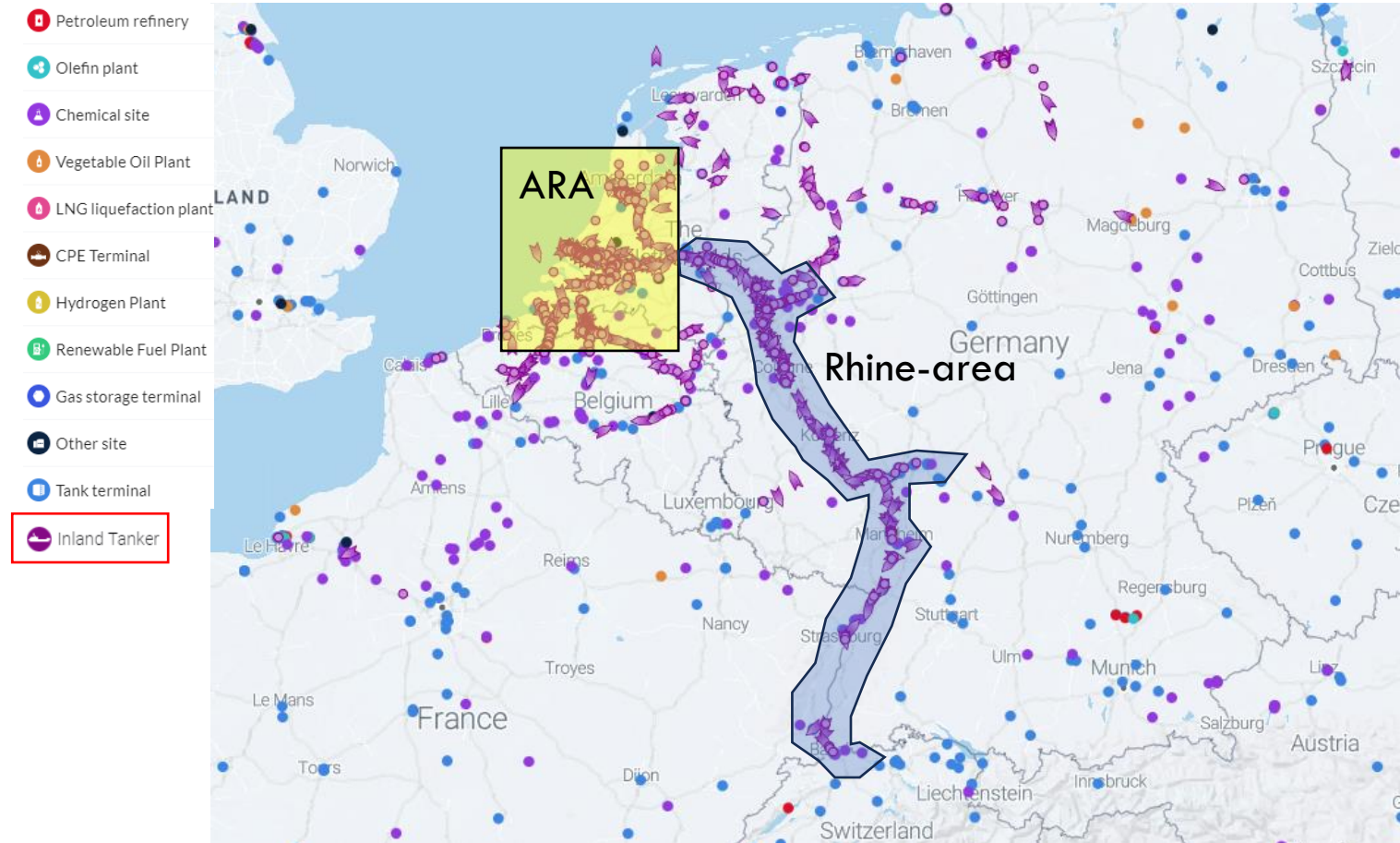
Tanker Barge Transport Market in Northwest Europe



Tanker barge transport in NWE

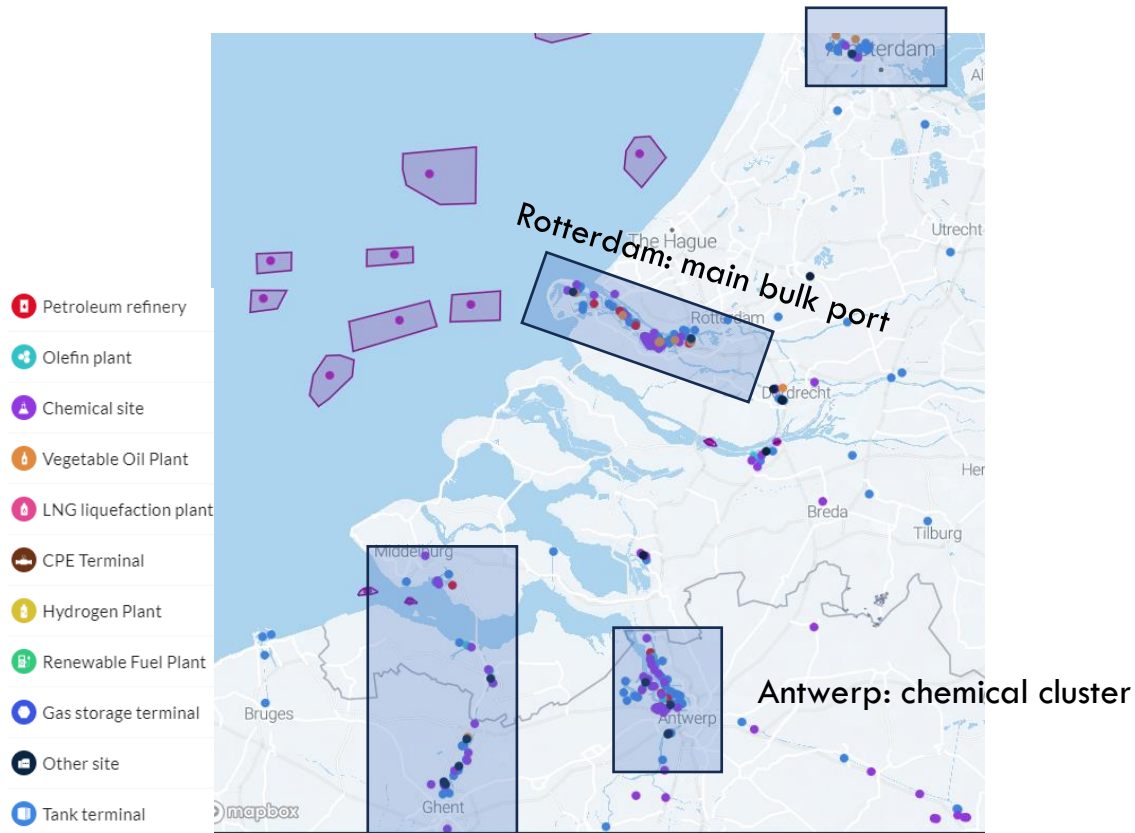
Tanker barges are mainly used in:

- ARA-region
- Rhine-area
- Inland canals

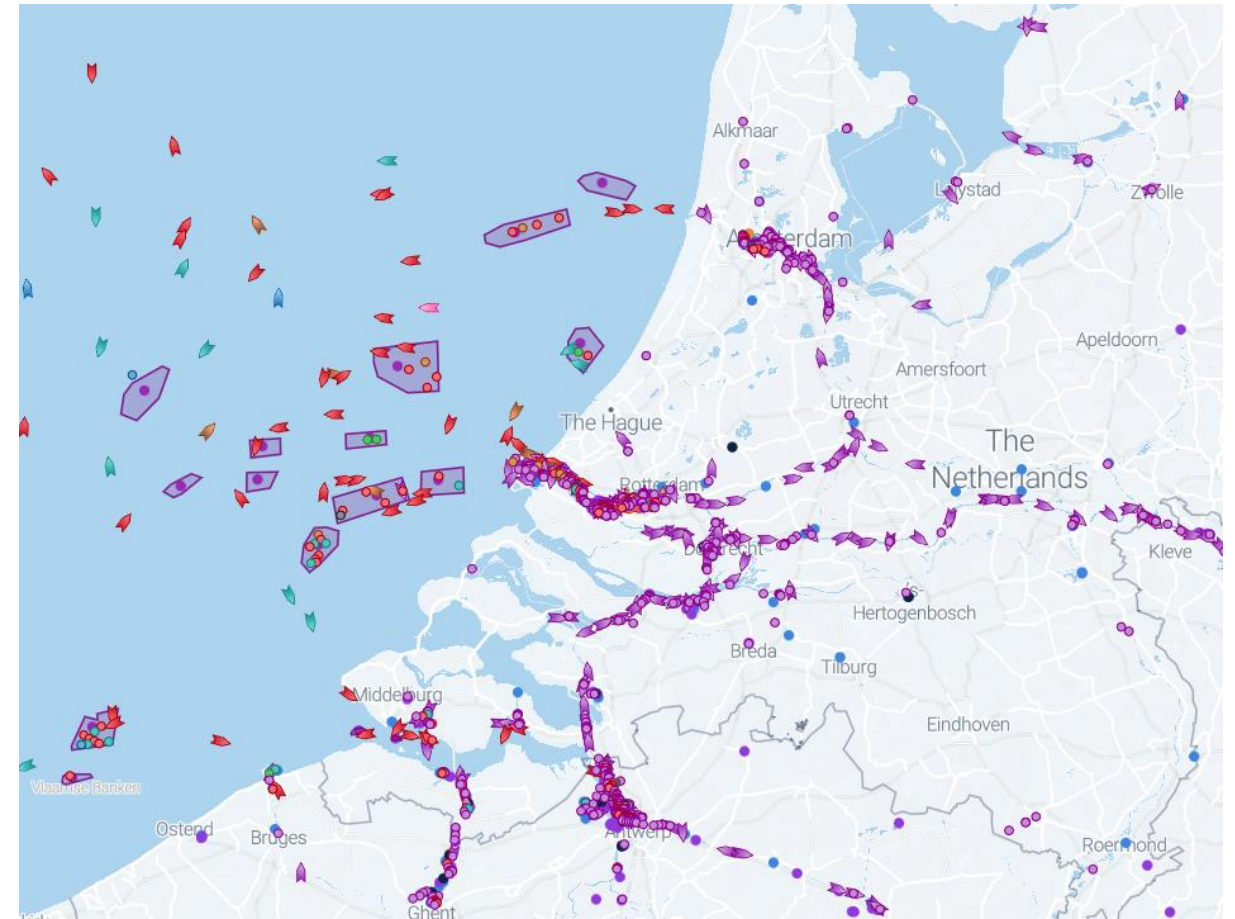


ARA/BENELUX tanker barge transport

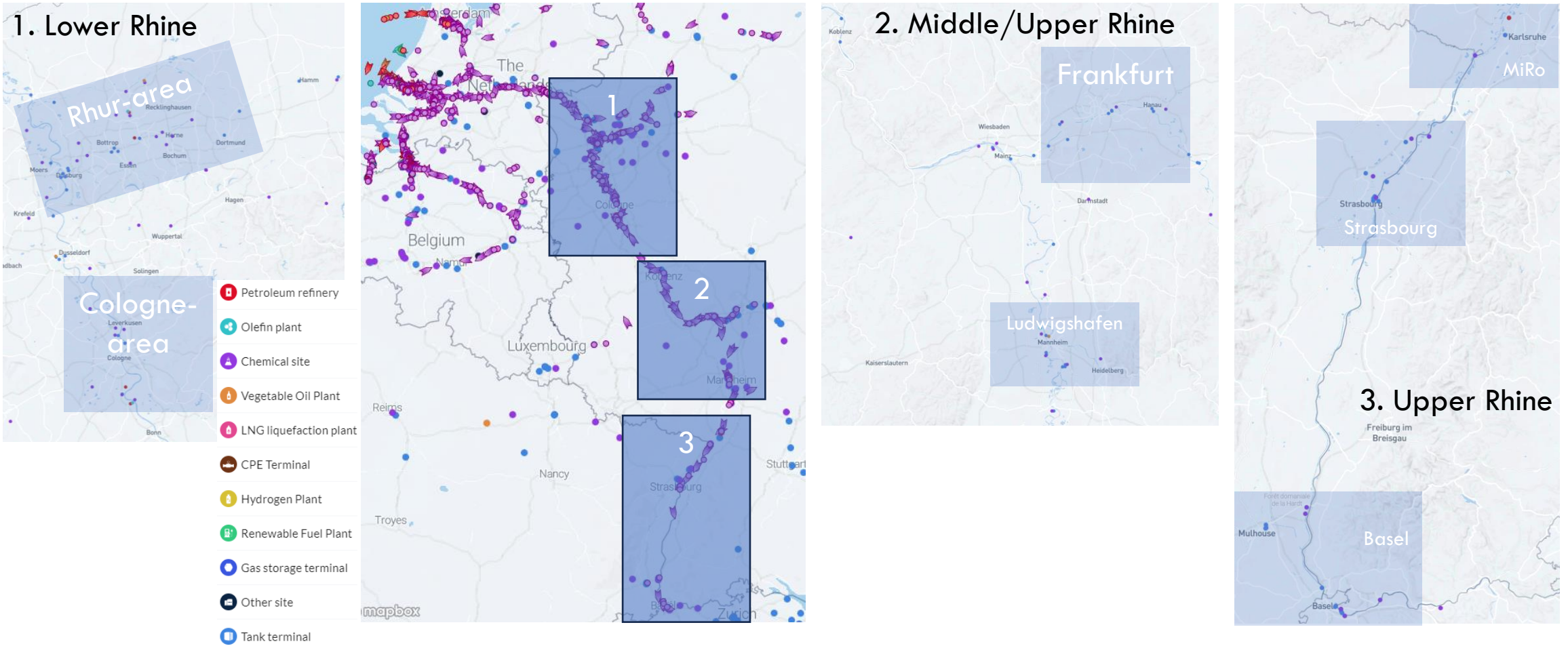
Amsterdam: global gasoline blend hub



Northsea port: bio-fuels and industry



Rhine tanker barge transport



Product flows up/down the Rhine by barge

From ARA to hinterland:

Diesel/gasoil

Naphtha

Gasoline

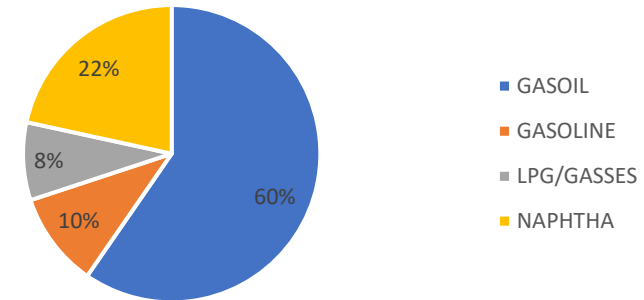
From hinterland to ARA:

Gasoline (components)

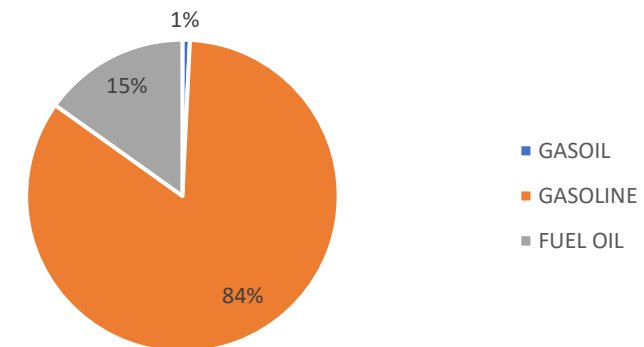
Fuel oil

Gasoil

ARA to hinterland, by barge, status 2023



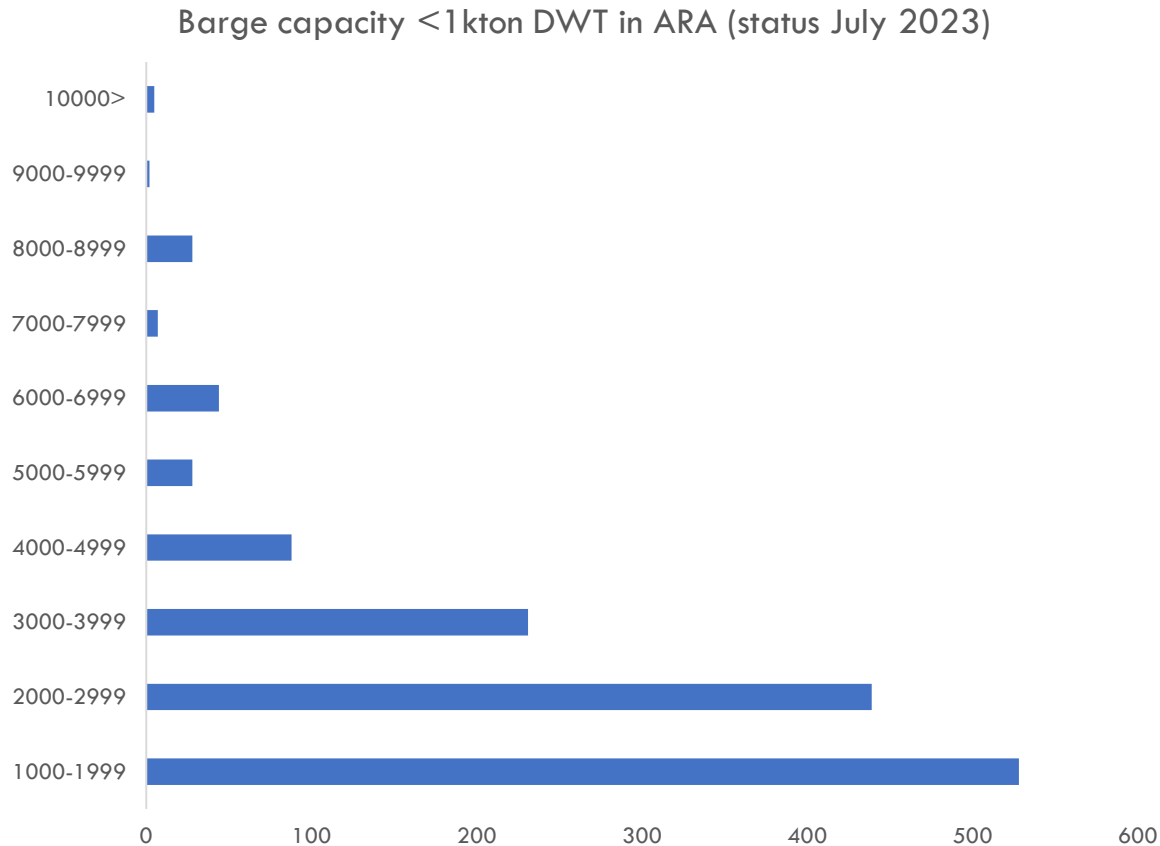
hinterland to ARA, by barge, status 2023



Tanker Barge Transport Markets



Tanker barge fleet



Market size:

Approximately 1500+ barges (incl. LPG/gas, clean, dirty)

Double hull; rest single (although phased out for majority of products) or triple hulls.

Total capacity available for oil products: 4.3 million tons DWT (status 2023)

Barge sizes (>86 meter):

Ranging in size from 1kton till 13kton

Most common sizes Double Hull tankers: 2kton - 5kton

Investments in barges:

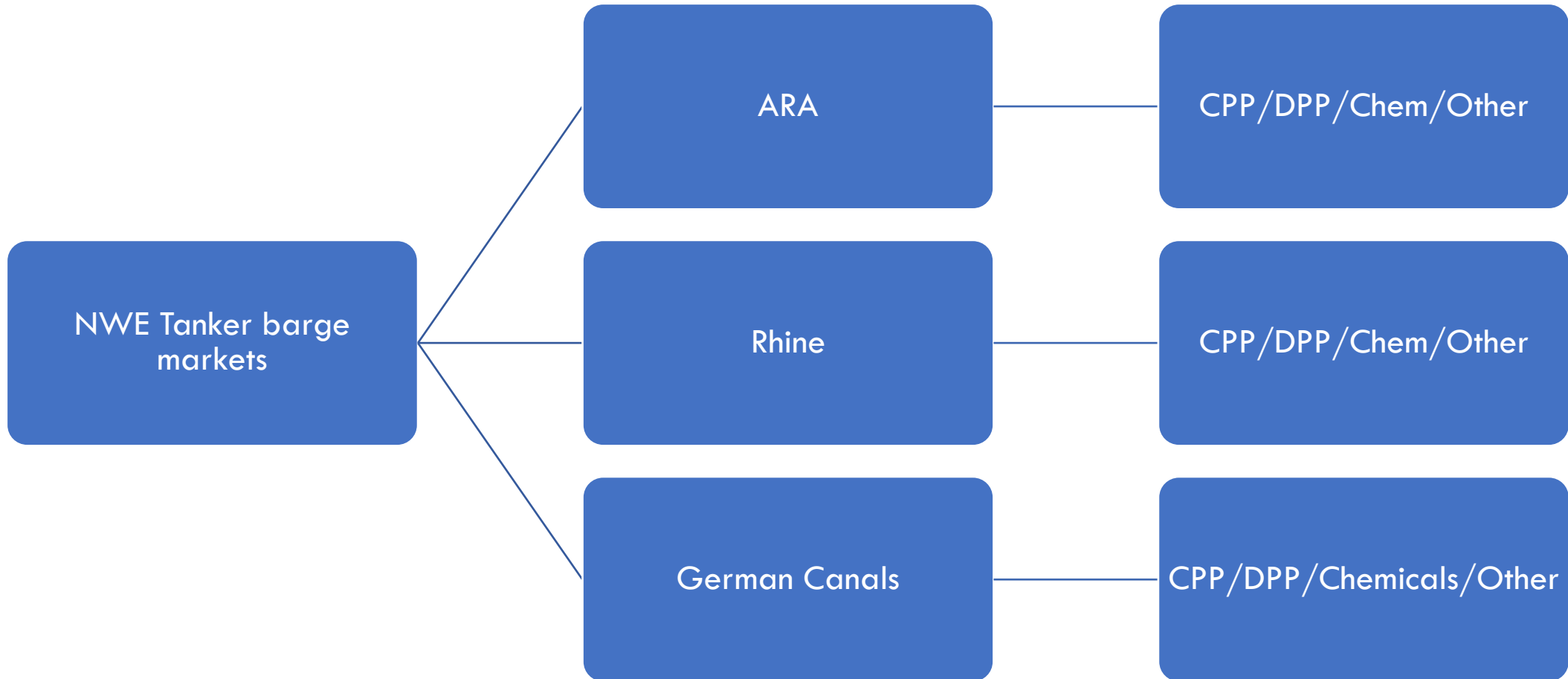
→ In 2023/24 more double hull tankers >7000DWT being built

→ More vessels built to cope with lower water levels

→ More vessels running dual-fuel (diesel/electricity)

→ plans to look for alternative fuels to handle increasing emission standards.

Distinct tanker barge transport markets



Tanker barge transport market players

Market players:

- Barge owners (supply)
- Brokers / barge operators (commercial / logistics)
- Oil traders (demand)

Commercial arrangements in Barge Markets

Contract type	Description Contract type	Split ¹ on Rhine market	Split ¹ on ARA market
Spot business	One-off transport from A to B	20%	50%
COA / Term contract	Contract to transport X kton/month during period T	60%	20%
Time Charter	Renting a barge for period T	20%	30%

¹ Approximate split, based on indicative information from barge operators

Tanker Barge Freight Rates



Rhine barge freight rates

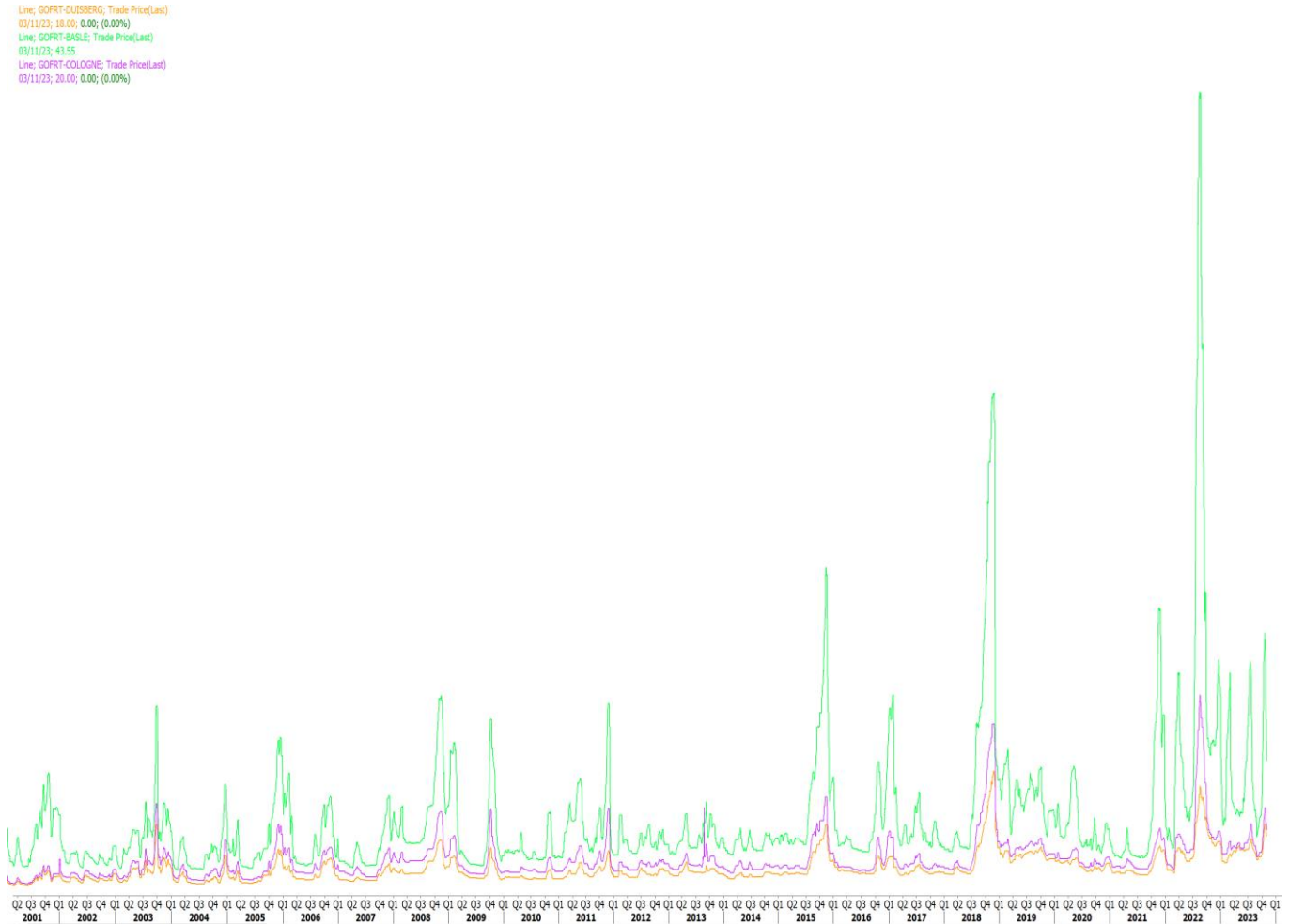
Rotterdam / Amsterdam to:

- Duisburg
- Dortmund
- Cologne
- Frankfurt
- Karlsruhe
- Strasbourg
- Basel (both in €/mton as CHF/mton)

Rates are related to each other, according to:

$$(\text{Freight Rate}_{i,t} - \text{costs}_i) = \frac{\alpha_t + \beta_t \cdot \text{Duration route}_i}{\text{max Loading Capacity}_{i,t \text{ till } t+4}}$$

...as if it was a taxi



ARA barge freight rates

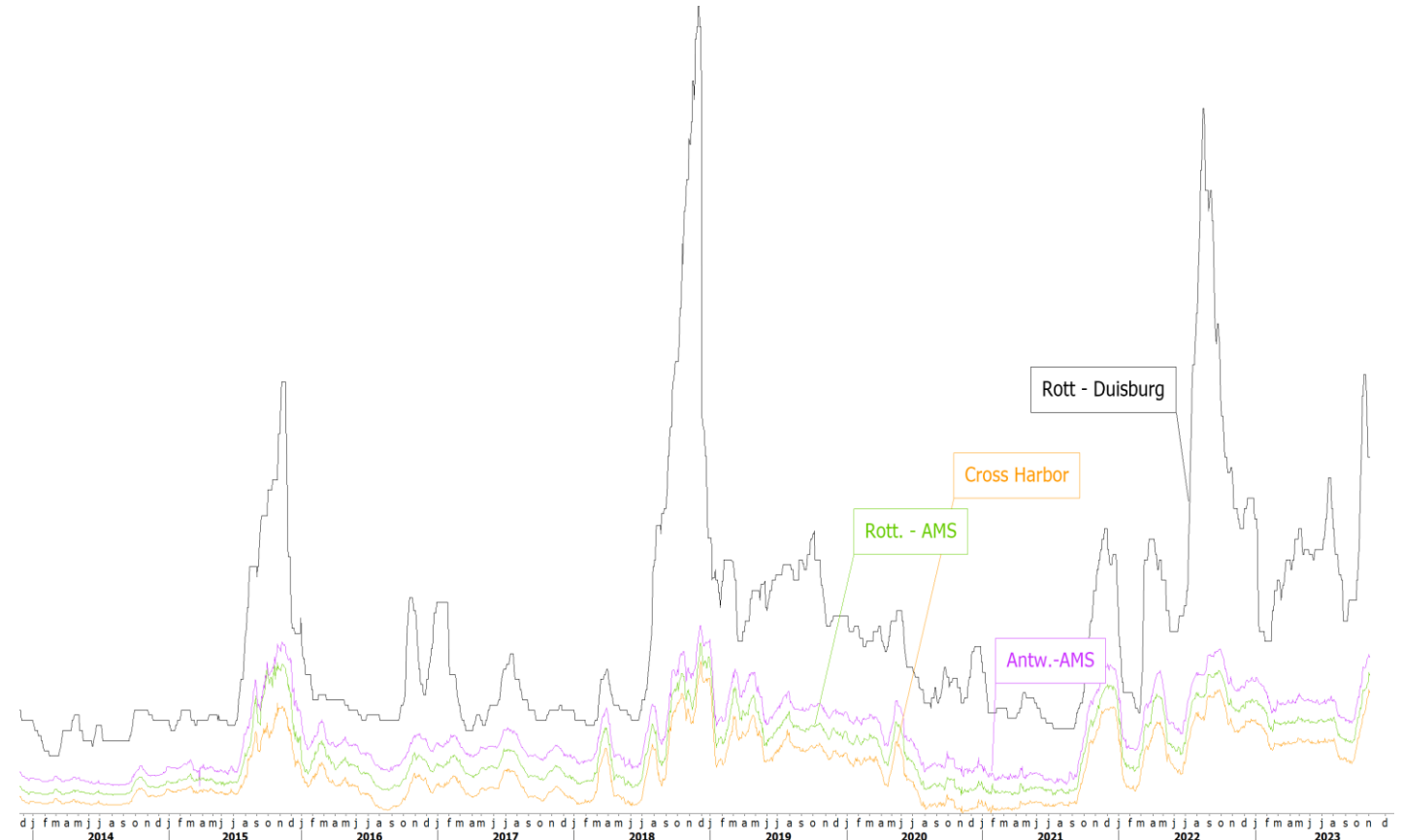
Between harbors ARA:

- Cross Harbor
- Rotterdam - Amsterdam
- Rotterdam - Antwerp
- Antwerp - Amsterdam
- Antwerp - Flushing
- Rotterdam – Flushing
- Amsterdam – Flushing

Rates are related to each other according to:

$$\text{Freight Rate}_{i,t} = \alpha_t + \beta_t \cdot \text{Duration}_i$$

The factor 'loading volume' (or water levels) is not taken into account by setting these freight rates



Link between ARA and Rhine barge markets

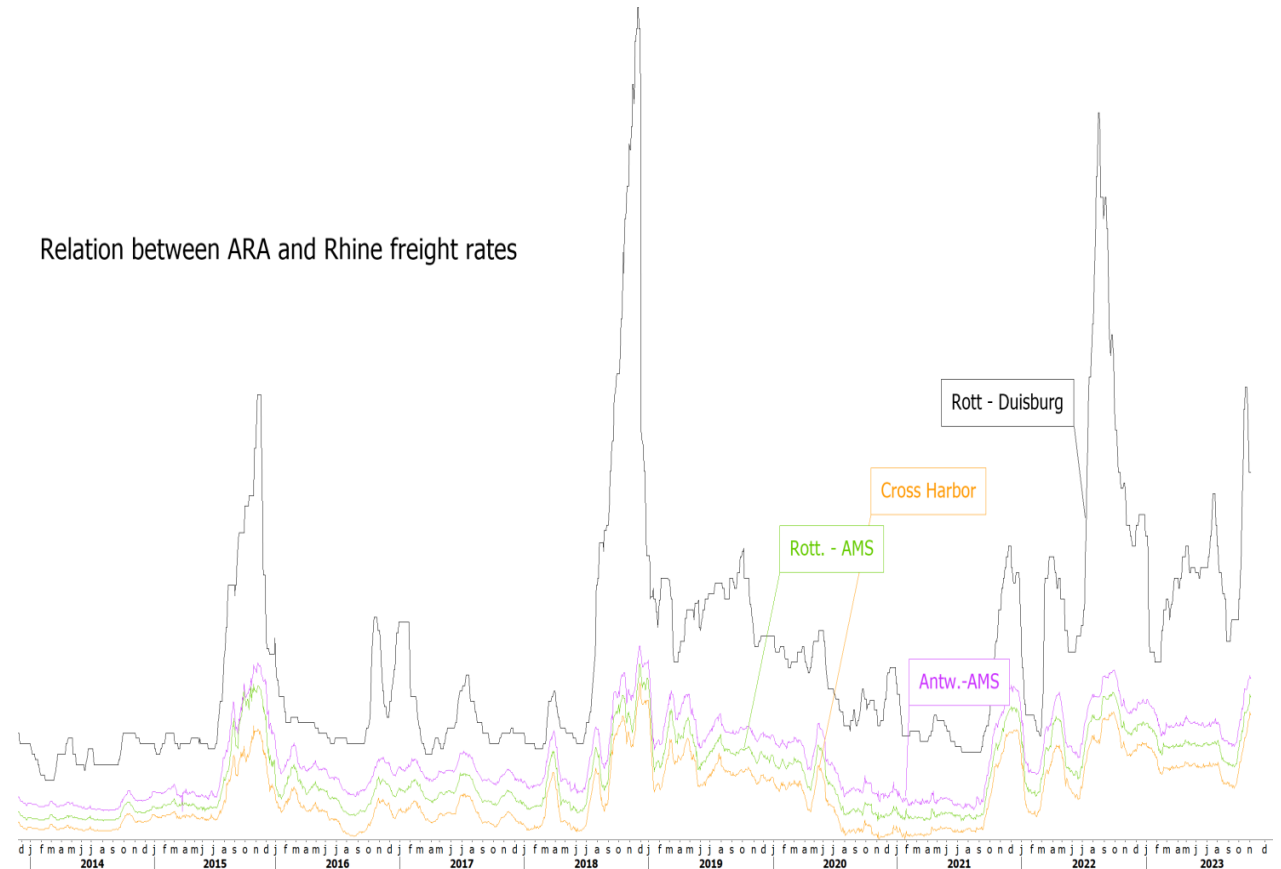
Geographical barge markets:

1. ARA barge transport market
2. Rhine barge transport market

Markets are linked (!)

- If rates are higher in (1)
- barge capacity shifts from (2) to (1)
- Increases supply in (1)
- Lowers pressure on ARA barge freight rates

Vise versa also applies!!



Economics and drivers



Drivers of barge freight rates

Barge freight rate drivers:

Free barge capacity

- Waiting times @ loading / discharge ports
- Average duration of voyage
- Total number of operational barges (single hull phase-out)
- Water levels (Rhine)

Transport demand

- End-consumer demand
- Oil price dynamics
- Calendar spread dynamics (contango/backwardation)
- ICE physical deliveries (ARA)
- Average cargo size (inventory management / forward curve related)

Operational costs

- Fuel costs
- Maximum loading capacity (water levels)

Trends that can impact freight rates

- De-industrialization due to high energy prices and transition costs
- Double-hull barges and decreasing water levels on Rhine
- De-gassing regulations
- Decarbonization of barge transport
- Energy transition reduces oil transport demand in the long run

Policy recommendations (personal views)

- Measures to increase the competitiveness of European base-industry
- Measures to reduce impact of low Rhine water levels
- Gradual implementation of decarbonization measures in barging

Any Questions?

