

# MARKET INSIGHT

INLAND NAVIGATION IN EUROPE

PUBLISHED IN

**WINTER 2016/2017**



**CCNR**

CENTRAL COMMISSION  
FOR THE NAVIGATION OF THE RHINE



# **Market Insight**

## **INLAND NAVIGATION IN EUROPE**

Published in  
**Winter 2016/2017**

# TABLE OF CONTENTS

## SUMMARY (P.4)

### 01

#### ECONOMIC CONTEXT (P.7)

Economic context in Europe (p.8)

Industrial activity and inland navigation (p.10)

Inland navigation-related sectors (p.12)

### 02

#### FREIGHT TRAFFIC ON INLAND WATERWAYS AND IN PORTS (P.15)

Transport performance in Europe (p.16-18)

Transport performance in main European IWT countries (p.20)

Dry bulk, liquid bulk and container transport (p.22)

Transshipment in European ports (p.24-26)

### 03

#### OPERATING CONDITIONS (P.29)

## SUMMARY

During the first half of 2016, inland navigation in Europe mirrored the general context of European economic growth, boosted in part by intra-EU trade but affected nevertheless by the overall slowing down of the global economy. Economic growth is expected to remain between 1 and 2% in the euro area in 2017.

The countries bordering the Rhine are maintaining their key role in European inland navigation; they represent 84% of Europe's riverborne transport, compared with 15% for the countries bordering the Danube.

The performance of inland waterway transport (IWT) in Europe, traditionally correlated to industrial growth in Europe, suddenly became detached from it in the second half of 2015 as a result of an exceptional period of low water conditions. This particularly affected demand in Germany. After the period of low water conditions at the end of 2015, traffic on the Rhine took an upward turn during the first half of 2016, almost reaching the level of traffic achieved in the first half of 2015. Notwithstanding, the first half of 2016 saw a 2.1% drop in traffic on the Rhine compared with the same period in 2015. Traffic on the Danube, on the other hand, experienced a difficult first half-year in 2016, with a drop in traffic compared with 2015 of as much as 31% on the middle section of the Danube, mainly because of poor harvests and a corresponding decrease in the transport of cereals and agricultural products. However, the transport of other goods – including metals and oil products – on the Danube increased substantially.

The volume of traffic on the Rhine is increasing at different speeds in the main market segments (dry bulk, liquid bulk, containers). Container traffic has experienced an upswing after the period of low water conditions, recording an increase of 20% since the end of 201

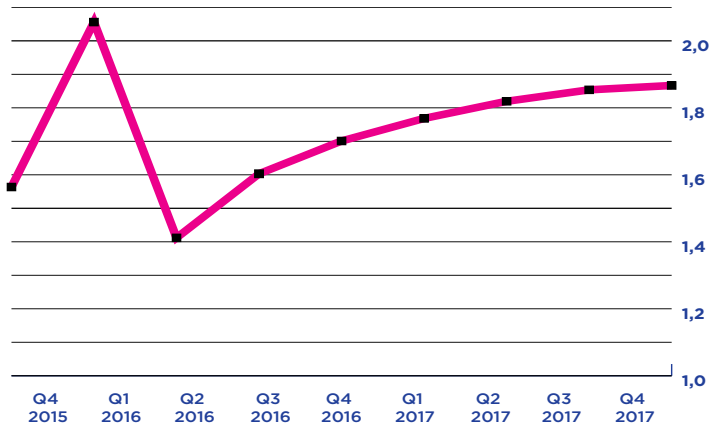


# 01

ECONOMIC  
CONTEXT

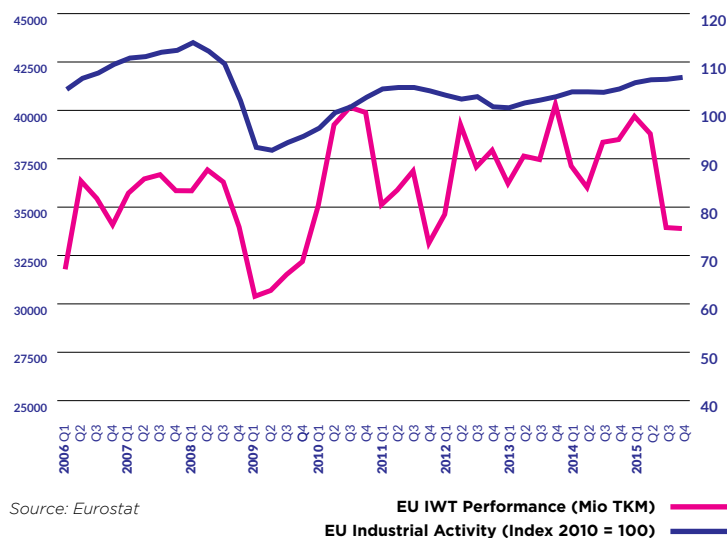
## ECONOMIC CONTEXT IN EUROPE

QUARTERLY GDP GROWTH OUTLOOK IN THE EURO ZONE  
(YEARLY RATE IN %)



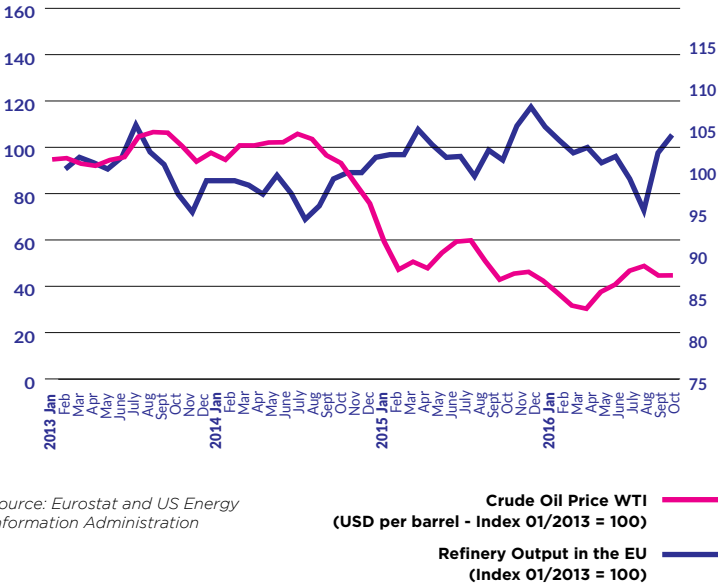
## INDUSTRIAL ACTIVITY AND INLAND NAVIGATION

### INDEX OF INDUSTRIAL PRODUCTION AND GOODS TRANSPORT ON INLAND WATERWAYS IN THE EU



# INLAND NAVIGATION-RELATED SECTORS

REFINERY OUTPUT IN THE EU AND CRUDE OIL PRICE





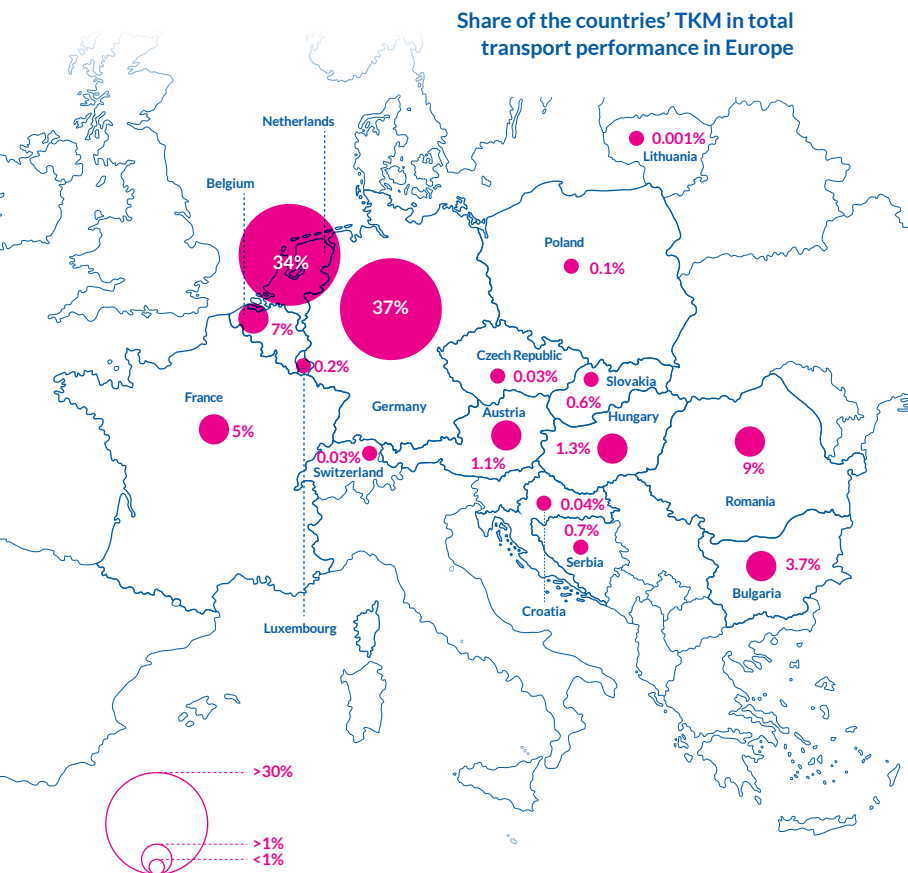


# 02

FREIGHT  
TRAFFIC  
ON INLAND  
WATERWAYS  
AND IN PORTS

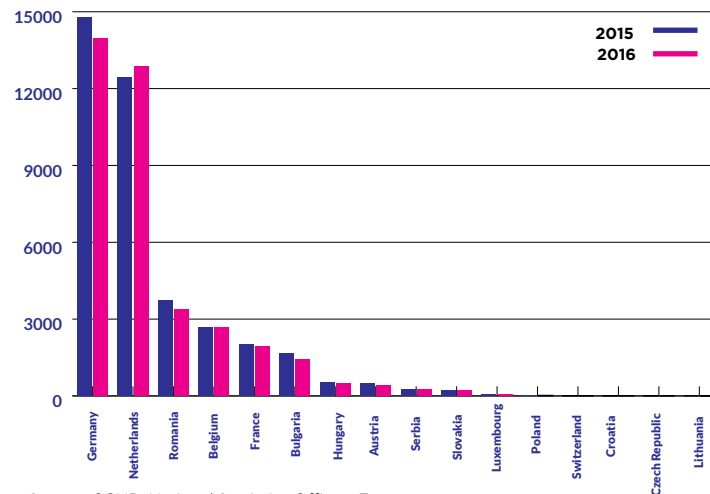
## TRANSPORT PERFORMANCE IN EUROPE

TRANSPORT PERFORMANCE IN IWT ON THE NATIONAL TERRITORY OF EACH COUNTRY IN EUROPE FOR Q2 2016



Source: National statistics offices, Eurostat, CCNR.  
For the definition of 'Europe': see the methodology at the end of the report

## COMPARISON OF TRANSPORT PERFORMANCE PER COUNTRY BETWEEN Q2 2015 AND Q2 2016 (MIO TKM)

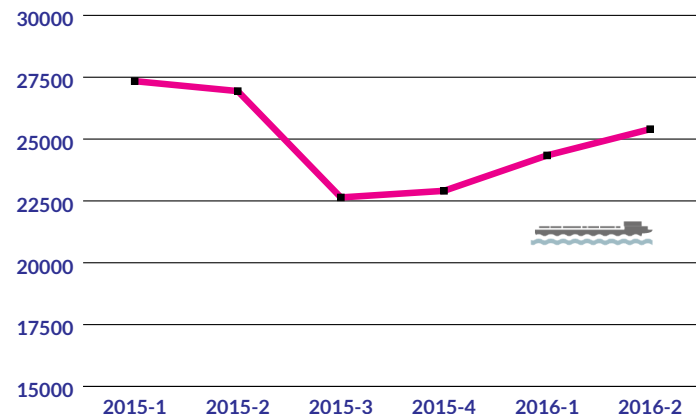


Source: CCNR, National Statistics Offices, Eurostat.

- In Europe, Rhine countries account for 84% of goods transport on inland waterways, whereas Danube countries represent 15%.
- 96.1 million tons of goods were transported on the traditional Rhine during the 1<sup>st</sup> semester 2016 (Q1+Q2). This represents a decrease of 2.1% compared to the same period in 2015.
- The Rhine traffic has not yet fully recovered from the low water period and the resulting sharp decline in traffic at the end of 2015.
- Compared with 2015, the decrease was greater during the 1<sup>st</sup> quarter than during the 2<sup>nd</sup>: -3.2% for Q1 2015-2016 vs -1.1% for Q2 2015-2016. This indicates that IWT traffic is on its way back to 2015 levels on the Rhine.
- The Danube traffic underwent a significant decline during the 1<sup>st</sup> semester of 2016 (Q1+Q2 2016), notably with a decrease of -31% for the Middle Danube, in particular on account of the sharp decrease for cereal and agricultural products transport decrease (due to bad harvest in 2015).

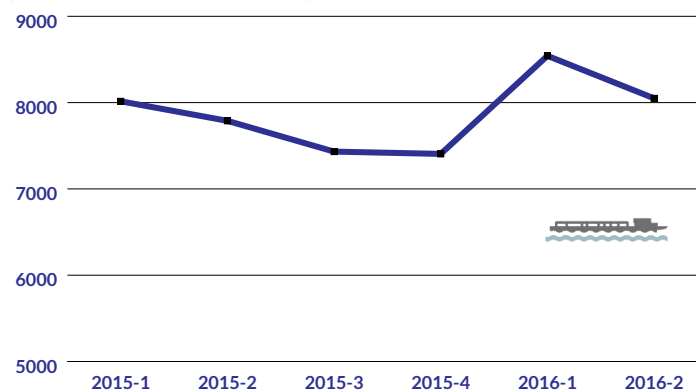
## ■ TRANSPORT PERFORMANCE IN EUROPE

### DRY CARGO TRANSPORT PERFORMANCE IN EUROPE (QUARTERLY DATA - MIO TKM)



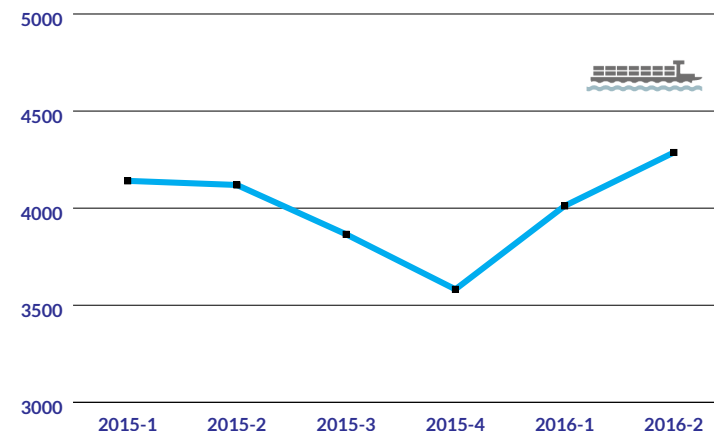
Source: National Statistics Offices, CCNR

### LIQUID CARGO TRANSPORT PERFORMANCE IN EUROPE (QUARTERLY DATA - MIO TKM)



Source: National Statistics Offices, CCNR

### CONTAINER TRANSPORT PERFORMANCE IN EUROPE (QUARTERLY DATA - MIO TKM)



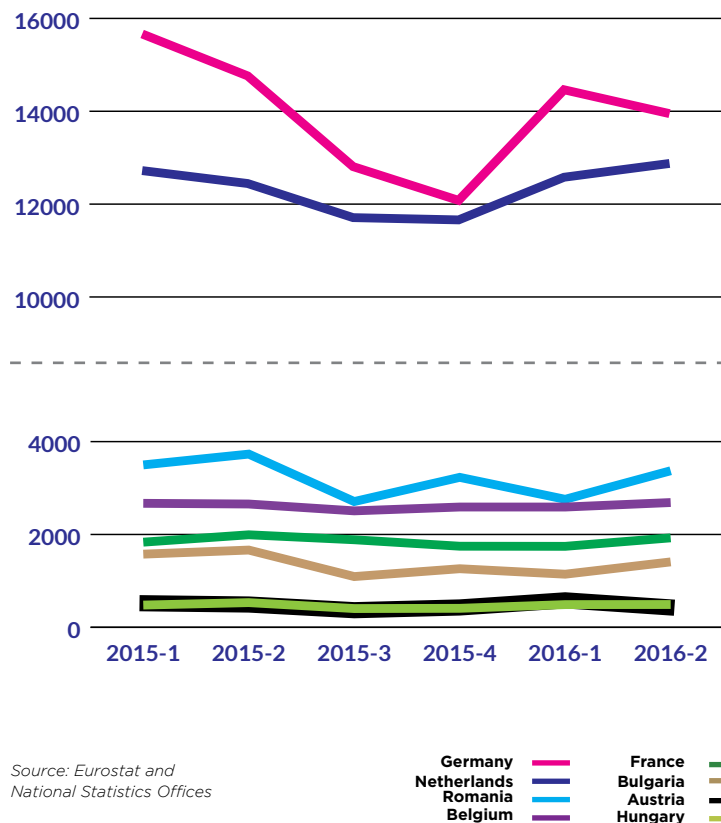
Source: National Statistics Offices, CCNR

- Container transport reached a record level during Q2 2016 reaching almost 4.3 billion TKM in Europe (+7% compared to Q1 2016 and +4.3% compared to Q2 2015).
- Dry cargo is slowly on its way back to the Q1 2015 level.
- In Q2 2016, liquid cargo transport slowly decreased compared to Q1 2016 (-6%), but remained higher than 2015 transport performance levels.
- Taking all segments together, transport performance in Q2 2016 increased by 2.3% compared to Q1 2016 and by decreased by 2.9% compared to Q2 2015.

**+20%**  
BETWEEN Q4 2015 AND Q2 2016 CONTAINER TRANSPORT  
EXPERIENCED A STRONG INCREASE RECOVERING FROM  
THE LOW WATER PERIOD OF END 2015.

## TRANSPORT PERFORMANCE IN MAIN EUROPEAN IWT COUNTRIES

INLAND SHIPPING TRANSPORT PERFORMANCE IN MAIN EUROPEAN IWT COUNTRIES (MIO TKM)



Source: Eurostat and  
National Statistics Offices

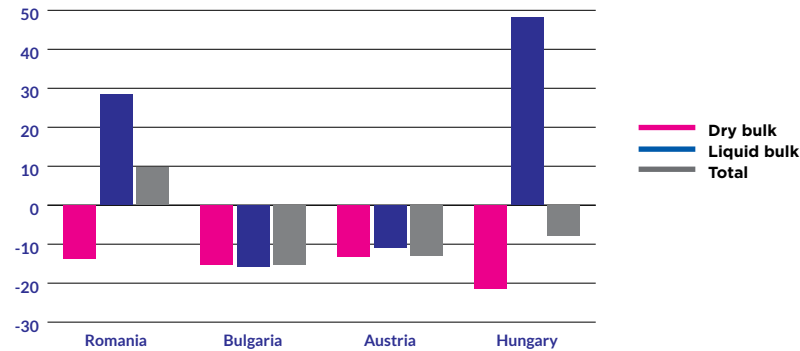
- The evolution in the two countries with the highest IWT volumes shows that the low water period in the 2<sup>nd</sup> half of 2015 had a more negative effect on transport demand in Germany than in the Netherlands. This is due to the fact that navigation conditions on rivers in Germany (especially on the Elbe and the German stretch of the Danube) were impacted more seriously by the low water conditions in autumn 2015. Complete recovery in Germany has not yet been achieved.
- In France, a slight upward trend for certain goods (agricultural products, foodstuff, fertilizers, metal products) is offset by negative tendencies for other products (coal, iron ores, oil products, sands, soil & building materials). This results in a rather stable evolution for the overall transport performance in France. Still considering the important weight of agricultural products in French inland navigation, bad harvests in 2016 are expected to have a negative impact after the summer.
- The evolution in the Danube countries was rather negative during the 1<sup>st</sup> half of 2016 for the Upper Danube (Austria), as well as the Middle Danube (Croatia, Hungary, Serbia) and Lower Danube (Bulgaria, Romania)- mainly due to a reduction in movement of agricultural products and foodstuff. This decline does not reflect long-term trends since it was the direct consequence of bad harvest results in 2015.
- Also on the German stretch of the Danube and on the Rhine-Main-Danube canal, severe reductions of cargo were registered.

# +2.4%

**Q2 VS Q1 2016 IN THE NETHERLANDS,**  
THE UPWARD TREND REGISTERED SINCE END 2015 IS  
STILL ONGOING.

## DRY BULK, LIQUID BULK AND CONTAINER TRANSPORT

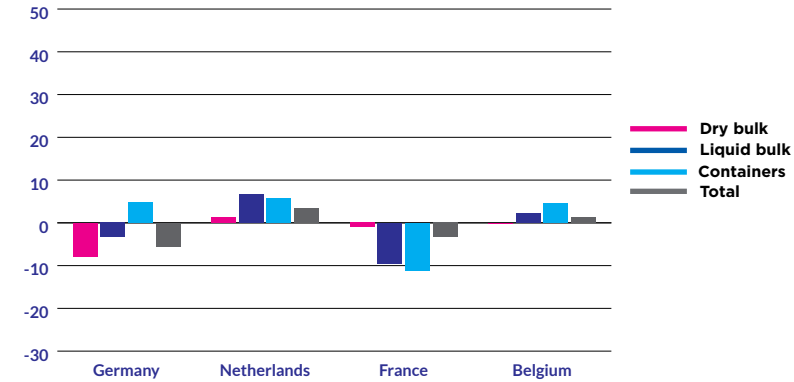
RATE OF CHANGE IN INLAND SHIPPING TRANSPORT PERFORMANCE IN DANUBE COUNTRIES (Q2 2016 VS Q2 2015 IN%)



Source: Eurostat

- Dry cargo is the overall dominant market segment in the Danube region. It is marked by high volatility, which is due to the major importance of agricultural products, while container transport is still very limited.
- Despite decreasing transport performance in the dry cargo segment due to bad harvests in the Danube region, some other dry cargo segments like metals and iron ores have experienced transport increase in parts of the Danube.
- The strong increase in liquid cargo transport in Hungary is due to the transport increase in mineral oil products. The still relatively low volumes explain the important rate of change.
- Container transport on the Danube remains very low, representing 0.5% of total transport performance during Q2 2016, while it represents 13.5% in the Rhine countries.

RATE OF CHANGE IN INLAND SHIPPING TRANSPORT PERFORMANCE IN RHINE COUNTRIES (Q2 2016 VS Q2 2015 IN%)

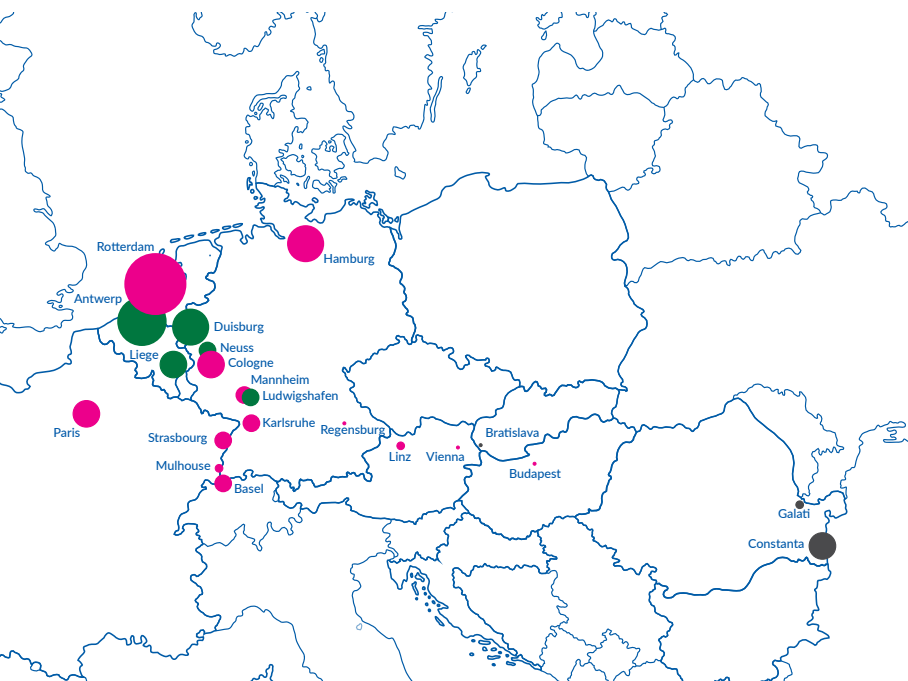


Source: Eurostat

- Container transport has renewed with a positive trend in both Germany and the Netherlands, while undergoing a severe decrease in France.
- Liquid cargo transports are performing well in the Netherlands, whereas they lost momentum in Germany. For Germany, these volumes are decreasing in the long run due to a falling consumer demand for heating oil and gasoline. In the Netherlands, however, these transports are fostered by rising trade movements of oil products and inter-refinery movements.
- Dry cargo segment is the weakest segment in all countries, reflecting saturation tendencies in certain industries.
- In France, the situation is explained by different trends according to goods segments. In Q2 2016, mineral oil products and iron ores accounted for losses of 20-30% with respect to Q2 2015, while agricultural products respectively gained 2%, foodstuff 20%, metals 3%, and fertilisers 14%.

## TRANSSHIPMENTS IN EUROPEAN PORTS

### GLOBAL TRAFFIC IN EUROPEAN PORTS IN 2016



● positive rate of change in global traffic between 1<sup>st</sup> half year 2015 and 1<sup>st</sup> half year 2016  
● negative rate of change in global traffic between 1<sup>st</sup> half year 2015 and 1<sup>st</sup> half year 2016

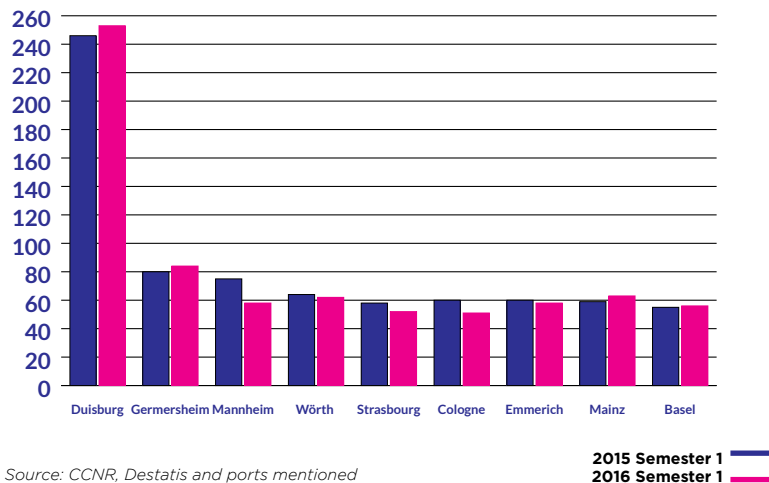
Source: CCNR, Danube Commission and ports mentioned

- The goods traffic in Rotterdam and Hamburg decreased between the 1<sup>st</sup> half of 2015 and 2016.
- The dry bulk segment was particularly impacted in the port of Rotterdam with a decrease of 3.9% between the 1<sup>st</sup> half of 2015 and 2016.
- The liquid bulk also experienced a decrease (-1.1%) but remains at historically high levels, helped by low fuel prices.
- Antwerp was able to increase its maritime traffic by almost 4% between the 1<sup>st</sup> half of 2015 and 2016, relying strongly on container traffic increase.
- The biggest European inland port, Duisburg, counted an increase of almost 3% in its IWT traffic over the same period.
- In parallel to the decrease in the main maritime port for the Rhine hinterland (Rotterdam), the major Rhine ports saw a decrease in transshipment between the 1<sup>st</sup> semester 2015 and the 1<sup>st</sup> semester 2016 (average rate of decrease was 4% for the biggest eight Rhine ports).
- The port of Neuss-Düsseldorf was the positive “outlier” with an increase in traffic of 8%.
- The major Danube ports witnessed a decrease in their traffic as well.

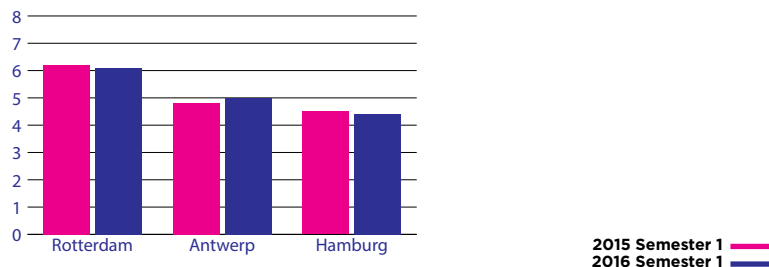
**INCREASE IN GOODS TRAFFIC**  
IN THE 1<sup>ST</sup> HALF OF 2016  
**FOR 1 OF THE 3 MAJOR MARITIME PORTS**  
**AND 2 OF THE 3 MAJOR INLAND PORTS**  
IN EUROPE

## TRANSSHIPMENTS IN EUROPEAN PORTS

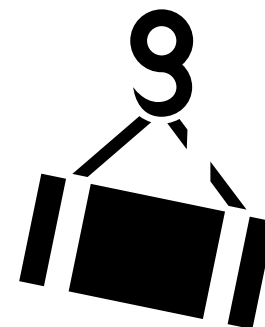
IWT CONTAINER TRAFFIC IN EUROPEAN INLAND PORTS IN THE 1<sup>ST</sup> HALF OF 2015 AND 2016 (IN 1000 TEU)



MARITIME CONTAINER TRAFFIC IN EUROPEAN SEA-PORTS IN THE 1<sup>ST</sup> HALF OF 2015 AND 2016 (IN MIO TEU)



## +2.9% CONTAINER TRANSSHIPMENT INCREASE IN DUISBURG BETWEEN 1<sup>ST</sup> SEMESTER 2015 & 1<sup>ST</sup> SEMESTER 2016



- Container handling in inland ports is part of multimodal logistics chains, and represents a growth segment especially along the Rhine, with its dense industrial areas requiring container transport possibilities.
- Ports offering multimodal container terminals help to further integrate IWT in logistical chains, by connecting it with high added-value products (machines, computers, equipment, etc.).
- Major container ports on the Rhine experienced contrasted evolution during the 1<sup>st</sup> half of 2016 compared to the 1<sup>st</sup> half of 2015, with, for example, an increase in containers transshipment in the ports of Duisburg, Germersheim, Mainz and Basel.
- The development potential of container traffic has still to be exploited in the Danube area.
- Maritime ports experienced the same evolution for container transshipment as for total goods transshipment (increase in Antwerp and decrease in Rotterdam and Hamburg between 1<sup>st</sup> semesters of 2015 and 2016).
- Although the maritime container traffic in Rotterdam declined slightly (-2.3 %) in the 1<sup>st</sup> half of 2016, IWT container traffic in the Netherlands and in Germany benefited from the growing container traffic in the port of Antwerp. In Antwerp, the maritime container traffic in the 1<sup>st</sup> half 2016 was higher by 4.2 % than in the 1<sup>st</sup> half year 2015, which resulted in a growing hinterland container transport from Antwerp to the Netherlands and Germany.





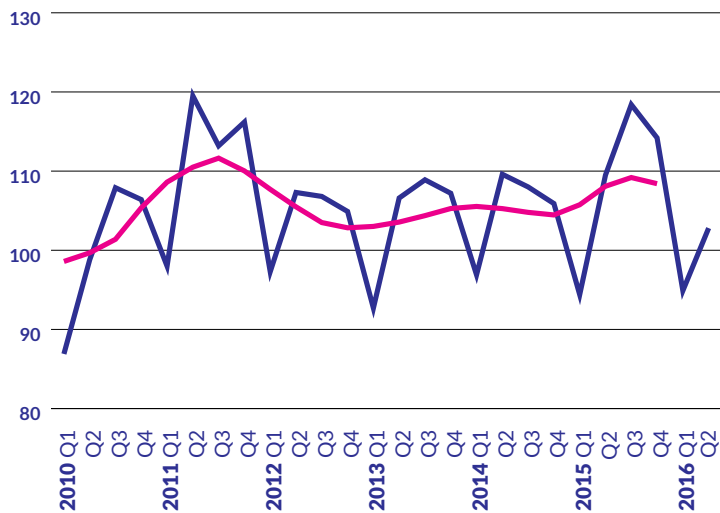
# 03

OPERATING  
CONDITIONS



## TURNOVER DEVELOPMENT IN EUROPE

TURNOVER DEVELOPMENT IN THE NETHERLANDS  
INDEX: 2010 = 100



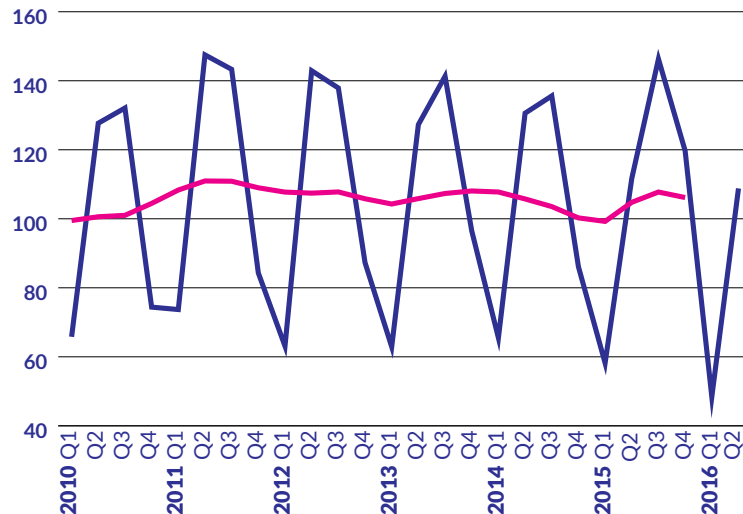
Source: CBS and CCNR calculation

Original series —  
Seasonally adjusted —

TURNOVER IN THE NETHERLANDS  
IN Q2 2016 SHRANK BY 6%  
COMPARED TO Q2 2015

-6%

TURNOVER DEVELOPMENT IN AUSTRIA  
INDEX: 2010 = 100



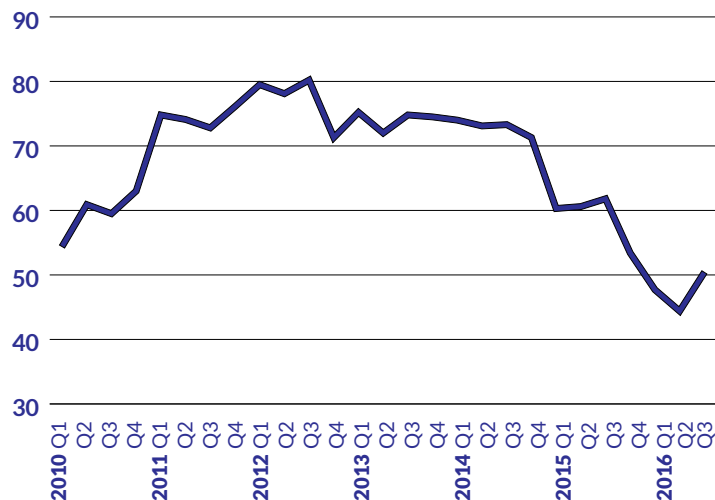
Source: Statistics Austria and CCNR calculation

Original series —  
Seasonally adjusted —

- During Q2 2016, water conditions enabled a high degree of loading and led to shrinking freight rates and turnovers.
- This evolution remains aligned with usual seasonal evolution.
- In Austria, where passenger transport is greater than goods transport, the high volatility of passenger shipping has a strong influence on turnover.
- After a trough in Q1 2016, turnover recovered slightly in Q2 2016, despite still being 3% lower than in Q2 2015.

## FREIGHT RATES AND FUEL PRICE

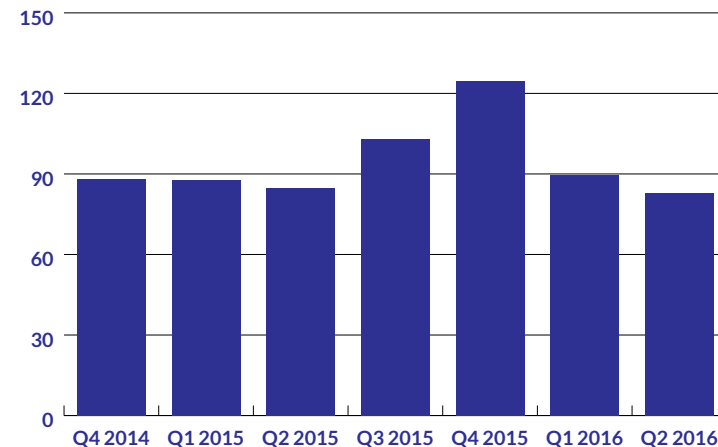
### DEVELOPMENT OF FUEL PRICES IN THE IWT SECTOR (IN EUR/100L.)



Source: CBRB

- Following the declining oil price, fuel prices did reach a trough in Q2 2016.
- In Q3 2016, fuel prices showed some signs of recovery, as oil prices picked up slightly.
- The OPEC countries' agreement at the end of 2016 might lead to a further upward trend in fuel prices during 2017.

### DEVELOPMENT OF INLAND NAVIGATION FREIGHT RATES IN THE NETHERLANDS (2015 = 100)

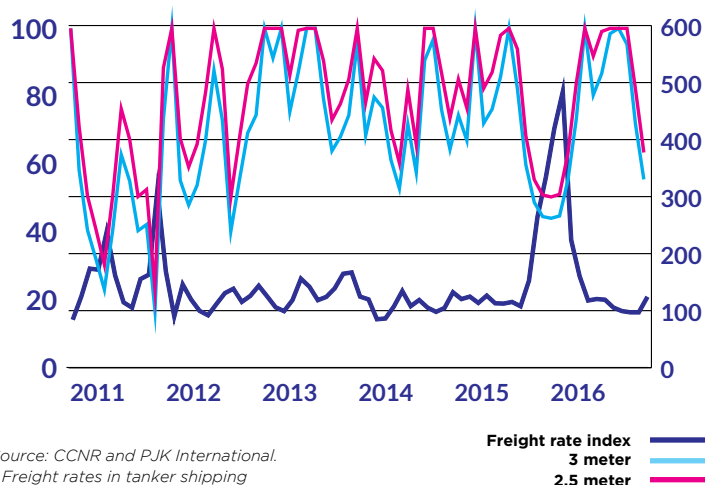


Source: CBS

- In Q2 2016, freight rates in goods transport in the Netherlands were slightly below the level of Q2 2015.
- Taking only tanker freight rates into account, we also observed a decrease during the Q2 2016 (-3.5% compared to Q2 2015).
- On the Danube, freight rates are correlated to transport running costs. As these costs are essentially composed of fuel cost (between 50 and 60%), low fuel prices during the 1<sup>st</sup> semester of 2016 have triggered a decrease in inland navigation freight rates.

## ■ FREIGHT RATES AND WATER CONDITIONS

POSSIBLE LOADING DEGREES AT KAUB/MIDDLE RHINE FOR VESSELS WITH A DRAUGHT OF 2.5 AND 3 METERS, COMPARED WITH FREIGHT RATES INDEX\*



Source: CCNR and PJK International.  
\* Freight rates in tanker shipping

- Freight rates were much weaker during the 1<sup>st</sup> half of 2016 than in autumn 2015, when low water levels increased prices sharply.
- Apart from supply/demand ratios, freight rates are strongly influenced by the natural conditions (water levels).
- Water levels and transport prices (freight rates) are negatively correlated.
- In the 1<sup>st</sup> half of 2016, the water levels along the Upper, Middle and Lower Rhine were rather favourable towards a high loading degree of vessels. However, this put a brake on freight rates.





# 04

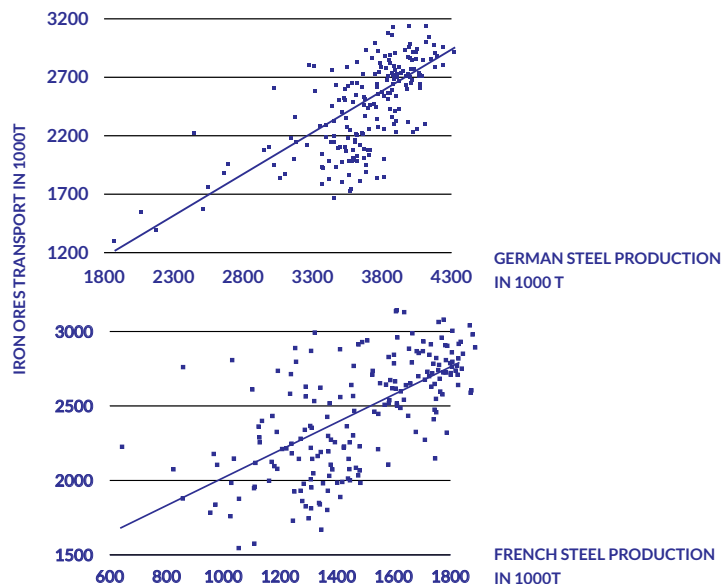
## OUTLOOK

## ■ FOCUS ON STEEL INDUSTRY

The transport of steel, steel products, iron ore and coal is strongly correlated with IWT. In Europe, the greatest transport volumes in this segment can be found in the Rhine area. The steel industry in Germany, France and Luxembourg is connected with the Rhine, the Moselle and the Saar rivers.

Due to high international competition, steel production and iron ore transport are stagnating in Europe.

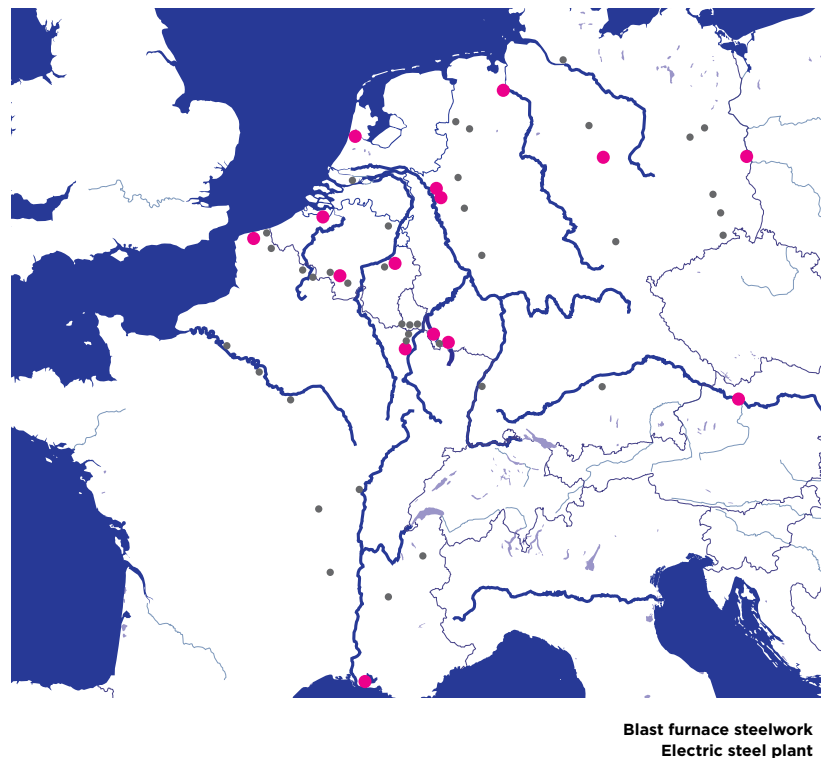
### GERMAN AND FRENCH STEEL PRODUCTION AND TRANSPORT OF IRON ORE ON THE RIVER RHINE \*



Source: World Steel Association and destatis / \* monthly data from 1/2000 until 9/2016

## 2/3 OF ALL IRON ORE AND METAL TRANSPORT ON EUROPEAN INLAND WATERWAYS ARE OBSERVED ALONG THE RHINE, MOSELLE AND SAAR.

### WEST EUROPEAN WATERWAYS AND STEEL PRODUCTION



Source: CCNR

## FORECAST MODEL AND RESULTS

### IRON ORES VOLUME TRANSPORTED ON THE RHINE IN 1000T AND FORECAST MODEL

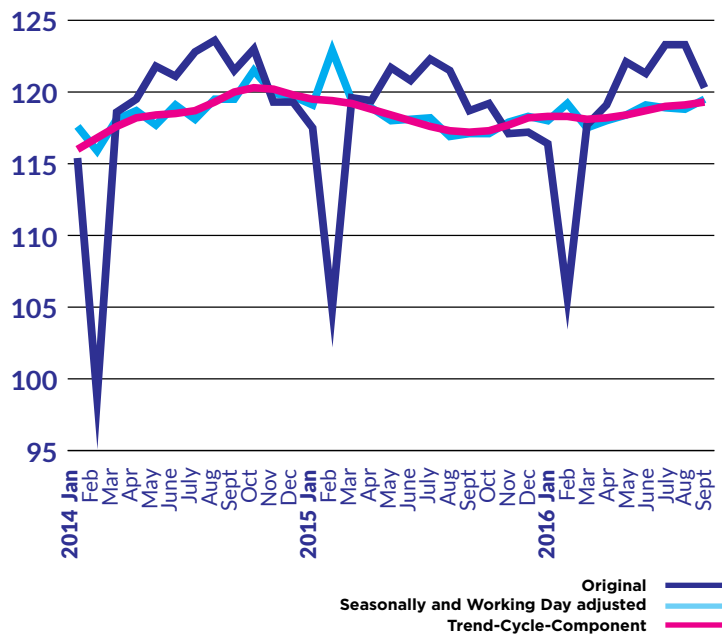


- Iron ore transport on the Rhine is expected to stagnate in 2017, in parallel with an expected stagnation of steel production in Western Europe.

- The main reason why Western European steel production is expected to pursue its stagnation trend in 2017 is the sharp global competition in this sector, especially from countries like China and India.

## WORLD TRADE OUTLOOK AND TRANSPORT TRENDS

RWI/ISL CONTAINER THROUGHPUT INDEX



Source: RWI and ISL calculation based on data from 81 ports

- The RWI/ISL Container throughput index is based on data from 81 world container ports covering 60% of worldwide container handling. This index is an early indicator for world trade and maritime container shipping.
- For the 2<sup>nd</sup> half of 2016, the trend-cycle-component of the index is still on an upward trend, giving credit to the positive outlook for the container transport.

## TRENDS IN DEMAND FOR TRANSPORT IN 2017

	Main driver(s)	Trends in demand
Agricultural products	Harvest results	Decrease
Iron ores	Steel production	Stagnation
Metals	Steel production	Stagnation
Coal	Weather & Energy policy, partly steel production	Decrease
Containers	World trade	Increase
Sand, soil & building materials	Construction activity	Stagnation
Mineral oil products	Oil prices	Stagnation
Chemicals	Chemical production	Increase

Source: CCNR

- Bad harvests in 2016 in Western Europe will keep having an impact on IWT at the end of 2016 and beginning of 2017. On the other hand, contrary to 2015, the Danube region has experienced good harvest results in 2016 that should have a positive impact on agriculture products IWT transport on the Danube.
- The outlook for the steel segment has changed from a decreasing to a stagnant tendency, due to the new outlook of steel production in Germany forecasting a stabilisation in the steel industry.
- The outlook on coal transport is still weak due to the ongoing growth of renewable energies. AGEBA is indeed expecting a decrease in coal use within the German energy sector (-4.4% for the first 9 months of 2016 compared to 2015).
- The outlook for the liquid cargo sector is more uncertain. The transport of mineral oil products might be less favourably affected by low oil prices and high profit margins in the refinery sector because of the recent OPEC countries agreement.

## GLOSSARY

**AGEB:** AG Energiebilanzen e.V. / Working Group on Energy Balances (Germany)

**CBRB :** Vereniging Centraal Bureau voor de Rijn- en Binnenvaart / Central Bureau for Inland Barging (Netherlands)

**Danube countries:** Austria, Bulgaria, Croatia, Hungary, Romania, Serbia, Slovakia

**EU:** European Union

**Europe:** European inland navigation in this report includes two countries not belonging to the European Union, Switzerland and Serbia

**Freight rate:** Price at which a cargo is delivered from one point to another

**GDP:** Gross Domestic Product

**IWT:** Inland Waterways Transport

**Loading degree:** percentage of maximum vessel loading

**MIO:** Million

**OECD:** Organisation for Economic Co-operation and Development

**Q1:** First Quarter

**Rhine countries:** Belgium, France, Germany, Luxemburg, Netherlands, Switzerland

**RWI/ISL Container Throughput Index:** Index of worldwide container throughput in ports

**TKM:** Ton-Kilometer (unit for transport performance which represents volume of goods transported multiplied by transport distance)

**TEU:** twenty-foot equivalent unit - unit of cargo capacity

**Turnover:** Sales volume net of sales taxes

**WTI:** West Texas Intermediate (grade of crude oil used as benchmark in oil pricing)

## NATIONAL STATISTICS OFFICES & INSTITUTES

Acronym	Original Name	English Name	Country
Statistik	Bundesanstalt Statistik Österreich	Statistics Austria	Austria
Statbel	Algemene Directie Statistiek / Direction générale Statistique/ Generaldirektion Statistik	Statistics Belgium	Belgium
NSI	Национален статистически институт	National Statistical Institute	Bulgaria
DZS	Državni Zavod za Statistiku	Central Bureau of Statistics of Croatia	Croatia
MDCR	Ministerstvo dopravy České republiky	Ministry of Transport of the Czech Republic	Czech Republic
FTA	Liikennevirasto	Finnish Transport Agency	Finland
VNF	Voies Navigables de France	Navigable Waterways of France	France
destatis	Statistisches Bundesamt	Federal Statistical Office of Germany	Germany
KSH / HCSO	Központi Statisztikai Hivatal	Hungarian Central Statistical Office	Hungary
MIT	Ministero delle Infrastrutture e dei Trasporti	Ministry of Transport and Infrastructure	Italy
AIPO	Agenzia Interregionale per il fiume Po	Interregional Agency of the Po River	Italy
OPS	Oficialiosios Statistikos Portalas	Statistics Lithuania (Official Statistics Portal)	Lithuania
STATEC	Institut national de la statistique et des études économiques du Grand-Duché de Luxembourg	National Institute of Statistics and Economic Studies of the Grand Duchy of Luxembourg	Luxembourg
CBS	Centraal Bureau voor de Statistiek	Statistics Netherlands	Netherlands
GUS	Główny Urząd Statystyczny	Central Statistical Office of Poland	Poland
P3C	Републички завод за статистику	Statistical Office of the Republic of Serbia	Republic of Serbia
INSSE	Institutul National de Statistica	National Institute of Statistics	Romania
Slovstat	Štatistický úrad Slovenskej republiky	Statistical Office of the Slovak Republic	Slovak Republic
Trafa	Trafikanalys	Transport Analysis	Sweden
DfT	Department for Transport	Department for Transport	United Kingdom



OTHER SOURCES

Original Name	English Name	Country
EUROSTAT	EUROSTAT	EU
OECD	OECD	World
World Steel Association	World Steel Association	World
AG Energiebilanzen	Working Group on Energy Statistics	Germany
Centraal Bureau voor de Rijn- en Binnenvaart	Central Bureau for Inland Barging	Netherlands
Federation Francaise de l'Acier	French Steel Association	France
Wirtschaftsverband Stahl	German Steel Association	Germany
Institut für Seeverkehrswirtschaft und Logistik	Institute of Shipping Economics and Logistics	Germany
Rheinisch-Westfälisches Institut für Wirtschaftsforschung	RWI - Leibniz-Institute for Economic Research	Germany
US. Energy Information Administration	US. Energy Information Administration	USA
PJK International	PJK International	Netherlands

METHODOLOGY

Freight traffic on inland waterways and in ports

Europe as defined in chapter 2 takes into account all European countries providing quarterly data on inland waterway transport. All these countries are listed on the Transport Performance in Europe map (page 16).

When discrepancies on total transport performance are observed between Eurostat and National Statistics data, the information is notified to Eurostat, and National Statistics Office data are taken into account.

When available, NST product classification is used in order to split transport performance into following transport segments: dry cargo, liquid cargo, containers.

When available, general cargo is included in dry cargo.

Hungary and Bulgaria transport performance split by segment is based on Hungary and Bulgaria quarterly transport volume split provided by the National Statistics Offices.

Outlook

Explanatory variables for the iron ore transport forecast model are German steel production, French steel production, weighted by indicators for the market share of inland shipping within the steel sector.

The forecast model result is based on the following formula:

$$\log(\text{Iron ores transport}) = 0.24 * \log(\text{Steel production in France}) + 0.73 * \log(\text{Steel production in Germany})$$

CREDITS

The Market Insight of European Inland Navigation is a common project of the CCNR and the European Commission

CONTRIBUTORS

CCNR

Guillaume LEGEAY (Project leader)

Norbert KRIEDEL (Economist)

Clémentine HURBOURQUE (Editorial coordination)

Angelika ESPENHAHN (Translation coordination)

Joseph DÜCK (Intern)

Contact: [ccnr@ccr-zkr.org](mailto:ccnr@ccr-zkr.org)

IN PARTNERSHIP WITH

Danube Commission

Moselle Commission

Sava Commission

EBU

ESO

IVR

TRANSLATION

Christophe HENER (French)

Bettina ACHHAMMER (German)

Pauline de ZINGER (Dutch)

Jane SWIFT (English proofreading)

## **LIABILITY DISCLAIMER**

Use of the knowledge, information or data contained in this document is at the user's own risk. The Central Commission for the Navigation of the Rhine and its secretariat and the European Commission shall in no way be liable for use of the knowledge, information or data contained in this document or any ensuing consequences. The facts presented in the study and opinions expressed are those of the authors and do not necessarily also represent the position of the Central Commission for the Navigation of the Rhine or the European Commission and its agencies on the subject in question. This notice does not constitute a formal commitment on the part of those organisations referred to in the report.

Imprint: January 2017

Published by the Central Commission for the Navigation of the Rhine  
2, place de la République 67082 STRASBOURG cedex – [www.ccr-zkr.org](http://www.ccr-zkr.org)  
ISSN 2519-1101



In partnership  
with the

