

# Review of European data sets and gap identification for external costs calculations on emissions to air by inland navigation

PLATINA SWP 2.2 Knowledge basis for innovation take-up and internalization of external cost

WORKSHOP 5 OCTOBER, BRUSSELS

# Agenda (morning)

- 10.00 Welcome and introduction (Rijkswaterstaat)
- 10.10 Tour de table, introduction of participants
- 10.20 Policy background (European Commission)
- 10.30 Study objectives, scope and methodology (STC)
- 10.45 Logistic parameters and aggregation of transport data (Panteia)
- 11.15 Energy consumption in IWT (DST)
- 11.30 Presentation on emissions and monetisation (STC)
- 11.45 Presentation main conclusions and recommendations (STC)
- 12.00 – 13.00 Lunch provided by PLATINA 2 / Rijkswaterstaat

# Agenda (afternoon)

- 13.00 – 13.20 Presentation BIVAS (Rijkswaterstaat)
- 13.20 – 15.30 Brainstorm and discussion for the preparation of roadmaps
  - Action 1: Collect and disseminate information on **fuel consumption and sailing speeds** of vessels on waterway sections
  - Action 2: Collect and disseminate information on **average loading factors and empty sailings** of vessels
  - Action 3: Take into account the **geographic location of air pollutants** NO<sub>x</sub> and PM and of emissions to air by IWT, through the use of a combination of sources
  - **Other actions**
- 15.30 – 16.00 Summary of main findings from workshop (all)
- 16.00 Closing of the meeting (Rijkswaterstaat)

# Questions 3 actions

**3 main actions have highest relevance and priority to close gaps:**

**Questions for each of the actions:**

- What can be done?
  - What are the quick wins and possible voluntary actions?
  - What can be done with optimised usage of RIS?
  - What can be done if legal framework is adapted?
- Who can/should take action and the lead?
- When can it be planned (time horizon 2016-2020)?
- Where can/should measures be implemented (geography)?

# Review of European data sets and gap identification for external costs calculations on emissions to air by inland navigation

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Martin Quispel, STC-NESTRA BV, member of STC-Group  
5 October, Brussels, workshop

# Background

- Air pollutant emissions ( $\text{NO}_x$  and  $\text{PM}_{2.5}$ ) resulting from burning fuel are relatively high compared to road and rail transport in terms of grams emissions per kWh. Together with the climate change emissions (mainly  $\text{CO}_2$ ) these emissions to air cause the vast majority of external costs of IWT that have been reported in European studies.
- There are relatively large differences in outcomes of IWT external costs calculations. The external costs estimations (euros per tkm) are used as well for Cost Benefit Assessments, e.g. Impact Assessment studies.
- External cost value may have large impact: important to assess the availability and quality of the datasets used in order to improve the reliability of the external cost calculations on a European level.
- PLATINA2 SWP 2.2, partners: STC, WVU, NEA, DST. Deliverable 2.3.

# Objectives and scope

- Main objectives:
  - Review quality of datasets for calculation of emissions and external costs for IWT at EU level, in euro per tonkilometer
  - Identify the knowledge gaps for external costs of emissions to air
  - Providing views on how to close the gaps.
- Scope:
  - EU level
  - Only emissions to air (no other external costs)
  - Tank to propeller (well to tank excluded)
  - Freight transport

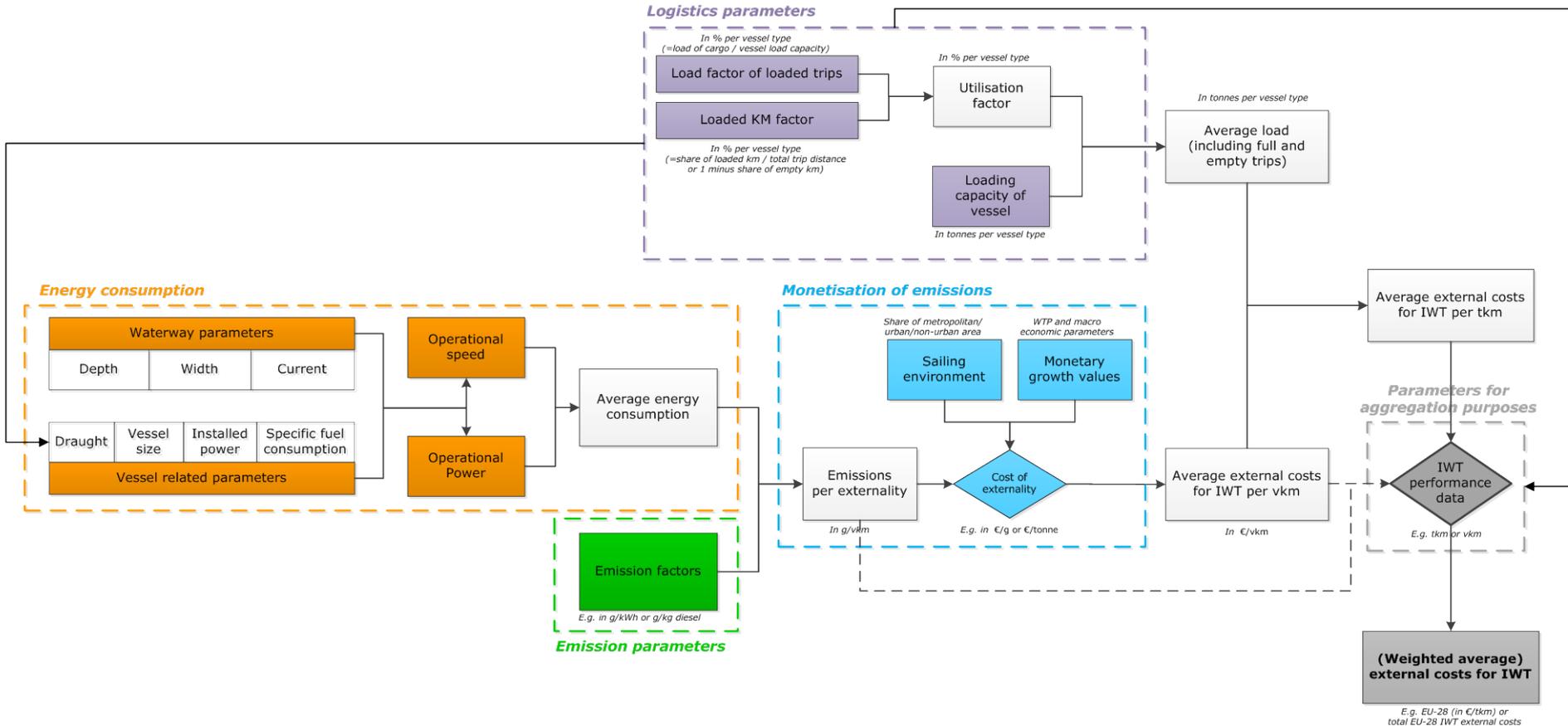
# Research questions

- Which are the main parameters for the estimation of external costs for IWT?
- What are the key factors influencing these parameters?
- What is the bandwidth in the values and how does this influence the outcome?
- What data collection is needed per parameter?
- To what extend is the required information available on a European level?
- How can the reliability of the datasets be improved?
- How can the gaps be closed for parameters that are not being measured?
- What is the advisable regularity for measuring and monitoring?

# Methodology

- For the identification of the main parameters, theoretical outline has been developed based on the methodology followed and the parameters used in the European '**Handbook on External Costs of Transport**'.
- Parameters are identified, described and data requirements are presented, taken into account the variety of circumstances and situations that occur in inland navigation, resulting in a certain bandwidth of possible values.
- Subsequently the available datasets are identified and compared with the requirements resulting in the identification of parameters for which the data reliability is missing on EU level and/or needs to be improved.
- Finally conclusions are drawn and recommendations are presented on how to close the gaps.

# Methodological framework

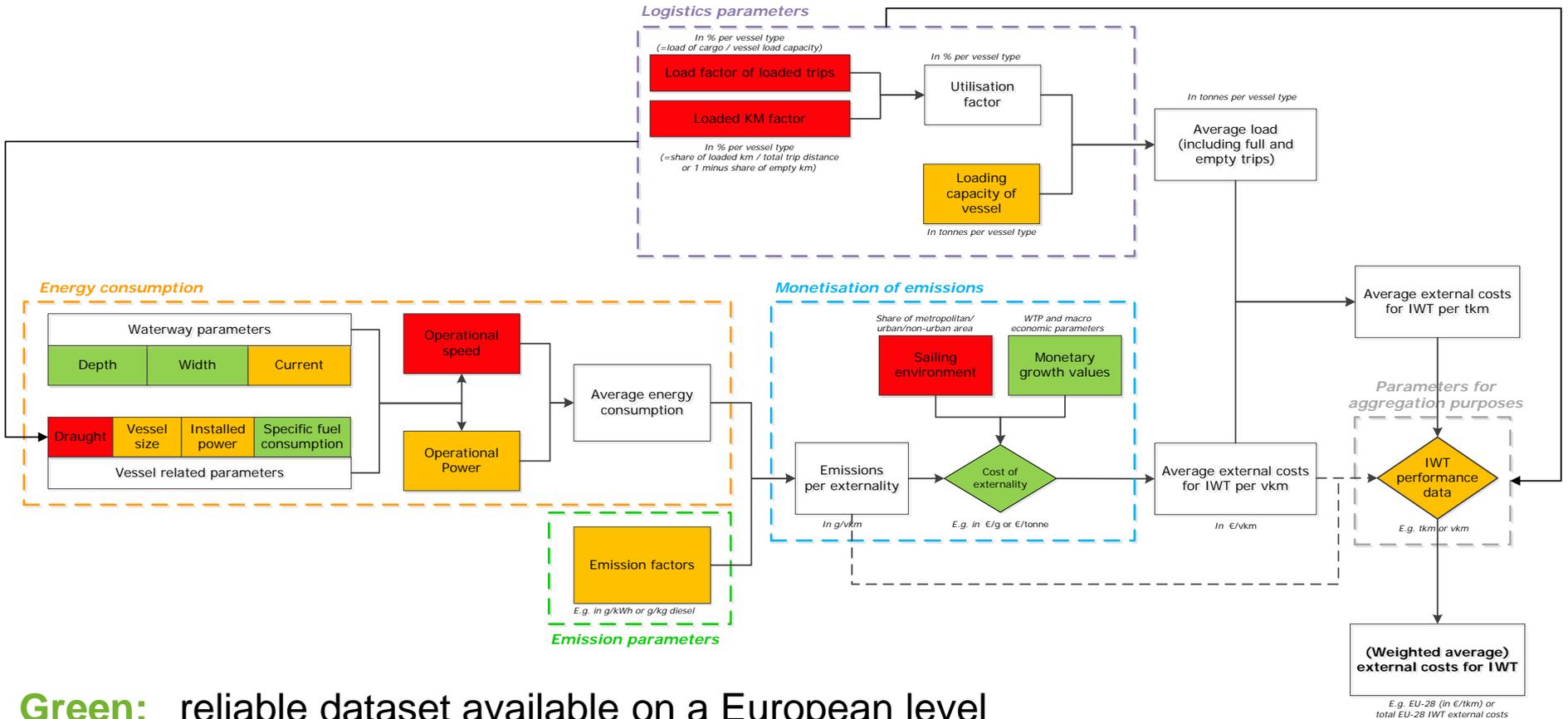


# Presentations

- Logistics parameters (transport efficiency): Wouter van der Geest
- Aggregation: Wouter van der Geest
- Energy consumption: Berthold Holtmann
- Emission parameters: Nathaly Dasburg
- Parameters for the monetisation of emissions: Nathaly Dasburg

# Main conclusions and recommendations

# Main gaps



**Green:** reliable dataset available on a European level

**Orange:** improvements needed on the current dataset to enhance the reliability

**Red:** no dataset available on a European level

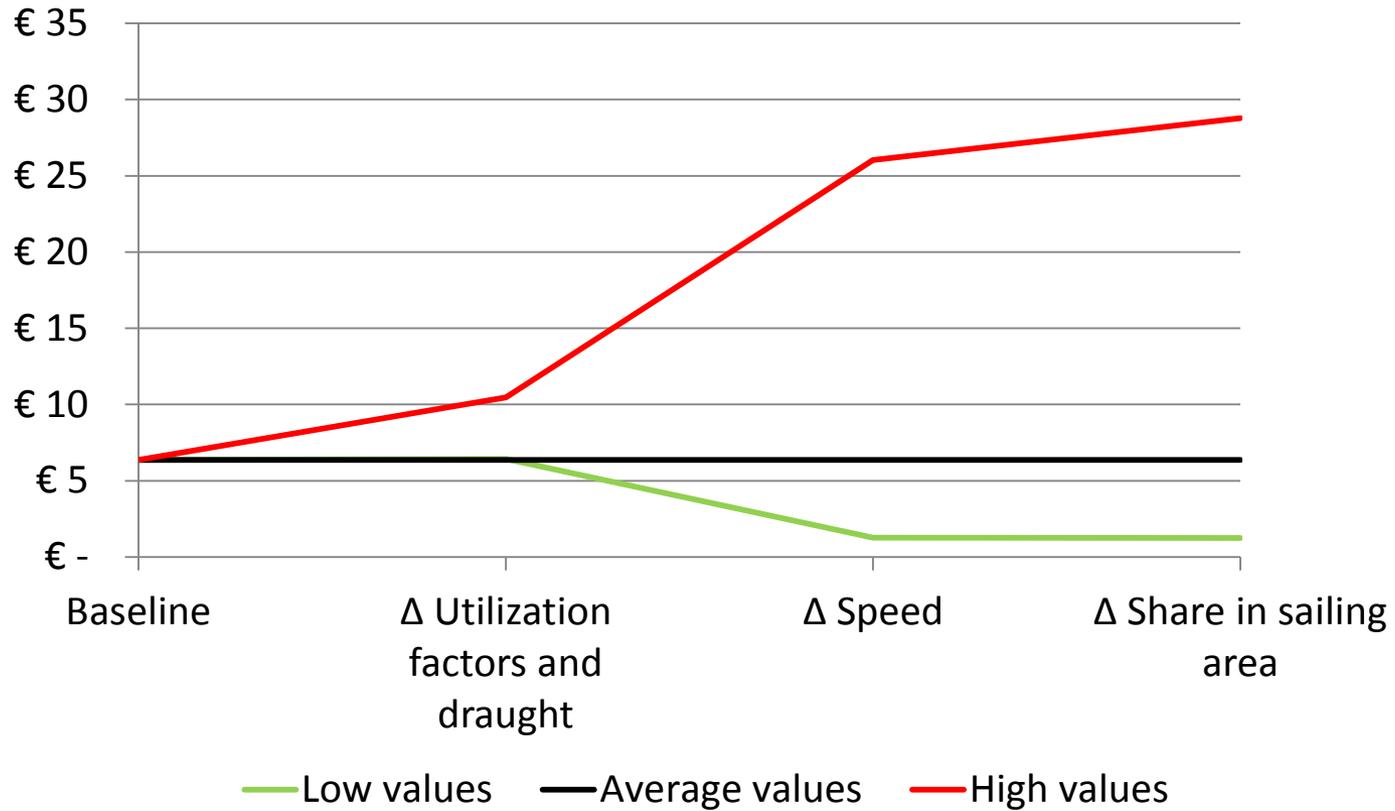
# Main findings

- Most significant issues that need to be addressed:
  - the lack of reliable and detailed data on the **fuel consumption** of vessels active in inland waterway transport
  - lack of reliable data on the **average tonnage carried** by inland vessels per travelled kilometre, properly taking into account the share of empty trips
  - lack of **geographic detail** to determine impact of NO<sub>x</sub> and PM<sub>2.5</sub> emissions by IWT

# Sensitivity (1/2)

	Extreme values observed leading to lower external costs per tkm	Base line situation (average values used in IWT external cost studies)	Extreme values observed leading to higher external costs per tkm
<b>Utilization factor (load factor x load km factor)</b>	62%	52%	25%
<b>Load factor of a loaded trip</b>	75%	68%	55%
<b>Speed</b>	8 km/h	15 km/h	18 km/h
<b>Sailing environment</b>	100% non-urban	5% urban and 95% non-urban	14% urban metropolitan, 53% urban, 33% non-urban

# Sensitivity (2/2)



# Conclusion

- A **trade-off** will emerge between the level of accuracy and the necessary effort in terms of data collection and thus funding. Therefore, defining **priorities is needed**.
- A starting point is **tackling first the data collection of parameters with the largest gaps and the highest impacts**.

# Recommendations (1/4)

**3 main actions have highest relevance and priority to close gaps:**

- **Action 1:**

**Collect and disseminate information on fuel consumption and sailing speeds of vessels on waterway sections**

- Real measurements of fuel consumption needed (detailed)
- Model based assessments based on measurements of real sailing speed, speed/power profiles and detailed information on the fairway dimensions and conditions

# Recommendations (2/4)

- **Action 2:**

## **Collect and disseminate information on average loading factors and empty sailings of vessels**

- Use existing datasets to make a first estimate for Europe by using information from the DESTATIS institute and Austrian statistics office  
*Limiting aspects:*
  1. *data is not differentiated to vessel size classes*
  2. *statistics do not present average load factor for North-South corridor, Lower Danube transports and the actual load factor for domestic transport in NL (possibility: BIVAS) and BE*
- Sailed (empty) kilometres: current EU databases are voluntary. Anonymised information from the Automatic Identification System (AIS) data in combination with information on the kilometres of loaded trips could be used.

# Recommendations (3/4)

- **Action 3:**

**Take into account the geographic location of air pollutants NO<sub>x</sub> and PM and of emissions to air by IWT, through the used of a combination of sources:**

- Statistical information on the population densities per NUTS 3 region or more detailed level of urban/rural classification (from Eurostat)
- Qualitative assessment using GIS applications
- OD freight data and traffic flows by IWT or e.g. through AIS

# Recommendations (4/4)

- Focused first on those countries and waterways with the following characteristics:
  - High share in the tonne-kilometre performance of IWT
  - Where the shadow prices for PM2.5 and NOx emissions are high
  - Where parameters change dynamically
  - Where the available data is relatively weak
- Expand legislative basis for statistics on European level:
  - make information on empty sailings mandatory
  - further differentiation of vessel types and regional areas (support needed from MS and international organisations)
  - information on emission profiles and engines installed in IWT (e.g. EHDB)

# Next steps

- The results from the workshop will be incorporated in a final report (PLATINA2 Deliverable 2.4).
- Focus will be particularly on the solutions and quick wins to close the gaps and the next steps.
- Final report is scheduled for end of 2015.

# *Thank you for your attention!*

## More information & contact details



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