



University of Antwerp
| TPR | Department of Transport
and Regional Economics

Smart Waterway Project

Economic viability of inland urban waterway transport in Ghent

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Content

- **Case setting**
- **Overall project objectives**
- **Economic evaluation**
- **Other possible application areas**
- **Conclusions**

Case setting (1)

The volume of roadway traffic is steadily increasing in Belgium.

Strong focus on increasing quality of life in urban areas by moving last-mile logistics (LML) to local waterways.

In the SmartWaterWay project an autonomous pallet shuttle barges will be developed that should allow cost effective transport in an urban setting. The case study is done in the city of Ghent (Belgium).



Case setting (2)

➤ Challenges

- Smaller inventory, higher frequencies.
- Increasing road freight traffic to urban areas.
- Increased number of commercial vehicles.
- High external costs of road transport.
- Need to improve modal share of sustainable modes.

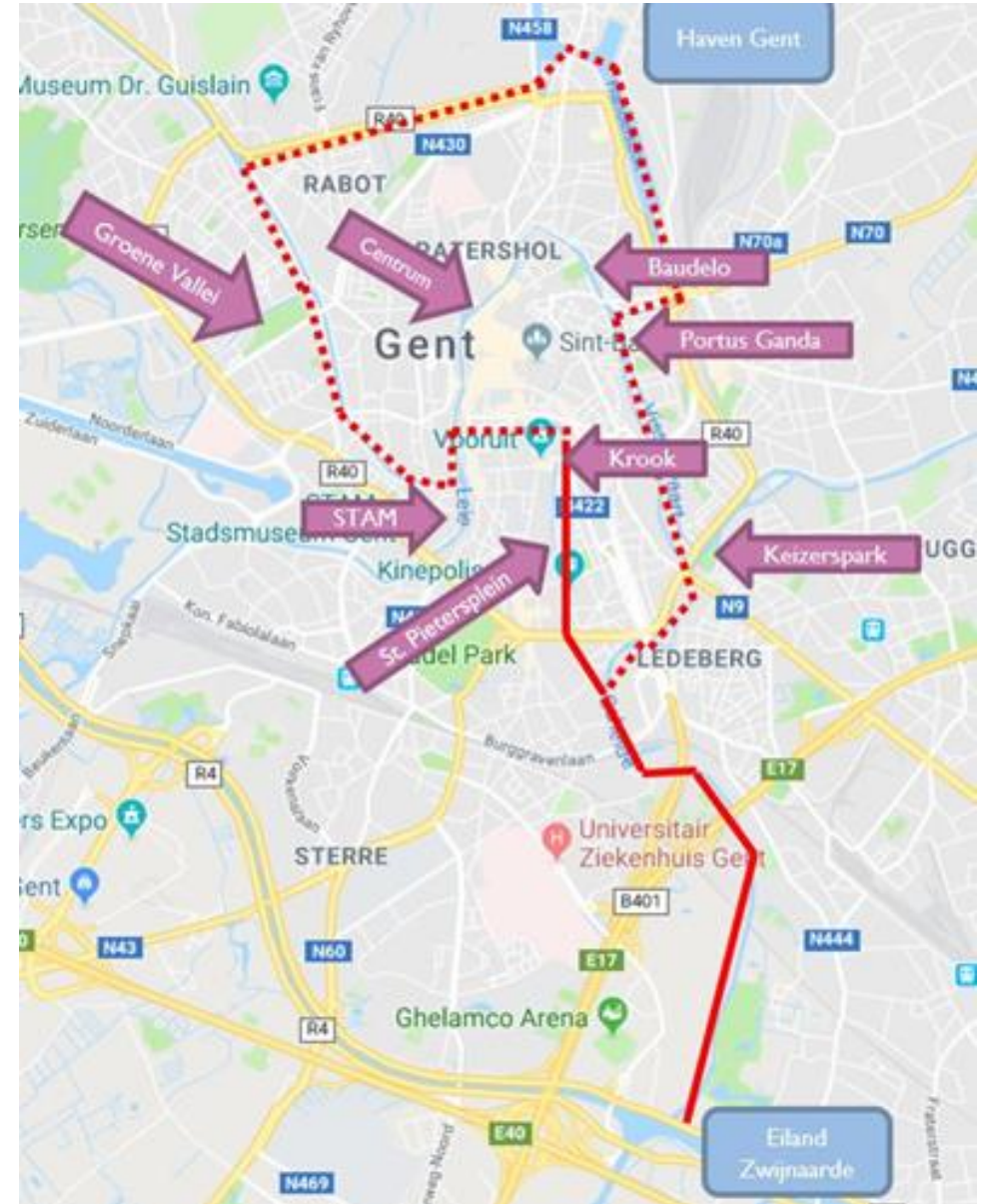
➤ Proposed solution

- Innovation in IWT (Autonomous PSBs)

➤ Study area

- City of Ghent (Belgium)

➤ Potential of using small inland waterways for urban logistics!



Smart Waterway project (Objectives)

- Create autonomous (small) inland vessel (PSB) by applying:
 - low-cost alternatives for communication, positioning and sensing (onboard)
 - additional data from sensing and localization infrastructure at complex locations on the waterways

PLC – Control System

Communication

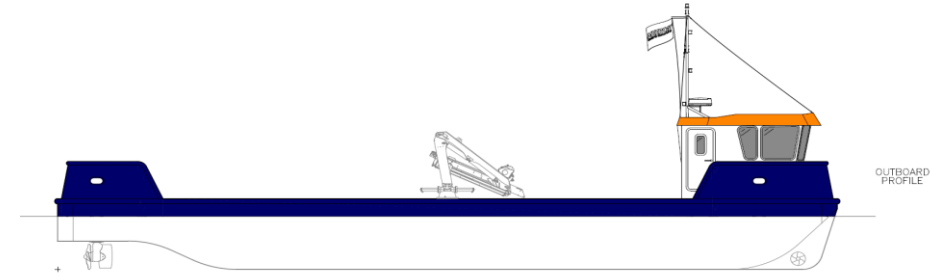
Remote Control

Positioning

Cameras, LiDAR, Laser & other sensors



Access to all city channels (19.5mx5m, 40-50T)



Infrastructure at critical points



Transport economic evaluation (1)

- ✓ **How feasible is the automated Pallet Shuttle Barge (PSB) for urban freight delivery from the private viewpoint?**
- ✓ **How feasible is the automated Pallet Shuttle Barge (PSB) for urban freight delivery from the socio-economic viewpoint?**

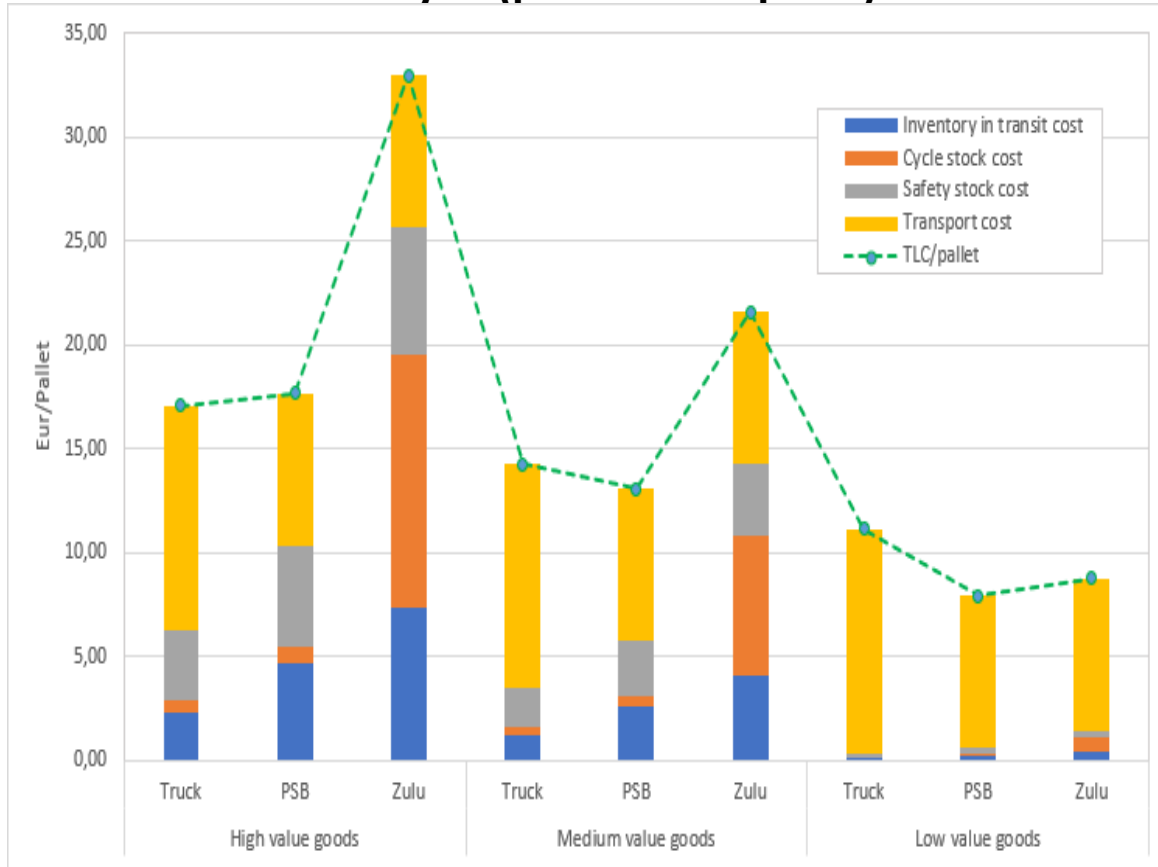
Transport economic evaluation (2)

- Socio-economic cost benefit analysis (SCBA)

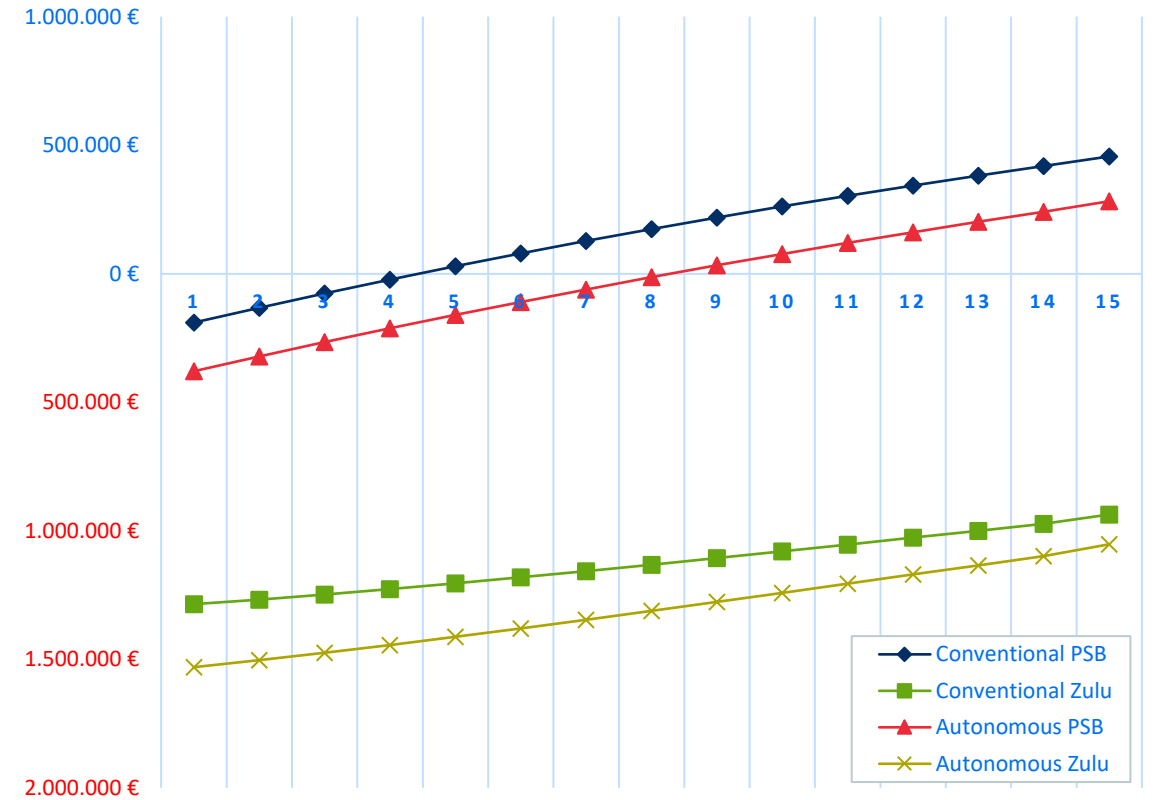
Actor	Possible outcomes					
Vessel owner benefit	> 0	< 0	> 0	< 0	> 0	< 0
Cargo owners benefit	> 0	< 0	< 0	< 0	> 0	> 0
Society benefit	> 0	< 0	> 0	> 0	< 0	> 0
Decision criteria						
Project evaluation	Positive Implement project	Negative Stop project	Positive if cargo owners can be compensated for; <u>otherwise, negative.</u>	Positive if the vessel owner and cargo owners can be compensated for; <u>otherwise, negative</u>	Positive if society can be compensated for; <u>otherwise, negative.</u>	Possible if the vessel owner can be compensated for; <u>otherwise, negative</u>

Transport economic evaluation (3)

TLC analysis (private viewpoint)

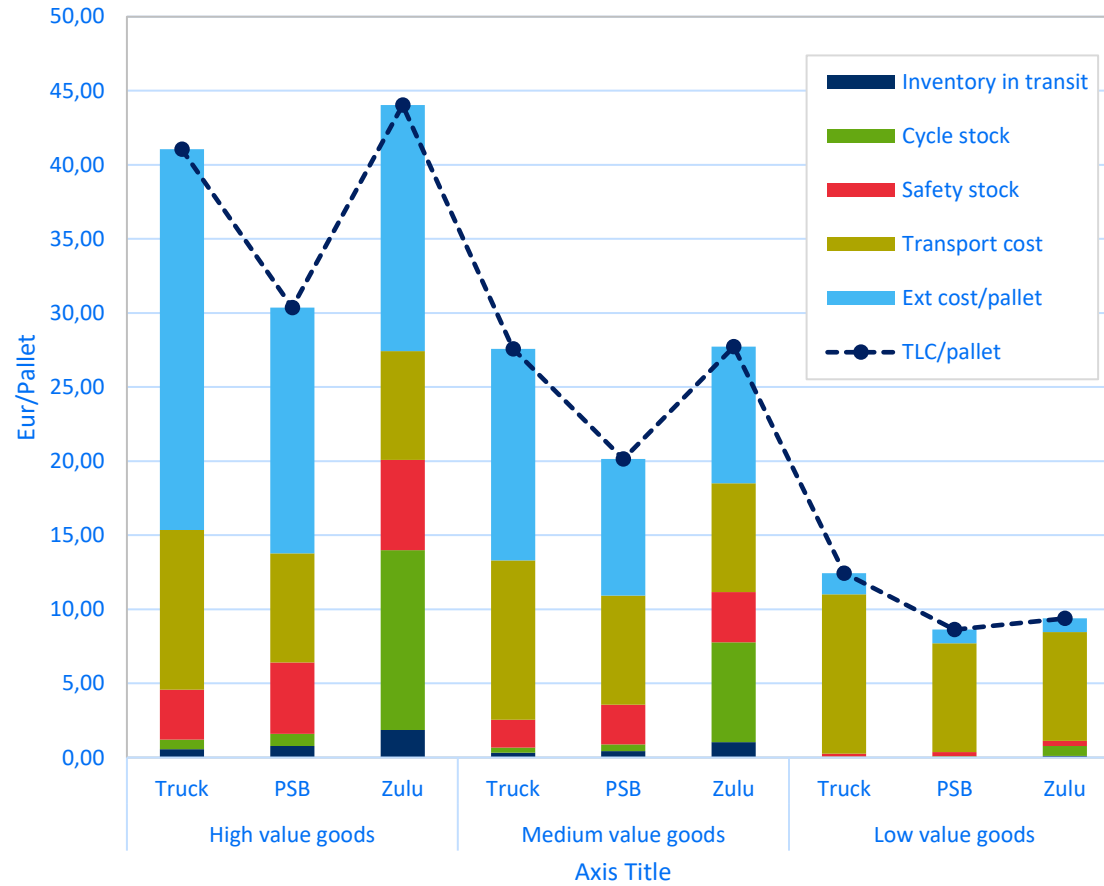


Cash flow analysis (private viewpoint)

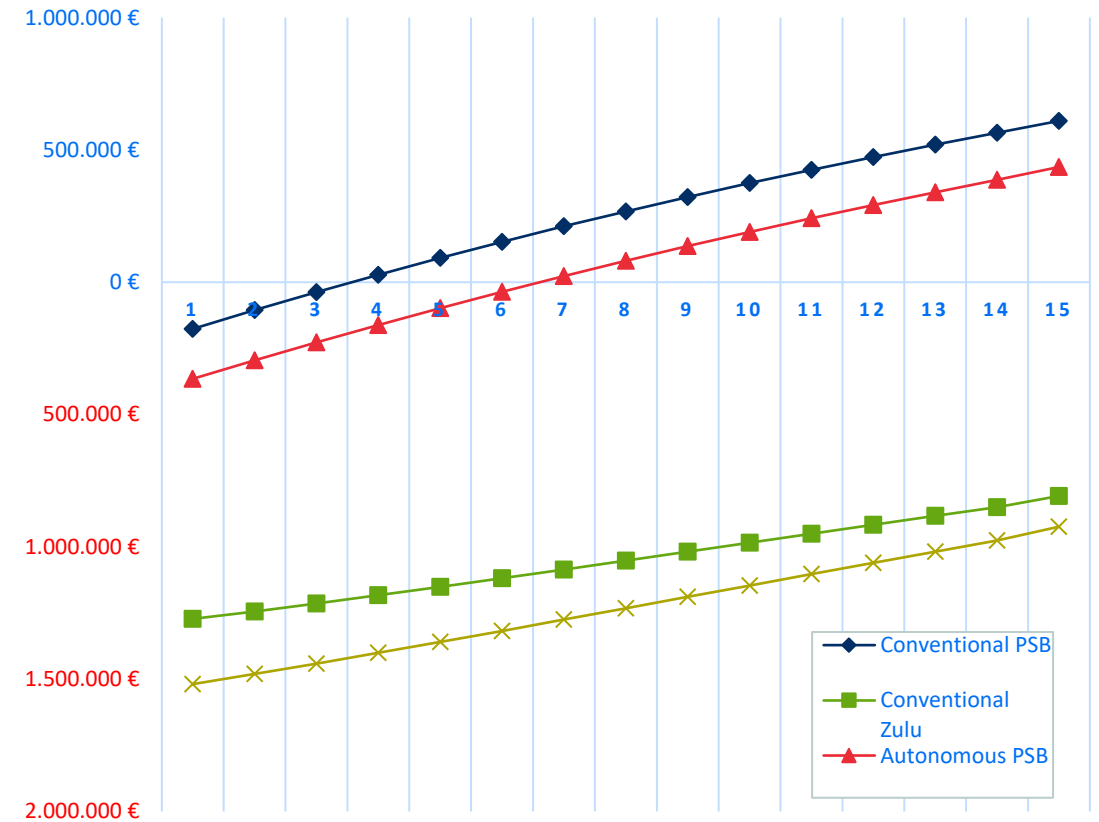


Transport economic evaluation (4)

TLC analysis (welfare viewpoint)



Cash flow analysis (welfare viewpoint)



Transport economic evaluation (5)

- SWOT analysis of PSB solution

Strengths

- High cargo capacity (economies of scale).
- Low transport cost.
- The positive business case for PSBs

Weaknesses

- Low speed.
- Capital-intensive, especially for automated vessels.

Opportunities

- Sustainable transport mode.
- Positive net benefit for society.
- High market share for different goods.

Threats

- High competition from road transport.
- Limited flexibility.
- Limited accessibility.

Possible other application areas (1)

Based on the insights obtained from the case study in Ghent also other possible areas are selected:



Amsterdam

Delft

Utrecht



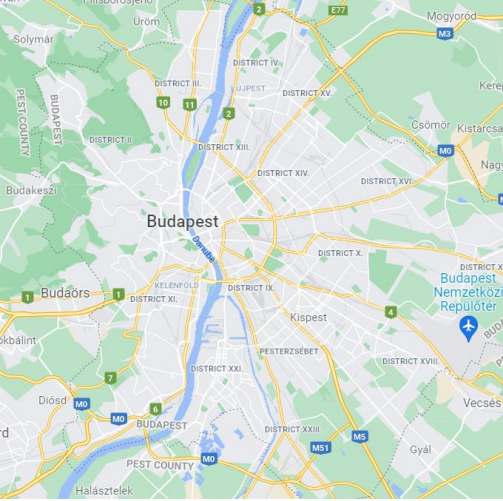
Paris

Brugge

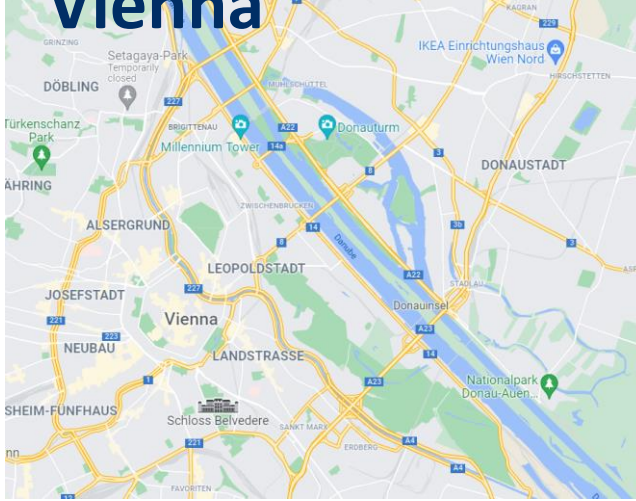
Antwerp

Possible other application areas (2)

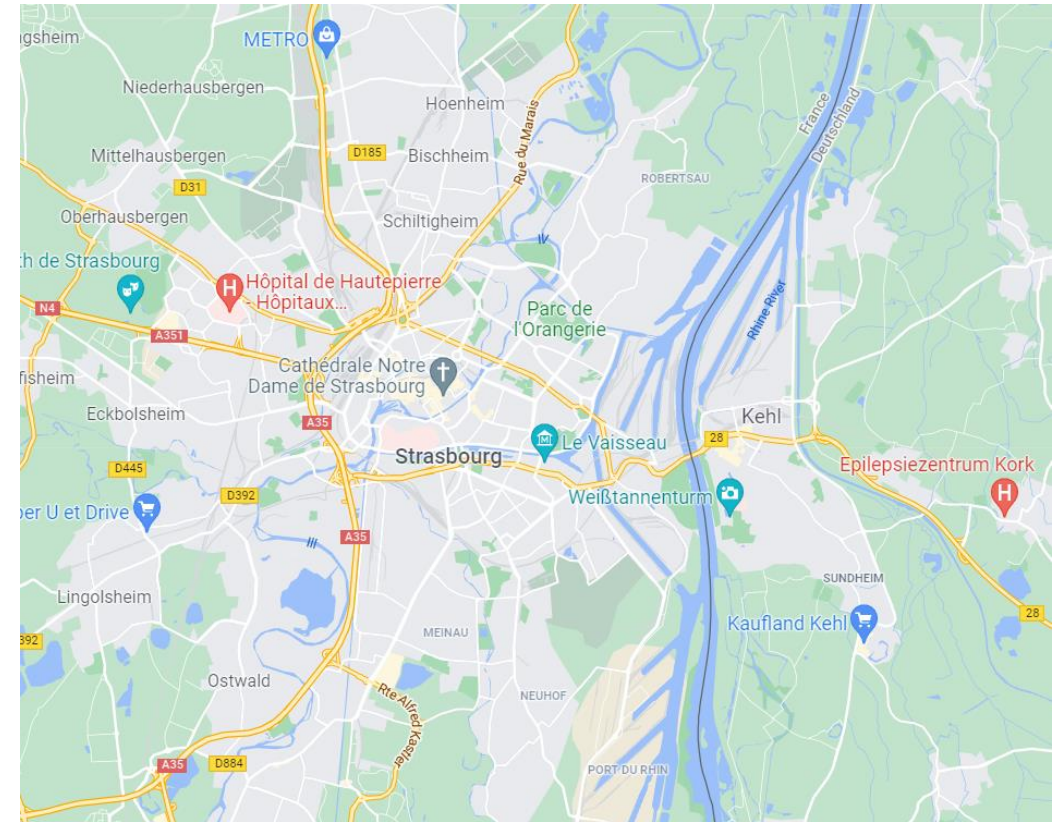
Budapest



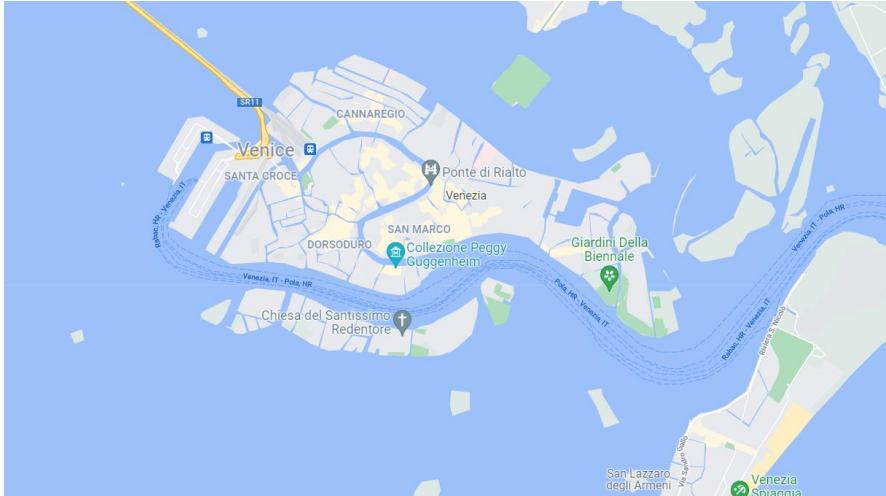
Vienna



Strasbourg



Venice



Conclusions

- Regarding the vessel type, PSB (conventional and autonomous) have positive NPV values. Thus they are viable for the vessel owner to use for urban freight delivery from the private point of view.
- Furthermore, the study reveals that IWT is mostly suitable for low-value goods that are not time-sensitive. The main reason for this is the low cost of in-transit inventory for this category of goods.
- Next to the city of Ghent also other possible application areas are selected where the concept could be applied

Project partners and info

More info:

<https://www.imec-int.com/en/research-portfolio/smartwaterway>

Contact

- ✓ Project lead: Louis-Robert Cool
- ✓ Research lead: Peter Hellinckx
- ✓ Proposal Manager: Siegfried Mercelis
- ✓ Innovation manager: Eric Moons

Project information

Industry

- ✓ Seafar
- ✓ Blue Line Logistics
- ✓ Citymesh
- ✓ Pozyx

Research

- ✓ imec – IDLab IBCN – UGent
- ✓ imec – IDLab Data Science Lab – UGent
- ✓ imec – IDLab MOSAIC – Uantwerpen
- ✓ UAntwerpen – TPR

