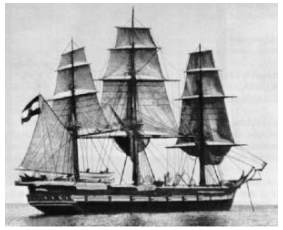
Inland Navigation Week

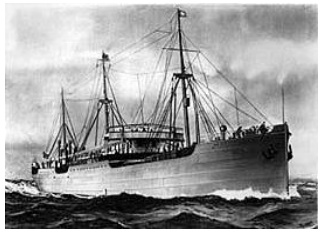
AEGIS – New waterborne logistics

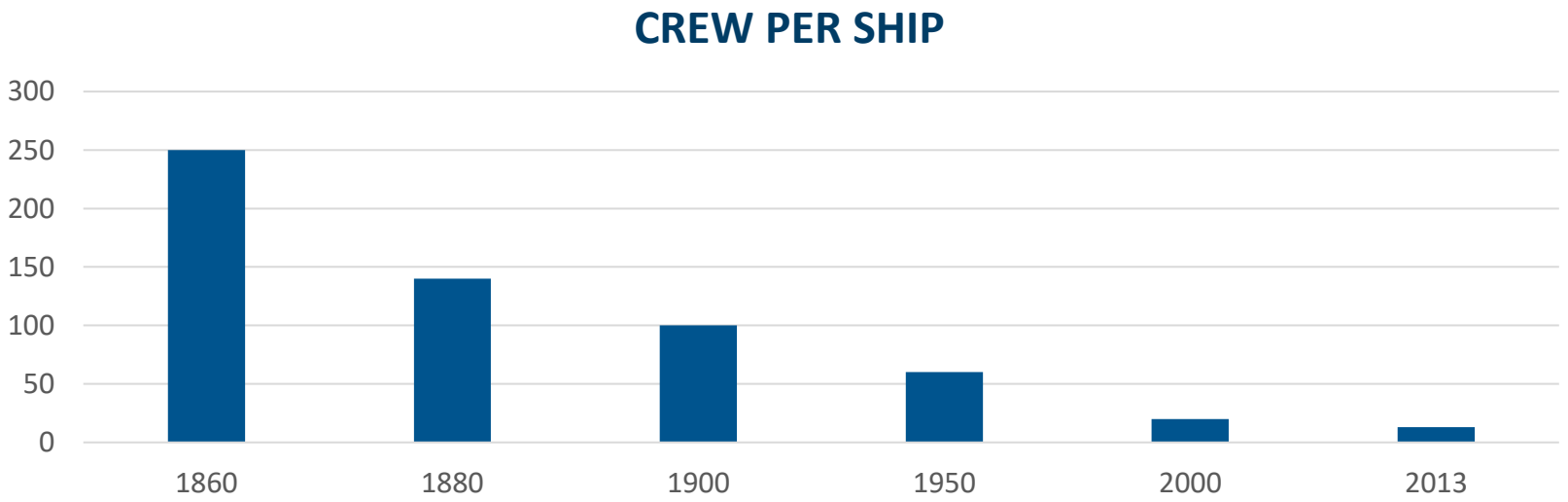
Odd Erik Mørkrid
SINTEF Ocean

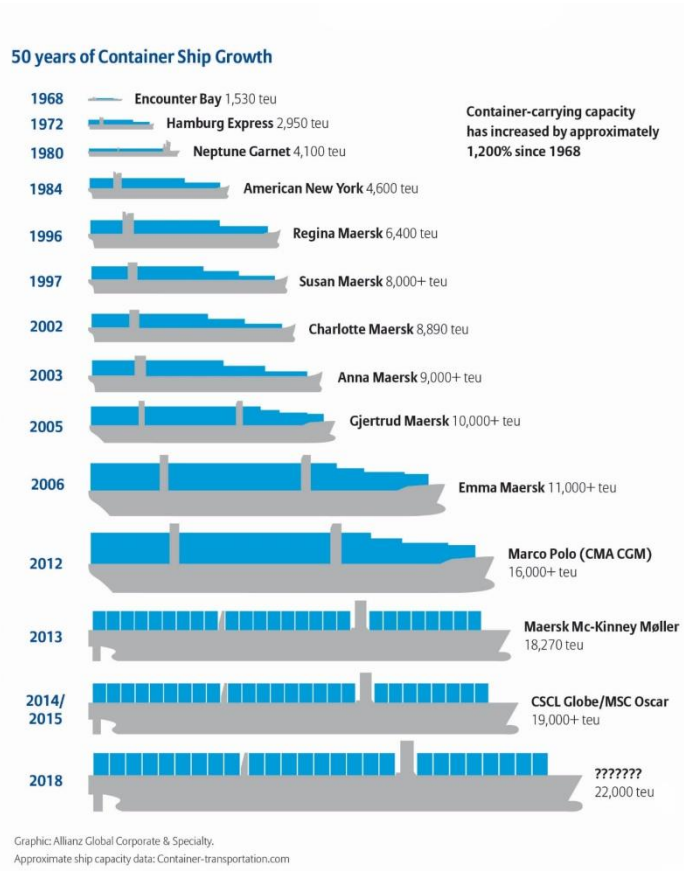
21.03.2023

A brief history of merchant shipping





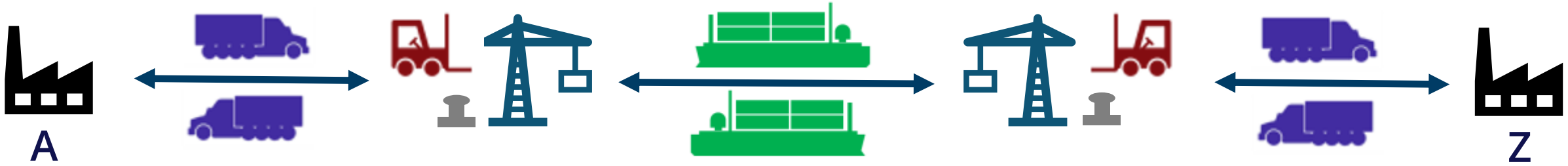




The project has received funding from the European Union's Horizon 2020 Research and innovation program under Grant Agreement N°859992.

The logistical challenge

How?



Advanced, Efficient and Green Intermodal Systems

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Project data

- EU Horizon 2020 call:
  MG-2-6-2019: Moving freight by Water: Sustainable Infrastructure and Innovative Vessels
- Budget: EUR 7.5 Million
- Start: June 1st 2020
- End: May 31st 2023 (36 months)
- http://aegis.autonomous-ship.org/

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AEGIS: *The next generation sustainable waterborne transport system*

- more **diverse** sizes of ships
- **mother-daughter** solutions
- more **flexible** ship systems
- **more automation in** cargo handling
- **standardized** cargo units
- new **digital** technologies

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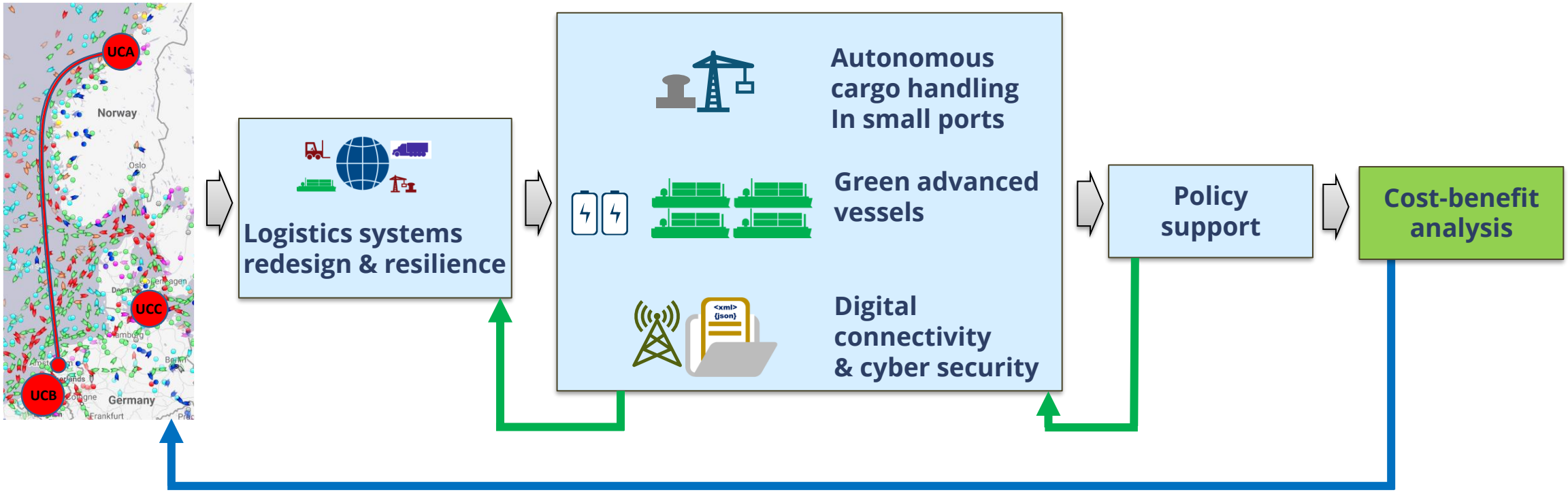
The AEGIS project



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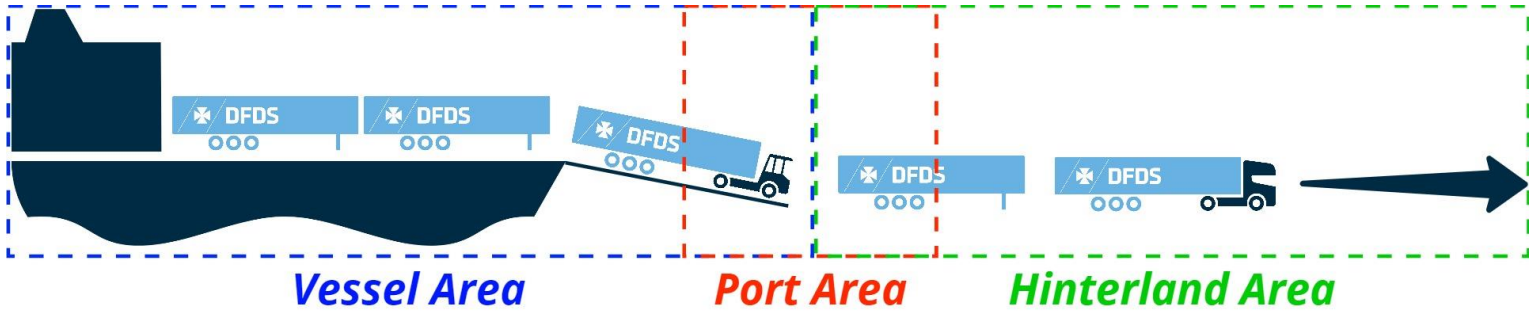
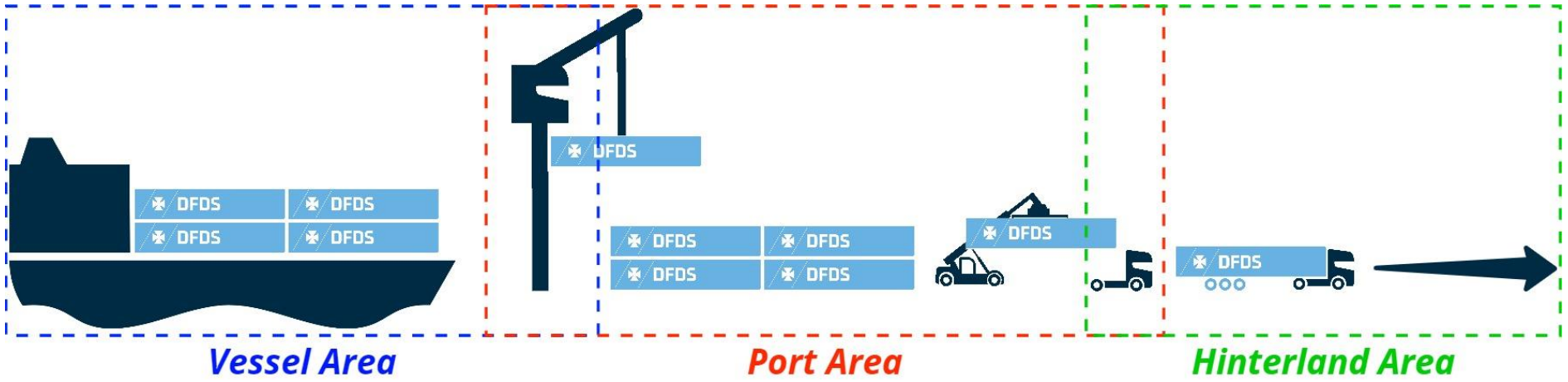
RoRo vs LoLo concepts



RoRo Barge Cargo Operations



LoLo Barge Cargo Operations

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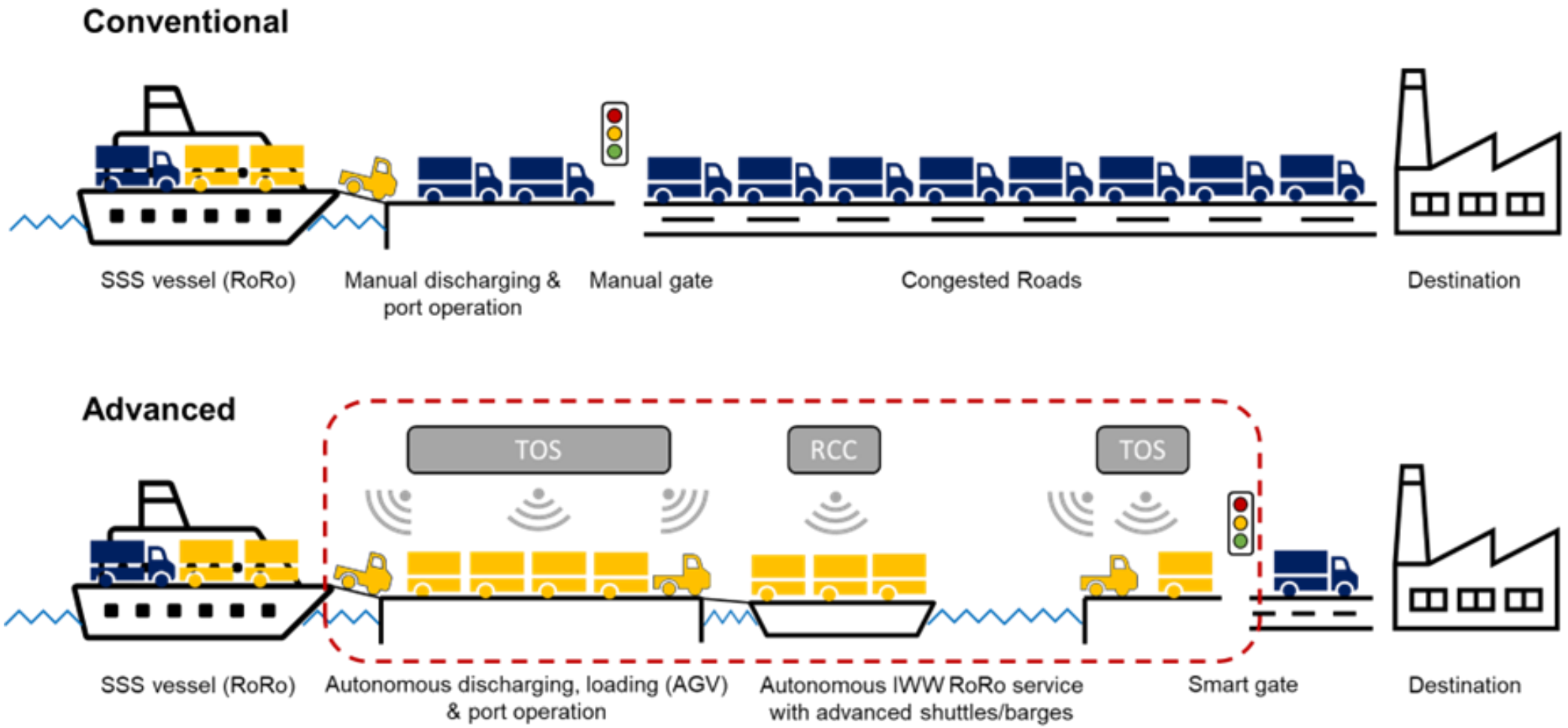
Smart and autonomous



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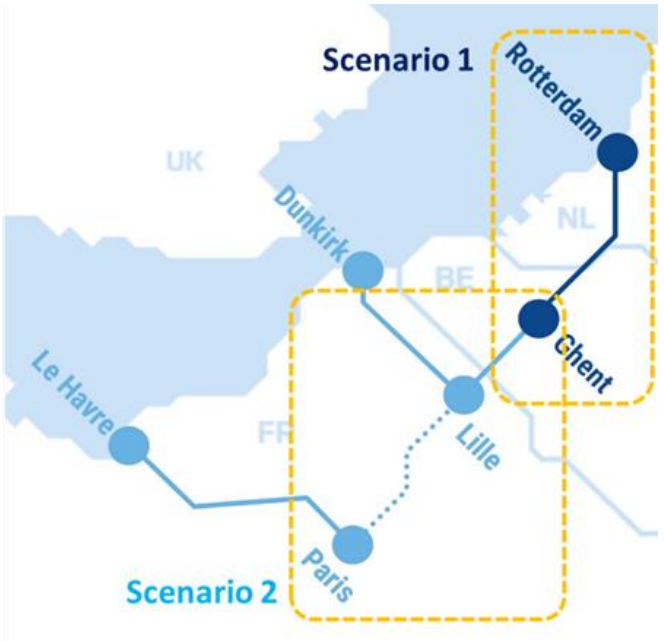
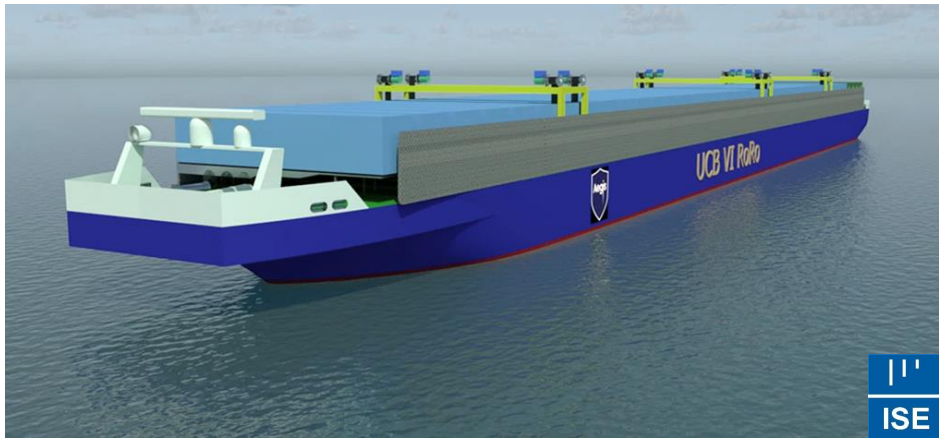
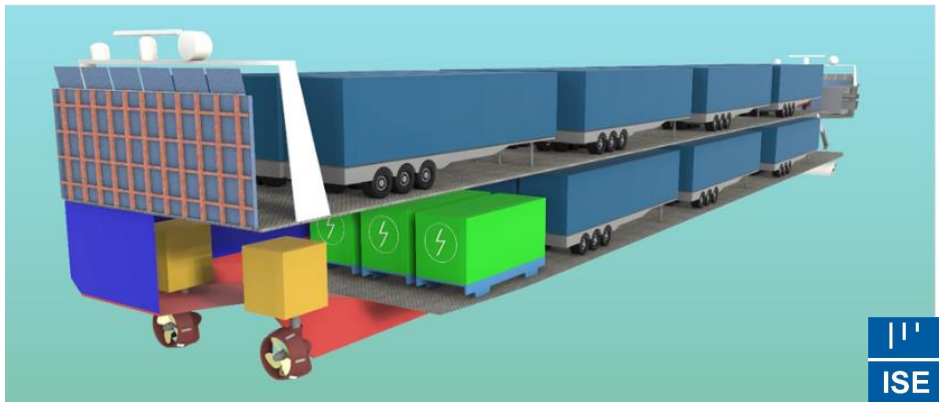
Use-case: RORO Short sea and inland shipping in Belgium and Netherlands







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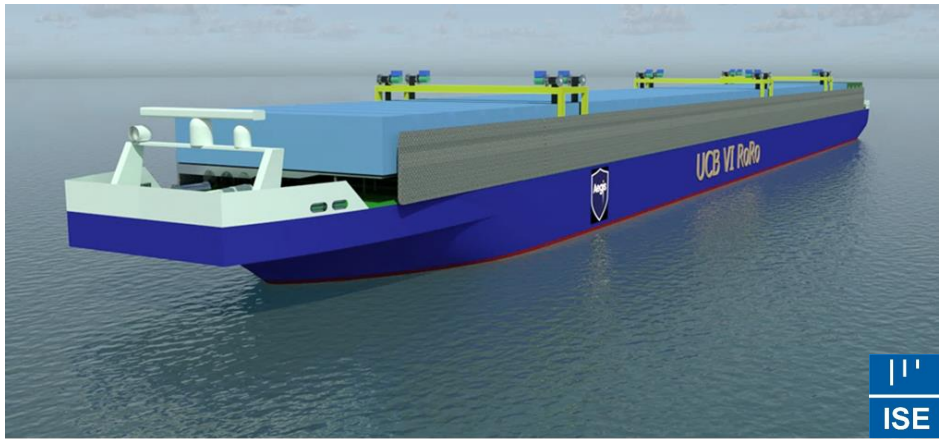
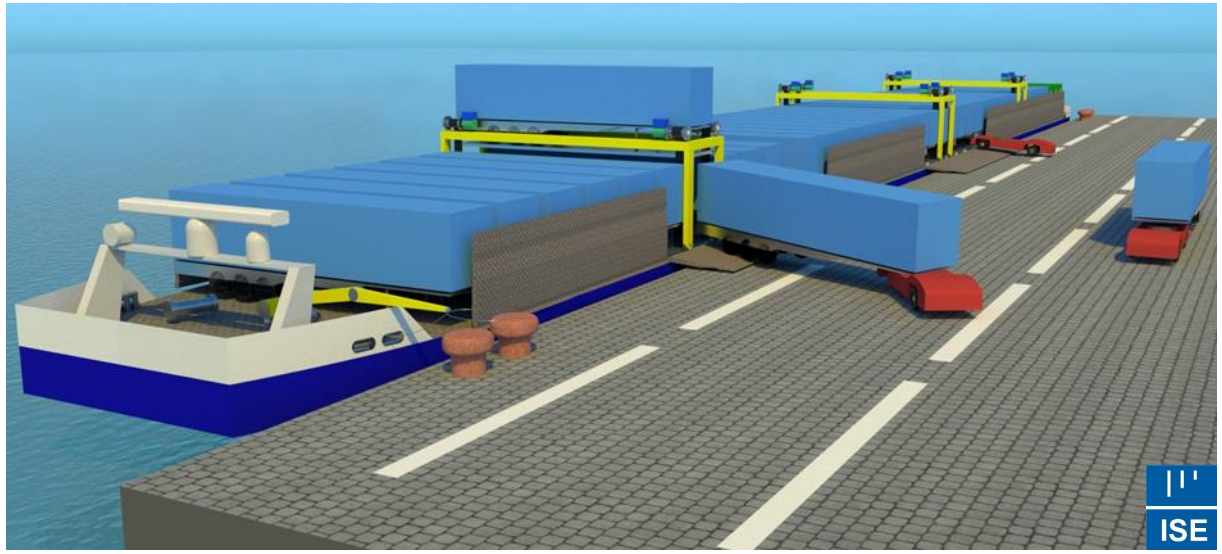
CEMT VI barge





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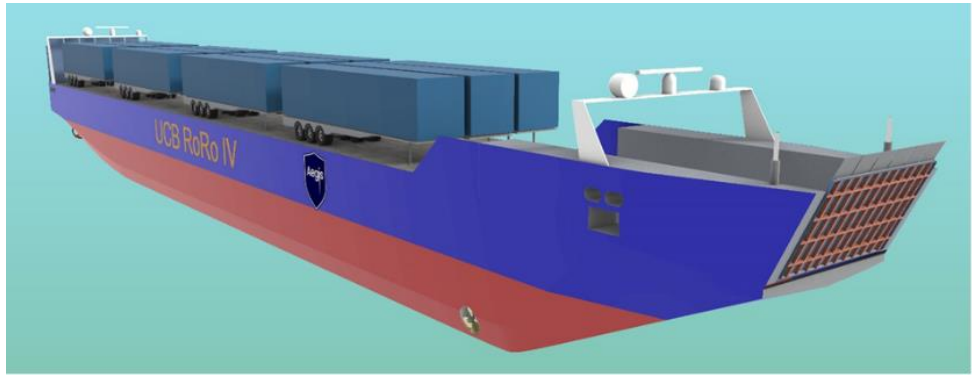
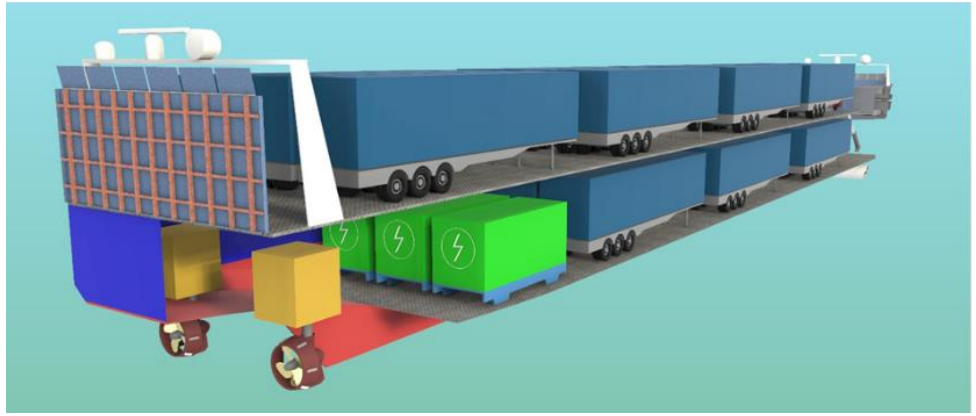
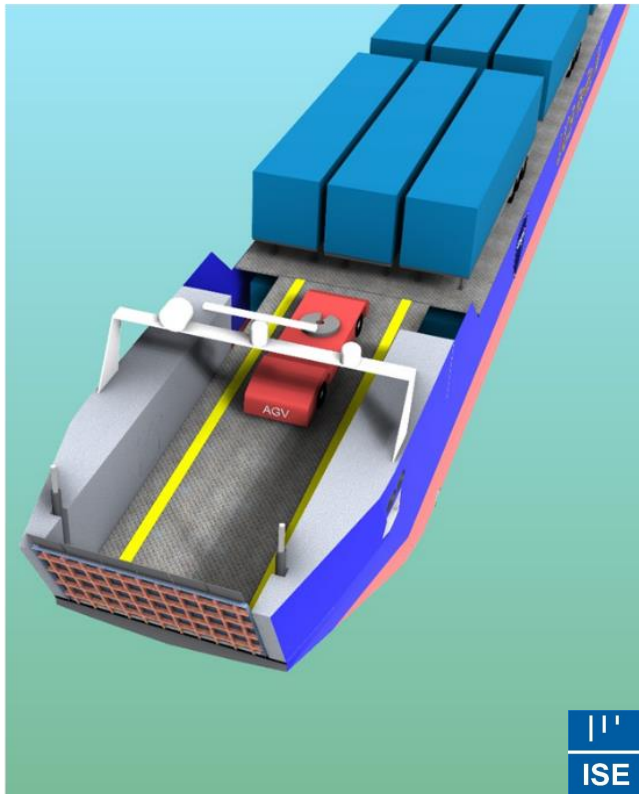
CEMT IV barge







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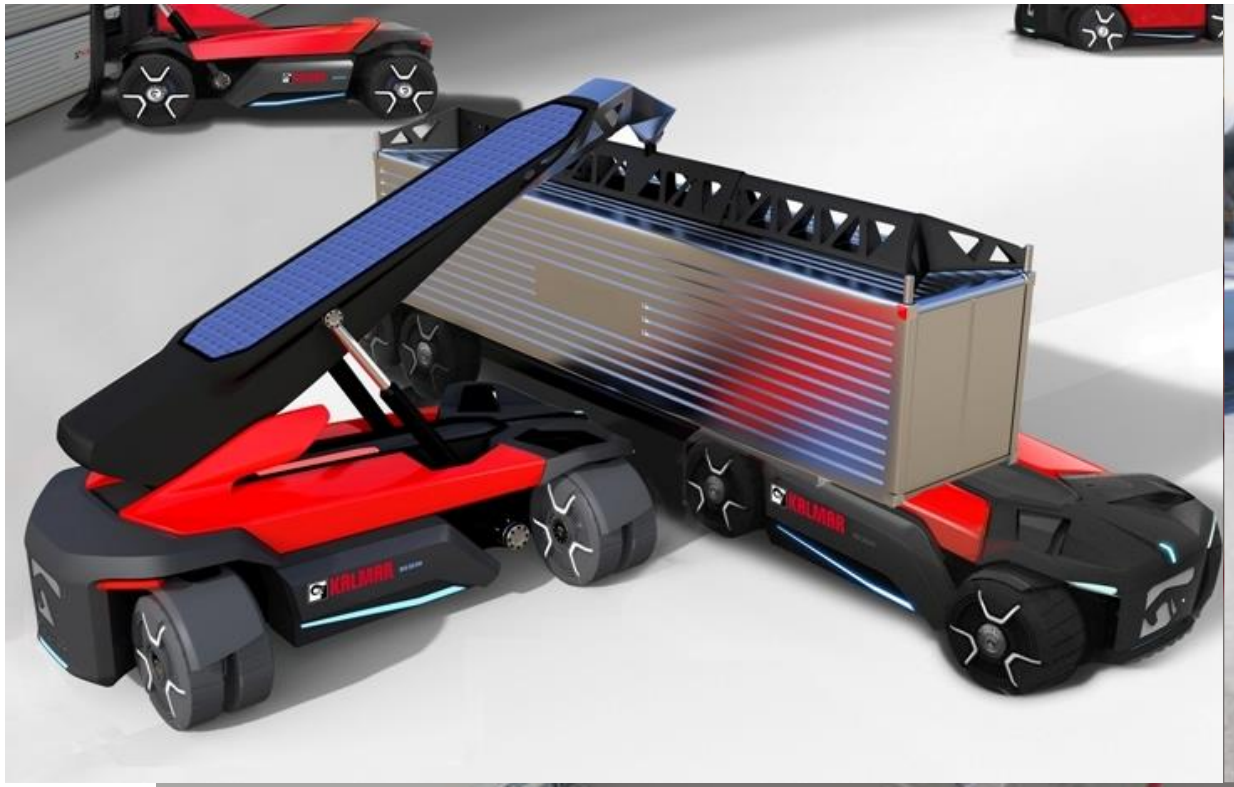
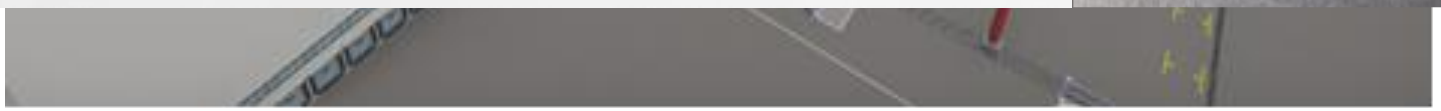
Use-case C: Revitalizing regional ports and city center terminals; Aalborg and Vordingborg





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Use-case A: Short sea terminals in Norway

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Study example: Daughter vessel vs trucks

- 81 nm
- Approx 8 hours (10 kn)
- 60 TEUs
- CO_2 emissions: 0*
- NO_X emissions: 0

*Tank-to-Wheel

- 173 km
- 2:26 hours
- 2 TEUs
- 63 litres diesel
- CO_2 emissions: 0,17 tons*
- NO_X emissions: 0,8 kg

*Well-to-Wheel

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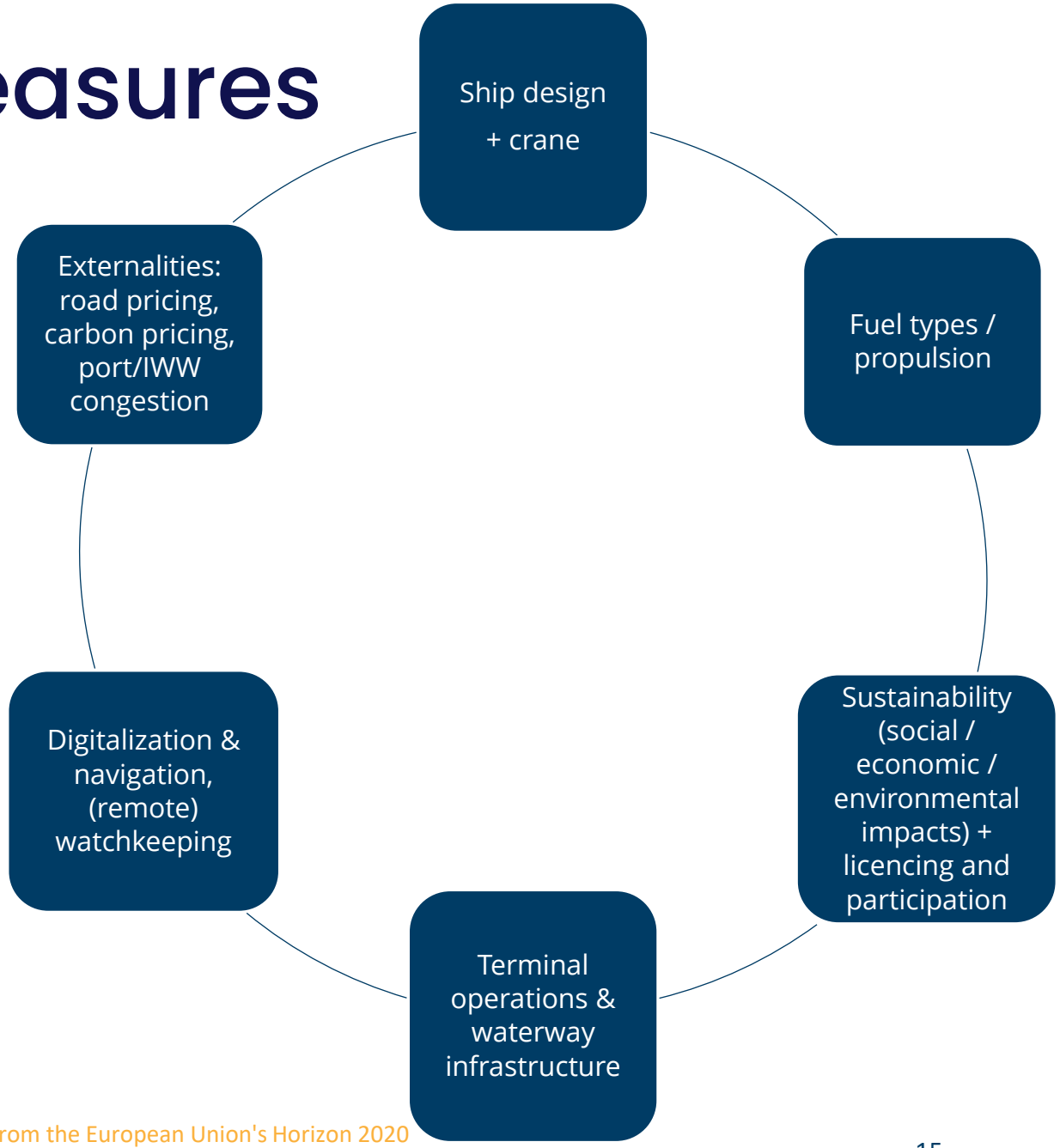
Policy support & measures

Three deliverables coming up:

- Report on ***public policy recommendations*** for a new European waterborne transport system
- Report on ***legal and regulatory challenges*** for a new European waterborne transport system
- Report on ***policy implementation measures*** for a new European waterborne transport system



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Conclusions

- Ships have grown too big and are too dependent on large ports
- The dependency on large ports have caused severe delays in the logistics world-wide
- The demand for reduction of GHG emissions is an opener for maritime transport, but ships must be built lighter, smaller and more flexible, with zero emission energy
- AEGIS proposed two maritime transport systems:
  - LoLo with a combination of big container ships and smaller autonomous feeders
  - RoRo barges on inland waterways, autonomous and with battery propulsion
- Preliminary calculations show that ships can compete on price and have significantly lower GHG emissions

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NAIADES III Flagships (AEGIS impact)

1. Helping waterway managers to ensure a high level of service (Good Navigation Status) along EU inland waterway corridors by 31 December 2030
2. **Updating the EU's legal framework for intermodal transport to stimulate IWT**
3. Speeding up certification procedures for innovative and low-emission vessels
4. Guaranteeing IWT investments take into account climate and environmental objectives
5. **Developing inland ports as multimodal alternative fuels infrastructure hubs**
6. **A roadmap for digitalisation and automation of IWT**
7. Smart and flexible EU crewing rules
8. Supporting the sector and Member States in the transition to zero-emission vessels

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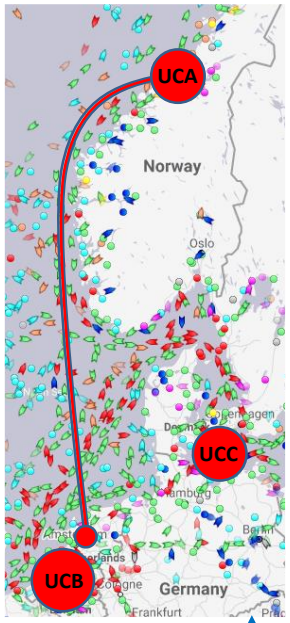
The AEGIS project

NAIADES III Flagships

- **2. Updating the EU's legal framework for intermodal transport to stimulate IWT**
- **5. Developing inland ports as multimodal alternative fuels infrastructure hubs**
- **6. A roadmap for digitalisation and automation of IWT**



Logistics systems redesign & resilience

- **Autonomous cargo handling In small ports**
- **Green advanced vessels**
- **Digital connectivity & cyber security**

Policy support

Cost-benefit analysis

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NAIADES III Impact Map

Strong direct impact

Direct impact

Indirect impact

shifting freight to water

- *New (feeder) vessel concepts*
- *Autonomous terminal operation (efficient transshipment)*
- *Logistics redesign*
- *Logistics simulations*

more attractive jobs

- *Remote Control Centre*
- *Automated cargo handling*

pathway to zero emission fleet

- *Battery propulsion (containerized)*
- *Uncrewed feeder vessels more cost-efficient*
- *Automated and electric terminal vehicles*
- *Automated mooring*

smart waterways

- *Cyber security methodology*
- *Standardized ship-shore-communication*
- *Policy recommendations*

Aegis

Thank you for your attention

Image: MacGregor/Cargotec