Is automation win-win-win? A perspective on sustainable developments goals and societal benefits

Harilaos N. Psaraftis
Technical University of Denmark

Navigating the Future of European Waters with Autonomous Innovation
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Scope

- View automation in the broader context of EU policy goals
- Report some results of the AEGIS project

The European Green Deal

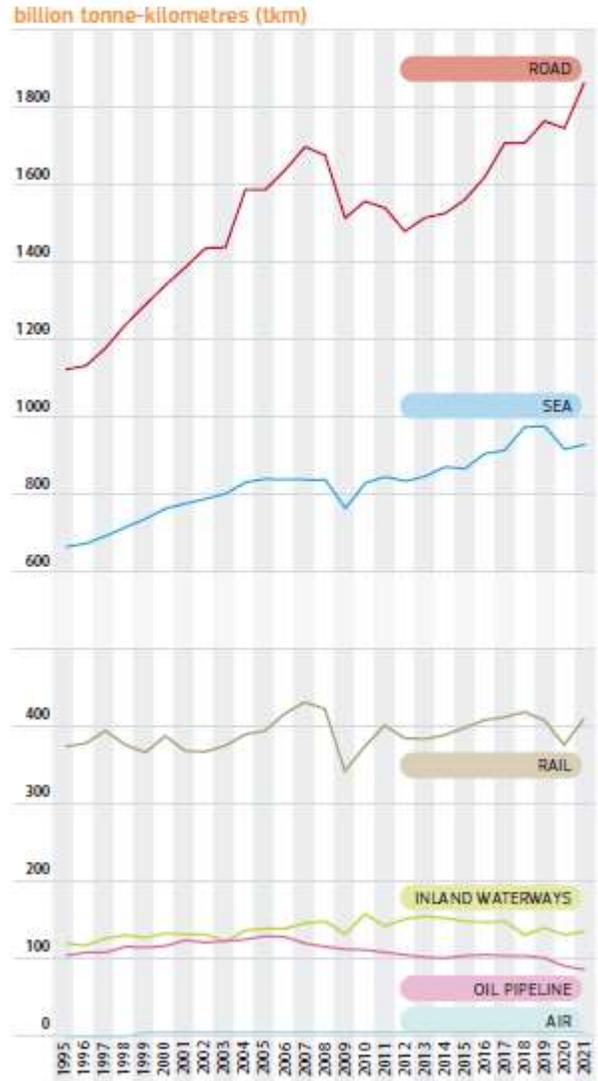# Central pillar of the European Green Deal

EU Transport policy: shift cargoes from road to greener modes

EU-27 Performance for freight transport 1995–2021 – BY MODE (2.2.1)

billion tonne-kilometres (tkm)

Source: EU statistical pocketbook 2023

Intra EU-27 Freight: Disturbing trends

GROWTH 1995-2021

ROAD 65%
SEA 39%
RAIL 9%
INLAND NAVIGATION 12%
AVIATION 67%

Road emits more GHGs

Enter AEGIS!

Sub... **Advanced, Efficient and Green Intermodal Systems**
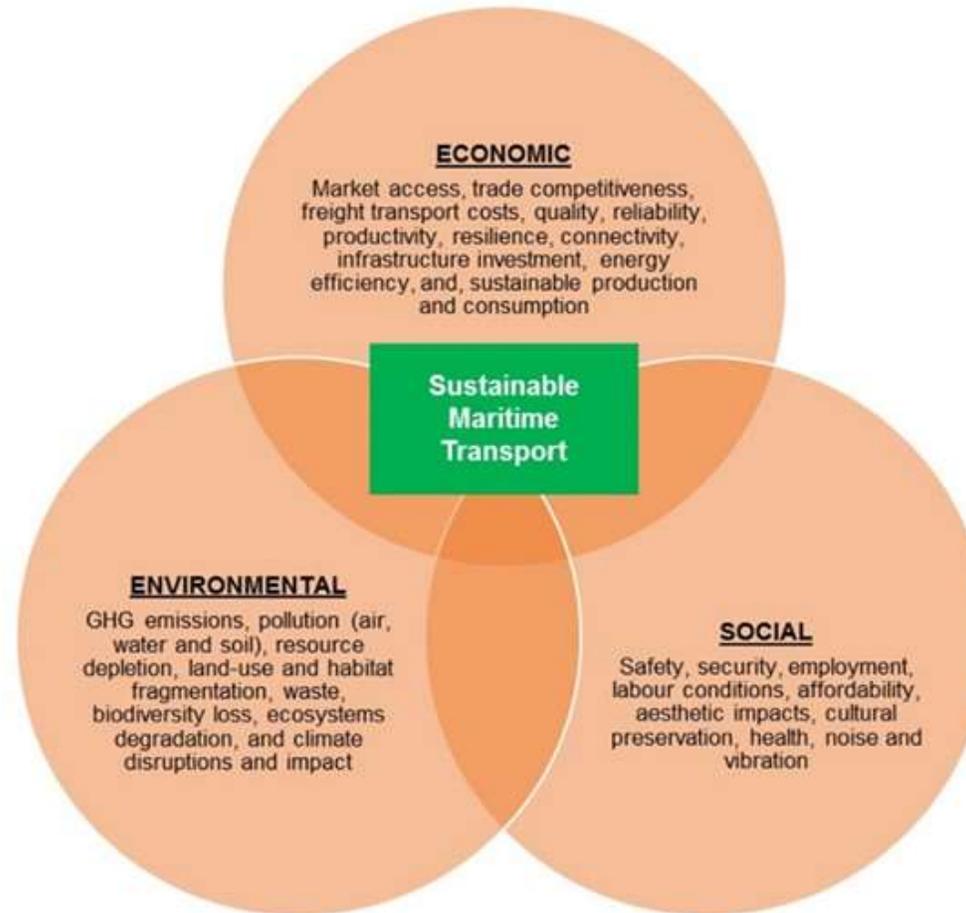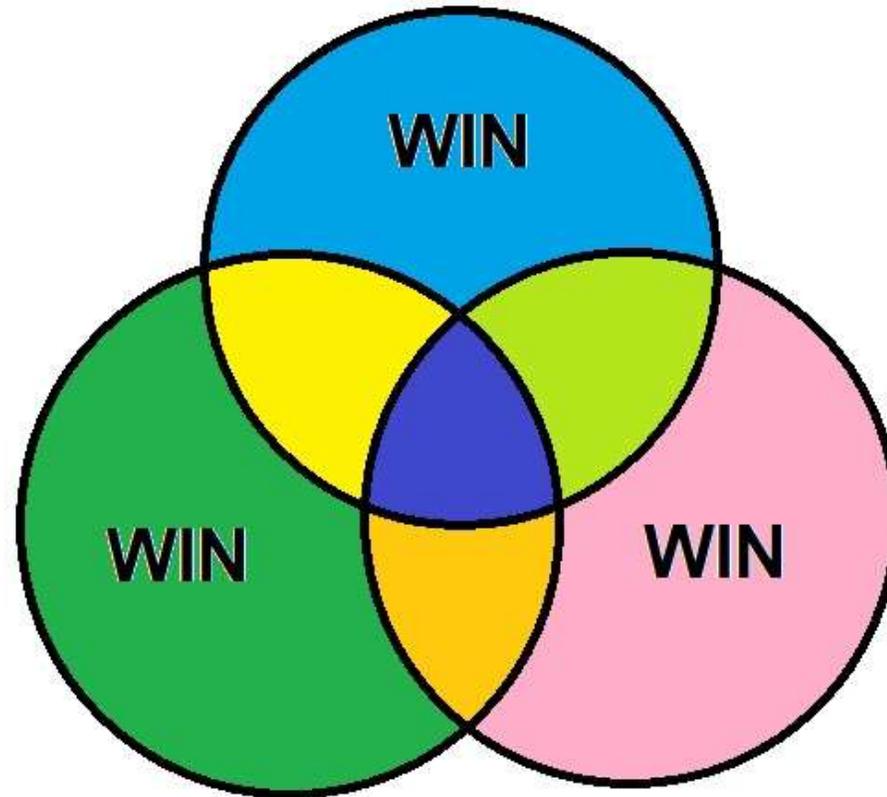
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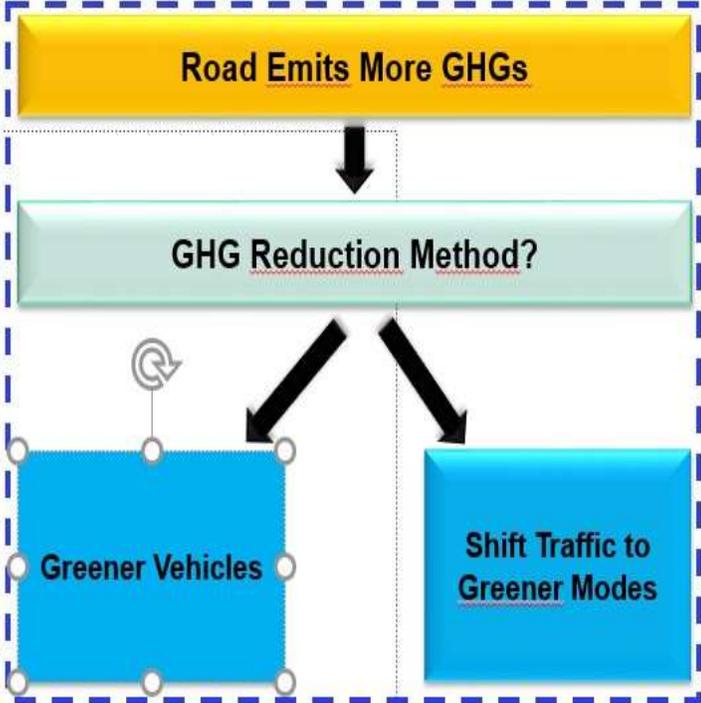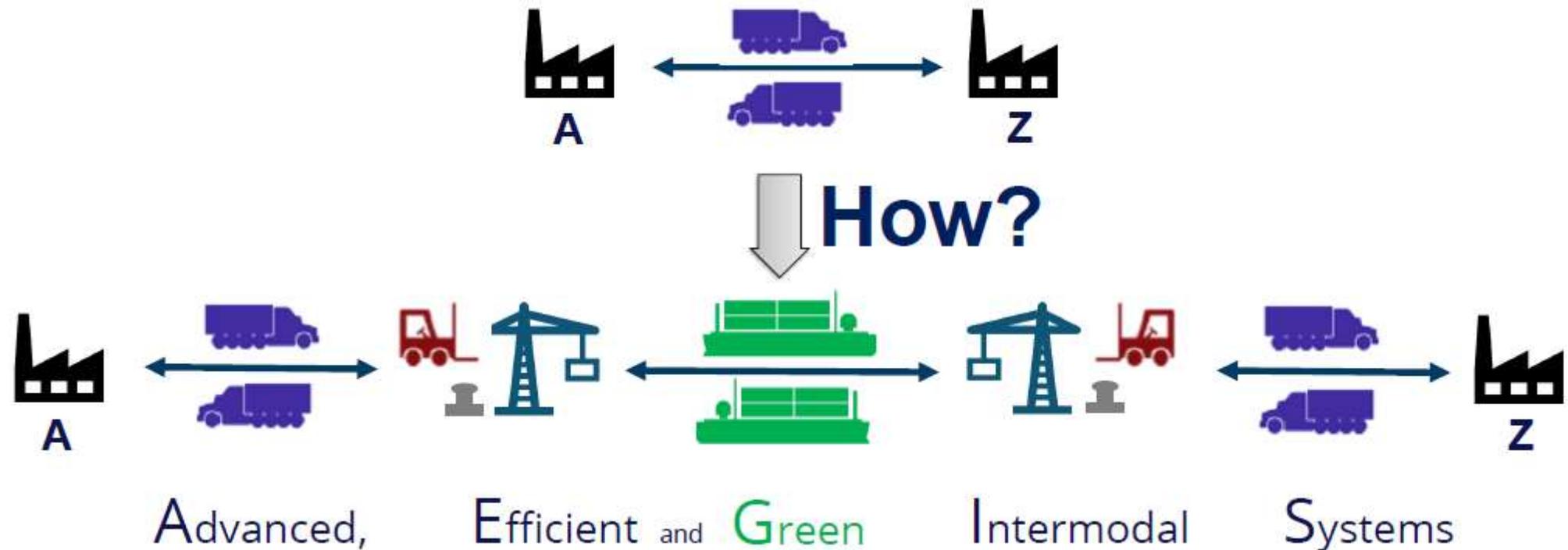
Three use cases (A, B, C)
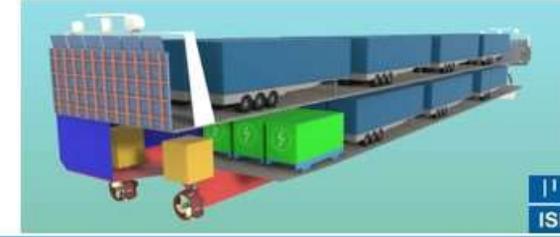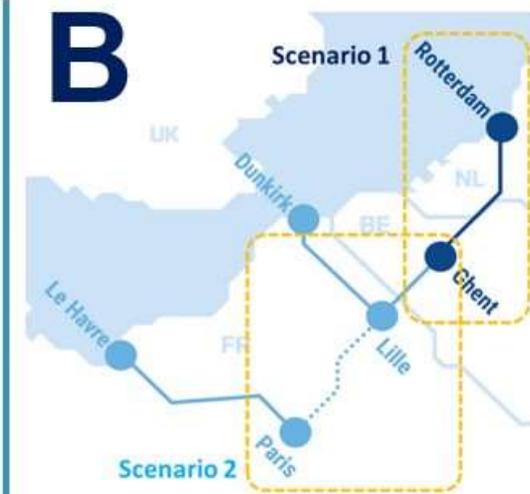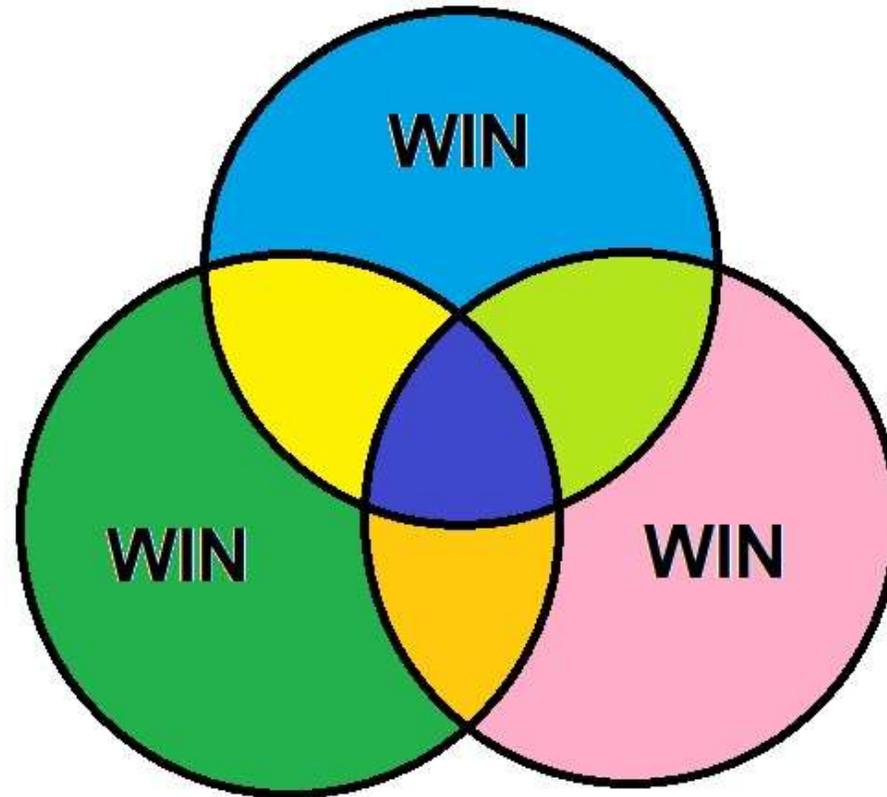
The 3 pillars of sustainable mobility

Source: UNCTAD

Can we achieve a win-win-win solution?

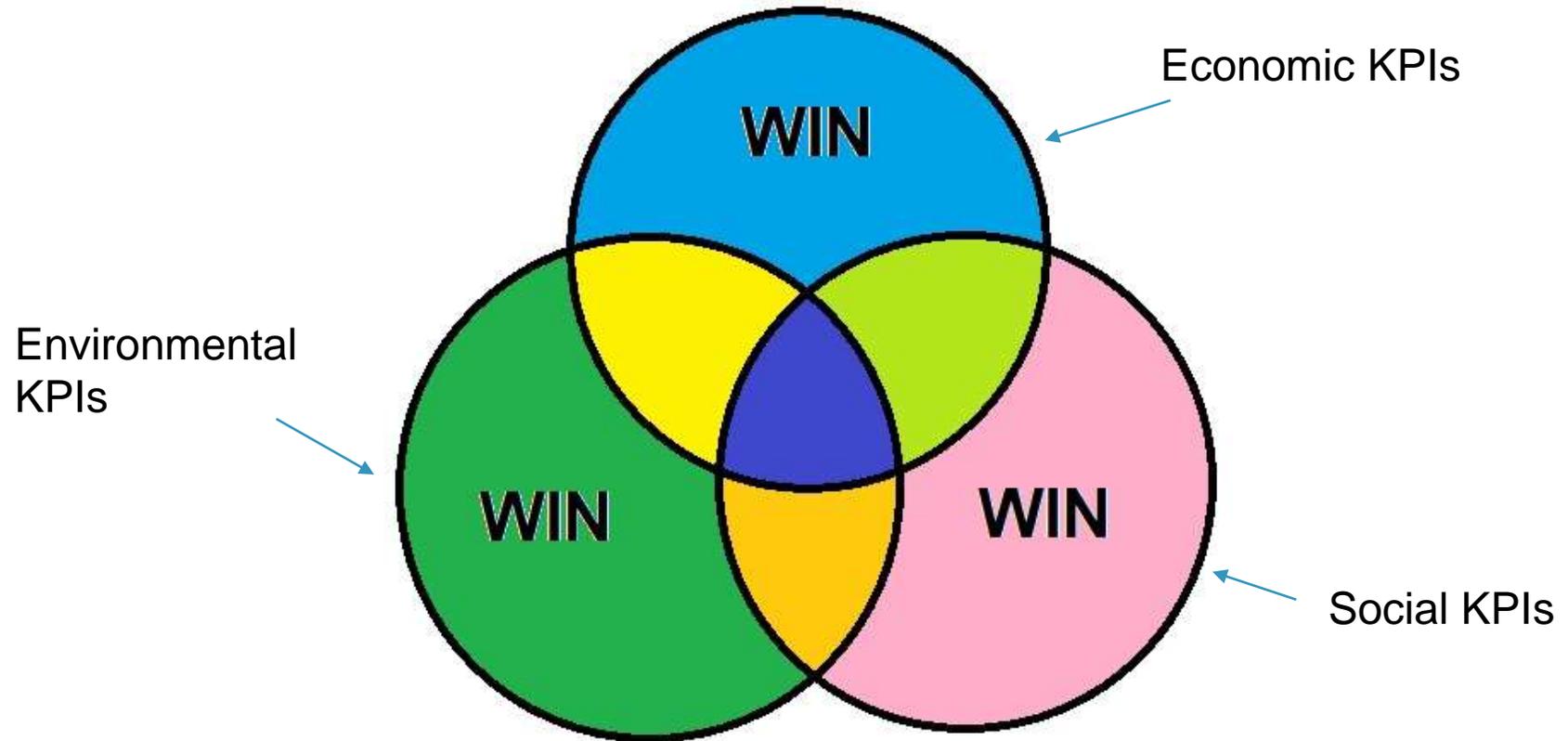# Can we achieve a win-win-win solution?

YES!

Can we achieve a win-win-win solution?

Economic KPIs

Environmental KPIs

Social KPIs

Economic KPIs

KPI Level	KPI Sublevel	KPI Name	KPI Measurement	Score Partners	Score AG
Economic	Cost	CAPEX	€	🟢⚪⚪	🟢⚪⚪
Economic	Cost	OPEX	€	🟢⚪⚪	🟢⚪⚪
Economic	Cost	Maintenance costs	€	⚪⚪🔴	🟢⚪⚪
Economic	Cost	Trade competitiveness factor	€	⚪🟡🔴	⚪⚪🔴
Economic	Cost	Port charges	€	🟢⚪🔴	⚪⚪⚪
Economic	Cost	Waterway dues	€/NM	⚪⚪🔴	⚪🟡⚪
Economic	Cost	Fuel cost	€/NM	⚪⚪🔴	🟢🟡⚪
Economic	Cost	Wages	€	⚪⚪🔴	🟢⚪⚪
Economic	Cost	Infrastructure development	€	⚪🟡⚪	⚪🟡⚪
Economic	Cost	Cargo unit cost	OPEX/TEUs	🟢⚪⚪	🟢🟢🔴

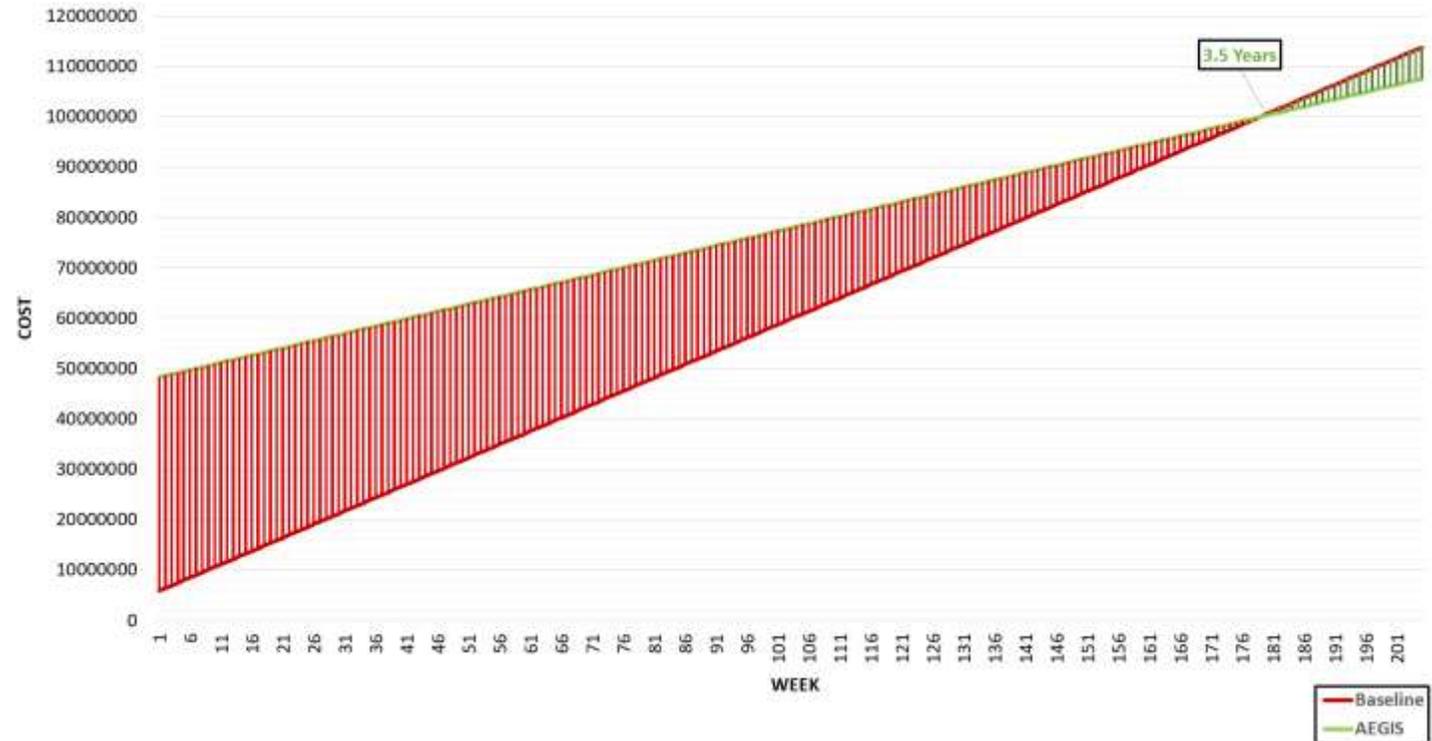| KPI Level	KPI Sublevel	KPI Name	KPI Measurement	Score Partners	Score AG
Economic	Time	Loading time	h	🟢⚪⚪	🟢⚪⚪
Economic	Time	Sailing time	h	🟢⚪⚪	🟢⚪⚪
Economic	Time	Unloading time	h	🟢⚪⚪	🟢⚪⚪
Economic	Time	Waiting time	h	🟢⚪⚪	🟢⚪⚪
Economic	Time	Drive time	h	🟢⚪⚪	⚪⚪🔴
Economic	Time	Punctuality rate	% of port calls	🟢⚪⚪	⚪🟡⚪
Economic	Time	Recovery time	h	🟢⚪⚪	⚪🟡⚪
Economic	Time	Salvage time	h	⚪⚪🔴	⚪⚪🔴
Economic	Time	Certificate handling	h	⚪🟡🔴	⚪🟡🔴
Economic	Time	Cargo handling time	TEUs/h	🟢⚪🔴	🟢⚪⚪

Main result- economic KPIs

- The AEGIS solution is better than the baseline (non-AEGIS) solution in terms of most economic KPIs

Example: use case B

Environmental KPIs

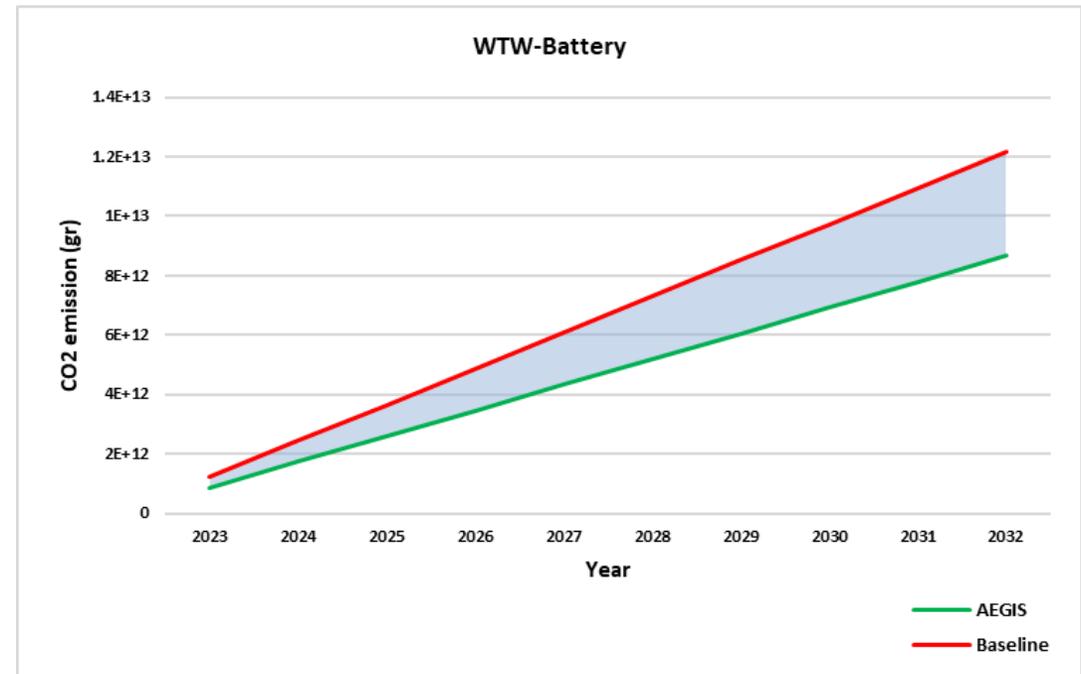| KPI Level	KPI Sublevel	KPI Name	KPI Measurement	Score Partners	Score AG
Environmental	Emissions	CO2	Kg of CO2/tkm	●○○ (green)	●○○ (green)
Environmental	Emissions	NOx	Kg of NOx/tkm	●○○ (green)	●○○ (green)
Environmental	Emissions	SOx	Kg of SOx/tkm	●○○ (green)	●○○ (green)
Environmental	Emissions	Particulate matter	Kg of PM10/tkm	●○○ (green)	●○○ (green)
Environmental	Emissions	Waste emissions	Kg	○●○ (yellow)	○●○ (yellow)
Environmental	Emissions	Acoustic emissions - Noise	dB	●○○ (green)	○●○ (yellow)
Environmental	Emissions	Light pollution	Lumens/shipment	○○● (red)	○○● (red)
Environmental	Others	Terminal area per cargo unit	m²/cargo unit	○●○ (yellow)	○○● (red)
Environmental	Others	Use of renewable energy sources	%	●○○ (green)	○●○ (yellow)
Environmental	Others	Sustainability factor	?	○○● (red)	○●○ (yellow)

Main result- environmental KPIs

- The AEGIS solution is better than the baseline (non-AEGIS) solution in terms of ALL environmental KPIs

- WTW (CO_2)
- TTW (SO_x, NO_x, PM)

WTW-Battery

AEGIS

Baseline

Social KPIs

KPI Level	KPI Sublevel	KPI Name	KPI Measurement	Score Partners	Score AG
Social	Security/Safety	Accident rate	#	🟢⚪⚪	🟢⚪⚪
Social	Security/Safety	Fatality rate	#	🟢⚪⚪	🟢⚪⚪
Social	Security/Safety	Fire incidents	#	🟢⚪⚪	🟢⚪⚪
Social	Security/Safety	Crime	#	⚪🟡⚪	⚪🟡⚪
Social	Work-life	Labor conditions	Work-life-balance	🟢⚪🔴	⚪⚪🔴
Social	Work-life	Employment	% of change	🟢⚪⚪	🟢🟡🔴
Social	Work-life	Income	% of change	🟢⚪⚪	⚪🟡⚪
Social	Work-life	Worker commuting time	Distance ship-home	⚪🟡🔴	⚪🟡⚪
Social	Work-life	Training	Time/worker	⚪🟡⚪	🟢🟡🔴
Social	Others	Traffic	# TEU/port call	⚪🟡⚪	⚪🟡🔴
Social	Others	Resilience	?	🟢⚪⚪	⚪⚪🔴
Social	Others	Citizen complaints	#	⚪⚪🔴	⚪⚪🔴
Social	Others	Port operations area	m^2	⚪🟡⚪	⚪🟡🔴

The project has received funding from the European Union's Horizon 2020

Main result- social KPIs

- The AEGIS solution is probably better than the baseline (non-AEGIS) solution in terms of reduction of (road) accidents and fatalities
- The AEGIS solution will likely result in some higher paying jobs

EU ETS favors AEGIS

- As of 2024, shipping and road transport will be included in the EU's Emissions Trading System (ETS)
- Ships above 5,000 GT and trucks will pay a carbon price
- This will help internalize the external costs of transport, AND reduce GHG emissions

- ETS was generally found to favor the AEGIS solution vis-a-vis the non-AEGIS solution

ALL IN ALL:

Automation is a **win**-**win**-**win** solution that supports the broader EU sustainable development goals!

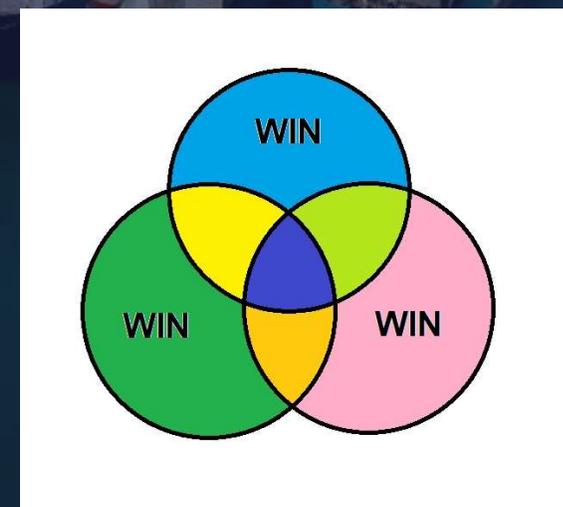AEGIS won the "Market Uptake" award at the Waterborne Days 2023!

26. SEPTEMBER 2023

Thank you very much!

hnpsar@dtu.dk