

Sustainable Logistics



Transportation

Warehousing & Fulfillment

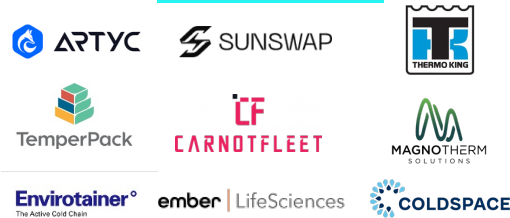
Multimodal



Space Optimization



Containers & Hardware



Cold Chains

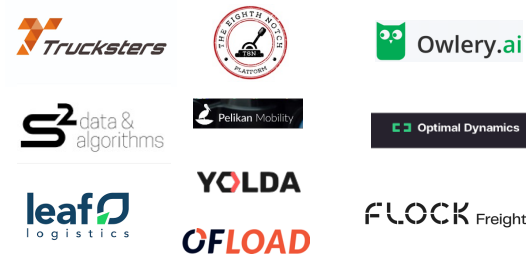
Maintenance & Energy Mgmt



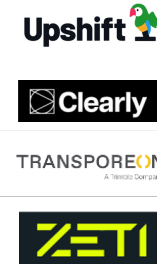
Delivery & Marketplaces



Route & Loading Optimization



Fleet Decarbonization



PV Deployment



Microhubs



Voyage & Fleet Optimization



Allowance Trading



Land

Sea

The **logistics** sector, including transportation and warehousing, is **responsible for 11% of global GHG emissions** ([MIT](#)). These stem from (1) the **distance travelled** by goods, (2) **fossil-fuel based transportation**, and (3) **inefficient cold chains**. While air is the most emissions-intensive mode per tonne-kilometre (tkm), road and sea are the largest emissions contributors in absolute terms. Accordingly, **new regulation** is incentivizing the emergence of both hardware and software plays addressing these two modes of transportation. As the **demand for freight is expected to triple by 2050** ([OECD](#)), **sustainable logistics solutions are more pressing than ever**.

Thesis: Reducing the emissions of the logistics sector will require (1) software plays to reduce excess distance travelled by freight through a combination of route and loading optimization, (2) hardware plays to enable fuel-switching across land, sea and air transportation and (3) a connected cold chain to intelligently manage energy and detect refrigerant leakage.

The Impact Problem

- 

Excess distance travelled: The logistics industry is widely undigitized with actors predominantly communicating bilaterally via email and spreadsheets. Resultantly, limited data transparency and analytics lead to suboptimal routing & loading of transport modes.
- 

Fossil-fuel based transportation: across land, sea and air, freight transportation is still heavily reliant on fossil fuels.
- 

Analog cold chains: a lack of preventive maintenance leads to refrigerant leakage. Connected cold warehouses could modulate their energy demand to enable renewables uptake.

Key Impact Facts

- 

Globally, 87Mt CO2e/year are attributed to trucks driving empty miles ([FreightWaves](#))
- 

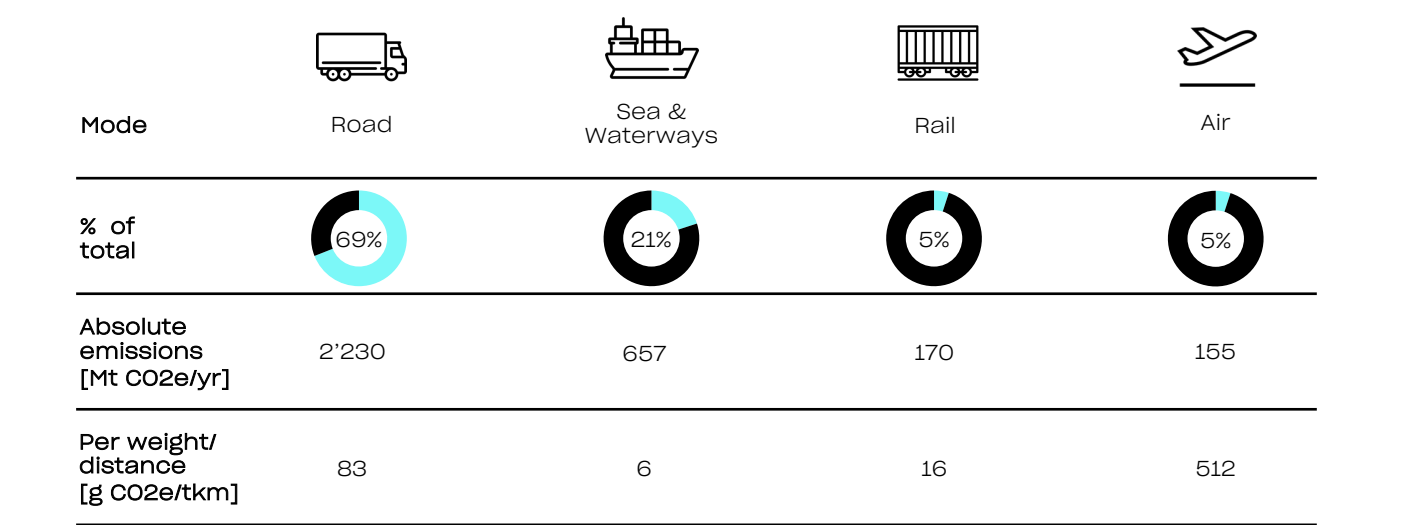
The lifespan of freight ships is between 10-25 years, thereby locking in propulsion hardware investments for a considerable time ([IOP](#))
- 

Emissions from refrigerant leakage are estimated to be 148 MtCO2e/year in the EU alone ([ISFP](#))
- 
- 

Business Opportunity

- Regulatory tailwinds for maritime decarbonization, including carbon pricing with EU ETS and direct measures with CII ([EU Commission](#), [IMO](#))
- Growing market, with demand for freight expected to triple by 2050 ([OECD](#))
- Rising deployment of EV charging infrastructure – 55% YoY increase in 2022 ([IEA](#))
- Truck driver shortage is creating additional incentives to make freight more efficient ([IRU](#))
- Stricter emissions requirements for heavy duty vehicles ([EU Commission](#))

CO2 Emissions by Freight Transportation Mode



Source: [MIT](#)

Solutions

- 

Route & Loading Optimization
- 

Voyage & Fleet Optimization
- 

Electrified Transportation & Mode Switching
- 

Warehouse & Cold Chain Management

Tech Plays

- Early Stage

 - Maritime voyage and fleet optimization software, enabling immediate and Capex-free emissions reduction
 - Software platforms pooling package delivery
- Growth Stage

 - Electrified and optimized last mile delivery platforms
 - Integrated cold warehouse energy management and predictive maintenance platforms

Startups to Watch

