

e-SMART TRAINING MATERIAL

Overview of Freight Transport & Green Logistics

The e-SMART project

While electrification of private transportation has continued to expand constantly, ambitions should move forward towards electric vehicles solutions in Last-Mile-Logistics (LML) and the Local Public Transport (LPT), with electricity generated from renewable energy sources.

The decarbonisation of the transport sector and particularly the mass deployment of electric vehicles need truly interoperable roll-outs of electric vehicle charging infrastructures powered by renewable energy as well as an intelligent charging management to prevent peak loads. This is especially important in the Alpine Space, where mobility and transport have always played a significant role.

The e-SMART project addresses this challenge: Bringing developments in e-mobility in LML and LPT together and improving the electric vehicle ecosystem building up on the concept of smart-territorial relationships.

Find out more about the e-SMART project:
www.alpine-space.eu/projects/e-smart

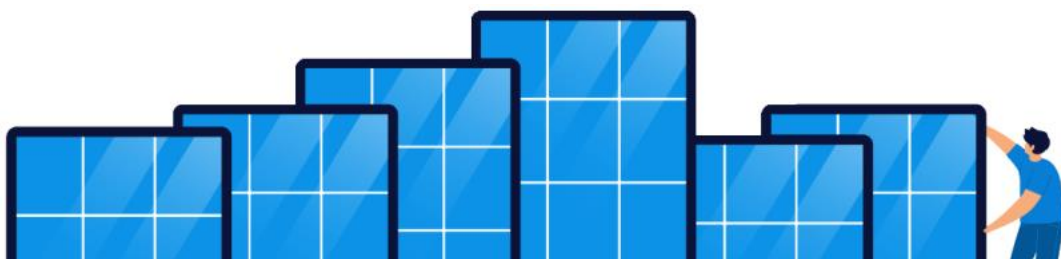


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Objective

This training material aims to provide readers with an overview of mode of transport in logistic operations and of its impact in terms of greenhouse gas emissions.



1. Introduction

The term "logistics" derives from the ancient Greek "λόγος" ("logos", relationship, word, calculation, reason, speech), from which "λογιστικός" ("logistikos", science of calculation).

Part of the supply chain process, logistics is the **set of organisational, management and strategic activities, which plans, executes, reports and coordinates the movement of goods within an organization's network of stakeholders until delivery of finished products to customers.**

The core pillar is to have **the right product, in the right place, at the right time**, choosing the best transport, optimising routes and minimizing empty runs.

The process includes:

- Suppliers
- Production & Manufacturing
- Packaging
- Distribution
- Customers

Logistics has the prerogative of aligning production with sales, ensuring the delivery of products on time and in the required quantities (effectiveness), optimising costs (efficiency).

Logistics is therefore the discipline that investigates the procedures and methods suitable for planning and controlling the flows of materials and information in companies producing and distributing goods and services.

In recent years, due to air pollution's levels and climate changes, increasing attention to public health and environmental impact has led to the emergence of the term **green logistic**, a logistics whose purpose is the management and shipment of materials and information at the lowest cost, guaranteeing the highest quality standards and **minimizing the environmental impacts of the processes** (McKinnon et al., 2010).

Even if data relating to greenhouse gas (GHG) emissions in the EU have been shown to be decreasing during the past years, according to the European Environmental Agency, *the transport sector has not followed this general trend and, as a result, its relative contribution to overall GHG emissions in Europe has become more significant*. EEA estimates that *the EU's transport emissions increased in 2019 by 0.8 % (not including shipping). This follows a 0.9 % increase in 2018. These rates of increase are the slowest since 2014.*

2. Mode of transport

The mode of transport plays a pivotal role. In principle, there are **three possible options to move goods** from one area to another of the world: **ground transport, ocean freight and air freight**.

As shown below, these three modes of transport have similarities and differences, different costs and benefits:

GROUND TRANSPORT

Ground transport is the oldest, the most immediate, the most flexible and the most used for short distances. It can be **by train (rail transport) or by truck (road transport)**.

In air and ocean shipments, ground transport is implemented to take the cargo from its place of origin to the airport or seaport (first-mile logistic and then to its destination (last-mile logistic) and it is ideal for short and medium distances.

In terms of costs, on one hand it is usually more accessible than air, on the other hand more expensive than ocean transport, especially in those countries where inland infrastructure may not be well-developed.

OCEAN FREIGHT

The most common form of transport for importers and exporters, suited especially for non-perishable goods and for large quantities of materials, since shipments are usually slower than the other mode of transports, depending on the distance and the services available. Usually, ocean freight represents the most economical type of transport.

AIR FREIGHT

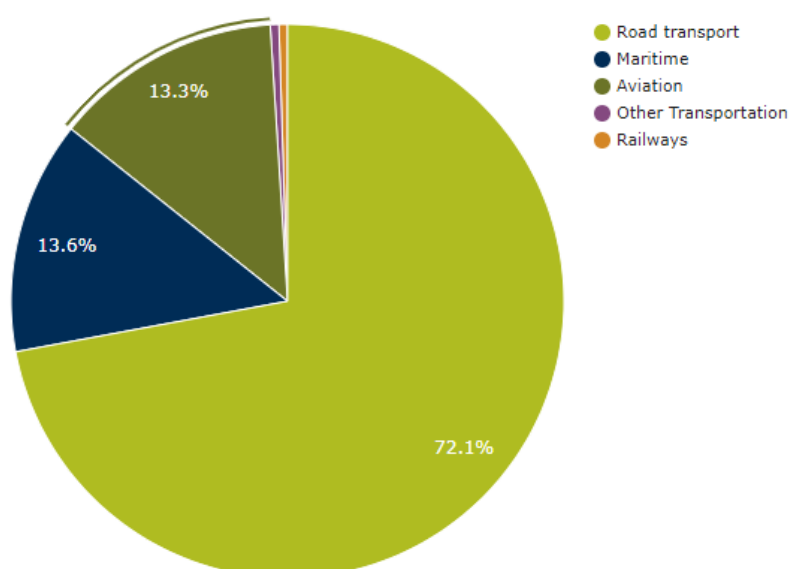
Considered the fastest mode of transport, air freight represents however the most expensive shipment. For this reasons, it is often chosen for perishable goods and high economic value goods.

3. Greenhouse gas emissions from transport: towards net-zero emissions

Trucks, railroads, freight ships, cargo aircraft, together with cars and commercial vessels and flights, **all contribute to transportation end-use sector emissions**.

More in evidence, the environmental impact of the transport sector can be clearly understood from numerical data on both global and EU level:

EU (Convention) – Share of transport greenhouse gas emissions



Source: National emissions reported to the UNFCCC and to the EU Greenhouse Gas Monitoring Mechanism provided by European Environment Agency (EEA)

With the Green Deal, it becomes clear that these **data are no longer sustainable**, and the EU's goal becomes clear: **achieving climate-neutral by 2050**. But how?

According to the United Nations Economic Commission for Europe, *CO2 abatement and improved fuel efficiency in the transport sector will be achieved mainly through:*

1. [Innovative vehicle technologies](#), advanced engine management systems and efficient vehicle powertrains;
2. The use of [sustainable biofuels](#), not only of the first generation (vegetable oil, bio-diesel, bio-alcohols and biogas from sugar plants, crops or animal fats etc.), but also of the second (biofuels from biomass, non-food crops including wood) and third generations (biodegradable fuels from algae);
3. An improved transport infrastructure together with Intelligent Transport Systems (ITS) to avoid traffic congestion and to foster the use of intermodal transport (road, rail and waterways);
4. Consumer information (campaigns for eco-driving*, use of public transport and modal transport etc.);

5. *Legal instruments (such as tax incentives for low carbon products and processes, taxation of CO2 intensive products and processes, etc.).*

4. References & Further Readings

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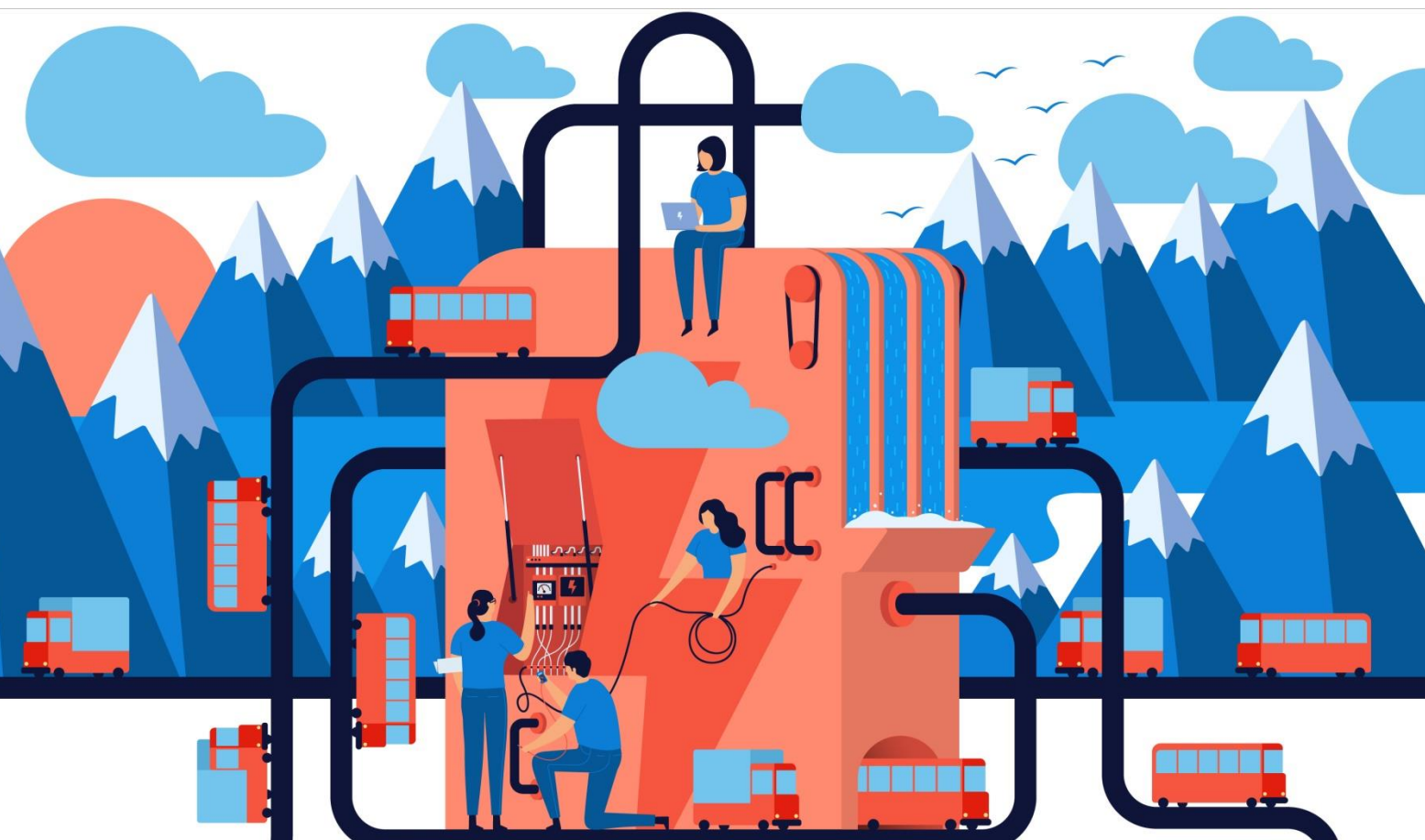
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