

MODULE 3

PODCAST: SUSTAINABLE LOGISTICS: HOW CAN WE REDUCE OUR CARBON FOOTPRINT?

Welcome to today's episode of our podcast! We'll focus on sustainable logistics and its key role in reducing carbon footprint. We'll analyze different strategies and technologies that help logistics companies become more eco-friendly.

A carbon footprint, a key metric in assessing the impact of a business on climate change, is the total amount of greenhouse gases (measured in tons of carbon dioxide equivalents – CO₂e) emitted by individual activities, organizations, events or products. It includes gases such as methane (CH₄) and nitrous oxide (N₂O), which contribute to global warming. Transport accounts for about 24% of global CO₂ emissions from energy use, according to data from the International Energy Agency (IEA).

In logistics, the main sources of greenhouse gas emissions are the combustion of fossil fuels in transport and energy-intensive processes in warehouses and distribution centers. Road transport, as the most common, is also particularly emission-intensive. For example, in the European Union, it accounts for about 20% of total greenhouse gas emissions. Switching to electric or hybrid vehicles has the potential to significantly reduce these emissions.

Different modes of transport have different impacts on carbon footprints. Sea and rail are typically more efficient in terms of CO₂ emissions per tonne of goods transported, compared to air and road. For example, rail is 3 to 5 times more efficient than road in terms of CO₂ emissions per kilometre.

Effective management of the carbon footprint in logistics not only contributes to environmental protection, but also helps companies adapt to climate change regulations. Introduction of environmental management systems such as ISO 14001, enables companies to systematically monitor and reduce emissions, which is increasingly required by customers and regulators.

Understanding and controlling the carbon footprint in logistics is a key activity that allows companies to not only minimize their impact on climate change, but also increase their competitiveness in the market. Research conducted by the Carbon Trust shows that companies that actively manage their carbon footprint achieve a 2.5 times higher return on equity. Therefore, investments in green logistics bring measurable benefits - both environmental and economic.

The Goal of Green Logistics

Green logistics are the optimization and operational processes in the supply chain aimed at minimizing negative impacts on the environment and maximizing energy efficiency. This means, among other things, reducing greenhouse gas emissions, more efficient use of resources and reducing waste.

According to the Organisation for Economic Co-operation and Development (OECD), transport is responsible for about 14% of global CO₂ emissions from energy use. Projections indicate that they could increase by 60% by 2050 if significant changes are not made. As a result, logistics companies are focusing on strategies such as improving fleet management, introducing electric vehicles and optimising routes to reduce these emissions.

Examples of CO₂ Reduction Strategies:

- **Route Optimization:** Modern route management software allows you to reduce unnecessary trips, which directly translates into lower fuel consumption. According to research by McKinsey, advanced route management systems can reduce fuel consumption by 10-20%.
- **Electric and Hybrid Vehicles:** The adoption of electric delivery vehicles and trucks is one of the most effective ways to reduce CO₂ emissions in transportation. For example, UPS has invested in a fleet of more than 10,000 electric vehicles, which has contributed to a significant reduction in its carbon footprint.

- **Use of Alternative Fuels:** Using biofuels and synthetic fuels can also significantly reduce harmful gas emissions. For example, FedEx has committed to achieving carbon neutrality by 2040 by increasing the use of alternative fuel sources in its aircraft fleet.

While green logistics offers many benefits, it also comes with challenges, such as the high upfront costs of investing in new technologies and the need to transform infrastructure. However, the long-term benefits—such as operational cost savings and increased customer satisfaction, which increasingly favors companies that adopt sustainable practices—are a powerful motivator for further action in this direction.

Reducing the carbon footprint in logistics not only contributes to environmental protection, but also increases the operational efficiency of companies. The use of green logistics is a strategic direction for companies wishing to lead in a modern, ecological economic world. The goal of green logistics is to create a sustainable supply chain that has a positive impact on the planet while offering real business benefits.

Emission Reduction Strategies

In the context of sustainable logistics, there are various methods to reduce carbon dioxide and other greenhouse gas emissions. A key element of these strategies is the efficient use of resources and reducing dependence on fossil fuels.

Upgrading fleets to fuel-efficient models or switching to electric vehicles is one of the most direct ways to reduce emissions in logistics. These vehicles use less fuel per mile, which translates into lower CO₂ emissions per freight moved. For example, according to the Environmental Defense Fund, adopting electric vehicles can reduce greenhouse gas emissions by up to 60% compared to traditional combustion vehicles, depending on the source of electricity.

Multimodal transport, which involves using different means of transport for a single shipment route, is often more energy efficient than using road transport alone. Combining rail, sea and road transport allows for the optimization of each delivery segment.

According to a report by the International Union of Railways, rail transport is able to reduce CO₂ emissions by 75% compared to road transport for the same amount of goods transported.

Case studies and statistics further underline the importance of these strategies. For example, in Europe, where governments are strongly supporting green logistics, there is a rapid development of multimodal transport infrastructure. In Germany, government programs focused on sustainable transport have contributed to the fact that around 30% of all freight transport is carried out by rail, which is significantly higher compared to other countries.

While these strategies offer many environmental and economic benefits, their implementation requires thoughtful policy, infrastructure investment, and cross-sector collaboration. The upfront costs of purchasing new vehicles or building multimodal infrastructure can be high, but the long-term savings and environmental benefits are significant.

Adopting fuel-efficient vehicles and developing multimodal transport are key strategies in green logistics to reduce carbon footprints. These actions not only reduce harmful gas emissions but also improve logistics efficiency and operating costs. As these technologies and methods become more widely used, we can expect significant progress in achieving sustainable global supply chains.

Route Optimization and Recycling

Route optimization is a fundamental element of sustainable logistics, aimed at reducing fuel consumption and emissions. With advanced GPS technologies and fleet management systems, companies can plan the most efficient routes, minimizing unnecessary trips. For example, studies conducted by the Environmental Protection Agency (EPA) in the US have shown that the use of route management systems can reduce fuel consumption by 10-15%, which directly translates into lower carbon dioxide emissions.

Reverse logistics, also known as return logistics, plays a key role in closing the life cycle of products by enabling their reuse or recycling. This process not only reduces waste but also enables the recovery of valuable materials. According to data from the report "The Circular Economy and Benefits for Society" conducted by the Club of Rome,

Countries that make intensive use of recycling practices and circular economy principles can reduce greenhouse gas emissions by up to 70%.

Modern fleet management software uses artificial intelligence algorithms to analyze data in real time, allowing for real-time route adjustments in response to changing road, weather, and traffic conditions. UPS, by implementing the ORION (On-Road Integrated Optimization and Navigation) system, estimated that it could save up to 100 million gallons of fuel per year by optimizing routes.

While recycling and reverse logistics offer significant environmental benefits, they face a number of operational and logistical challenges, such as the need to separate materials and the need to work with local recycling centers. Despite these challenges, more and more companies are recognizing the value of the circular economy, as is evident in their increasing investment in these areas.

Route optimization and recycling in the context of green logistics are not only a response to environmental requirements, but also provide concrete economic benefits through reduced operating costs and better resource management. These strategies are an integral part of the drive towards more sustainable practices in supply chains worldwide, and their development and improvement will continue to respond to growing ecological needs and environmental regulations.

Telematics and Electric Vehicles

Telematics, using advanced technologies such as GPS, sensors and data analysis software, enables transport companies to significantly increase operational efficiency. Telematics systems allow for monitoring the condition of vehicles, driver driving style, and route optimization in real time. According to data from a report by Allied Market Research, the global market for telematics in transport was to reach \$55 billion by 2022, which indicates growing interest and trust in these technologies.

With the power of telematics, companies can significantly reduce the time spent on the road, which directly translates into lower fuel consumption and lower emissions. For example, telematics systems can reduce fuel consumption by 20% by optimizing routes and monitoring driver driving styles, as shown

Electric vehicles (EVs) are changing the landscape of green logistics by eliminating local emissions. Their growing popularity is supported by the expansion of charging infrastructure and advances in battery technology, which increase their range and efficiency. For example, Tesla has unveiled an electric Semi truck that can travel up to 500 miles on a single charge when fully loaded, opening up new possibilities for sustainable long-haul transportation.

Many leading logistics companies are already investing in electric vehicles. UPS, one of the world's largest courier companies, has ordered 10,000 electric delivery vehicles from British manufacturer Arrival to meet the needs of its European fleet, thereby reducing CO2 emissions. In addition, these vehicles have lower operating costs, making them attractive from a financial perspective.

Despite their many benefits, both telematics and electric vehicles pose challenges for logistics companies, such as high upfront costs, the need to train staff and adapt infrastructure. However, over time, these technologies are becoming more accessible and cost-effective, helping to accelerate the transition to more sustainable methods of transport.

The integration of telematics and electric vehicles in logistics is not only a response to environmental pressures, but also a way to increase operational efficiency and reduce costs. With these technologies, the future of green logistics seems promising, with the potential to significantly reduce the global carbon footprint of the transport industry.

Sustainable Supply Chain

A sustainable supply chain is one that integrates environmental, economic and social aspects at every stage – from sourcing raw materials, through production, to distributing the final product to the consumer. The key to its effectiveness is integrated planning and cooperation between all participants in the chain, which allows not only for cost reduction, but also for minimizing the impact on the environment.

Integrated planning in a sustainable supply chain refers to the coordination and cooperation between suppliers, manufacturers and distributors in order to optimize processes and resources. An example of the application of integrated

planning is Toyota's Just-In-Time (JIT) system, which involves delivering components to production only when they are needed, minimizing inventory and reducing waste. This system not only reduces costs, but also helps reduce the carbon footprint by reducing the need for warehousing and transportation.

In the Netherlands, Philips has implemented a closed-loop recycling program for its medical products, which allows valuable materials and components to be reused. By adopting such practices, Philips has not only reduced waste, but also achieved significant cost savings.

According to a report by the Ellen MacArthur Foundation, full implementation of the circular economy concept in Europe could save up to \$630 billion per year in material costs in the manufacturing sector. The use of sustainable practices in the supply chain not only brings financial benefits, but also significantly reduces harmful emissions.

Implementing a sustainable supply chain is associated with challenges, such as the need to invest in new technologies, change purchasing strategies and transform production processes. However, the potential for innovation and long-term environmental, economic and social benefits makes it a key development direction for companies around the world.

A sustainable supply chain is no longer an option, but a necessity in the context of global sustainability efforts. Companies that adopt an integrated approach and collaborate across the supply chain not only contribute to environmental protection, but also build a strong market position by increasing efficiency and reducing costs.

Finally, it is important to remember the importance of education and training in promoting best practices in sustainable logistics. Only by constantly learning and adapting can we effectively reduce our carbon footprint and contribute to the protection of the environment. Thank you for listening to today's episode. I hope this information inspires you to continue to explore the topic of sustainable logistics and its impact on our planet.

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