

ECOLOGICAL SOLUTIONS IN LOGISTICS

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The growing ecological awareness among the society in recent years has led to many positive changes, which are also adopted by enterprises. The introduction of ecological solutions can be quite a challenge, but there are many ways to reduce the negative impact on the environment. The logistics sector is actively seeking sustainable solutions to environmental challenges. To reduce the environmental impact of logistics operations, companies are implementing advanced solutions to improve energy efficiency and utilize clean energy sources. This includes optimizing transport routes and loading, selecting environmentally friendly storage and transshipment sites, and integrating renewable energy sources. Successful implementation of these measures significantly reduces greenhouse gas emissions and other negative environmental impacts of logistics companies.

Transport

Transport is one of the key factors determining the environmental footprint of logistics operations. Emissions from trucks, trains, ships and aircraft account for a significant share of total greenhouse gas emissions in the logistics industry. Optimising the use of transport, including the choice of environmentally friendly fuels and the introduction of new technologies, is therefore a priority to reduce the environmental footprint of logistics.

Electric and hybrid vehicles have made significant strides in logistics, offering a cleaner and more sustainable option compared to traditional gasoline and diesel vehicles. Companies like UPS have been pioneers in this area, with a history of testing electric vehicles dating back to the 1930s. UPS's "Rolling Laboratory" initiative, for example, has expanded to include over 7,200 alternative-fuel and advanced-technology vehicles, demonstrating the viability and growth of electric and hybrid vehicles in the logistics sector [1]. These advancements are particularly evident in medium-duty applications, where electric vehicles are ideal due to their regenerative braking capabilities and the operational model of logistics fleets.

Hydrogen fuels are emerging as a promising alternative for a climate-neutral future in logistics. They offer high energy content and can be produced from a large base source, making them a viable option for heavy transportation vehicles like trucks, trains, and potentially planes. Countries like the US, Japan, Germany, and China have already started deploying hydrogen-fueled cars and buses. The use of Hydrogen Enriched Compressed Natural Gas (H-CNG) is also being explored, with standards being set for safety evaluation and testing of vehicles propelled by hydrogen fuel cells (Logistics Insider) [1].

Both electric/hybrid vehicles and hydrogen fuels represent significant advancements in the logistics industry, contributing to the reduction of greenhouse gas emissions and the move towards more sustainable and cost-effective operations. The ongoing development and adoption of these technologies will play a crucial role in shaping the future of sustainable logistics.

In order to reduce fuel consumption, it is worth taking care of reducing the so-called empty runs. By properly planning the loading in advance, logistics companies can optimally

arrange the goods on the semi-trailer. Thanks to this, the entire load can be taken in one transport, thus reducing exhaust emissions.

Optimization of routes and vehicle loading also plays an important role. The use of advanced routing algorithms can reduce vehicle mileage, idling and fuel consumption. Optimizing truck and van loading and eliminating incomplete trips helps minimize emissions per unit of cargo transported. Implementing vehicle and driver behavior monitoring systems can identify and eliminate inefficient driving practices.

Recycling and packaging management

Effective recycling is an important factor in improving the sustainability of logistics operations. Key principles, strategies and trends in waste management in the logistics chain include waste prevention, reuse and recycling. Waste prevention can be achieved by optimizing packaging, reducing the use of single-use materials and reviewing logistics processes. Where waste cannot be prevented, reuse opportunities such as returnable containers, pallets and packaging materials should be considered. For waste that cannot be prevented or reused, effective segregation and recycling systems should be put in place to maximize the reduction of waste sent to landfill.

Sustainable packaging is another vital practice in eco-friendly logistics. Utilizing recyclable or biodegradable materials minimizes environmental impact. It's a proactive step in managing logistics operations sustainably, reducing waste and the carbon footprint of packaging processes. Investing in sustainable packaging reflects a commitment to environmental stewardship and operational efficiency, playing a significant role in modern logistics operations.

Energy efficiency

Energy efficiency in logistics is achieved by promoting using renewable energy sources. The integration of renewable energies in warehouses and distribution centers contributes to increasing the sustainability of logistics operations as well as reducing operating costs in the long term.

Big players in warehouse management systems, such as GXO Logistics, constantly challenge the industry by introducing cutting-edge green solutions. Their facilities are not only equipped with sensor networks that capture carbon footprint in real-time but also help to automate the operations to improve order accuracy and optimize recycling of returned products [2].

New technologies are used to decrease the environmental impact of building as well. Replacing halogen lights with energy-efficient LED lights, rainwater harvesting, air source heat pumps for administration areas, and environmentally friendly ammonia refrigeration are only a couple of examples of how to save natural resources and reach operational footprint goals at the same time.

These measures combine to reduce the overall environmental impact of logistics and help companies meet regulatory requirements and societal expectations. The use of energy monitoring technologies and transport management systems also plays an important role by providing additional control over fuel consumption and emissions. Implementing energy-efficient solutions not only improves environmental performance, but also enhances the competitiveness of companies in the market by reducing costs and improving reputation. Thus, an integrated approach to energy efficiency in logistics is a key element of sustainable development and economic efficiency of logistics operations.

References

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