The future of tire warehousing is carbon-neutral

Pesmel's automated warehousing solutions do not just increase efficiency and productivity. They are also an integral part of the company's comprehensive carbon-neutral solution for sustainable tire logistics.

The CO2 emissions can be only 0.06 kg per handled tire, mininizing the need for compensation in order to achieve carbon neutrality.

For over 40 years, Pesmel has been providing customers with many benefits such as improved energy efficiency, shorter turnaround times, and space optimization. Today, the unique high-bay ASRS system also allows the establishment of carbon neutral warehousing, improving the overall sustainability of customer's operations. Because warehousing and distribution are a key element of any tire supply chain, creating carbon neutral distribution centers has a big role to play in reducing the environmental impact.

"Pesmel's unique high-bay ASRS allows the establishment of carbon neutral warehousing."

Examining the possibilities

To fully understand the contribution that can be made with sustainable distribution centers, Pesmel prepared a new climate impact summary examining the carbon footprint of Pesmel solutions. An ASRS system with a storage capacity of 660,000 tires, annual tire production of 4,000,000 units, eight stacker cranes and a lifecycle of 40 years was evaluated. The life cycle greenhouse gas emissions of this system were calculated at just under 22,000 metric tons of CO2e, the majority of which comes from two sources – the steel required for manufacture and the operational energy consumption. The calculation includes product manufacturing, use of the system, and disposal.

Steel is the main material used in ASRS, with the racking, cladding and stacker cranes all primarily using the metal. In our example, over 2,900,000 kg of steel is used in total, or 90.6% of all material. The remainder is mainly accounted for by mineral wool, fuel and oil, and zinc. Although the production of steel requires significant energy outlay, it holds an important position in the circular economy. It is the most recycled material in the world and is able to be recycled many times without reducing its quality while using only one third of the energy needed to make virgin steel. For every one kilogram of steel that is recycled over the product's life, a saving of 1.5 kilograms of CO2e is realized. Therefore, the steel in the ASRS example represents a saving of about 4,360 tonnes of emissions and an equivalent reduction in carbon handprint.

Sustainable stacker cranes and solar solutions

The other main way in which CO2 emission reductions can be made is by increasing the energy efficiency of the ASRS. The ultimate goal is to create a system whereby more energy is produced than consumed. For many years, Pesmel has included regenerative drive technology in stacker cranes as a well-established and easy way to reduce energy use. Included in the standard offering, braking energy is collected and fed back into the power grid. This technology is paired with energy efficient operating devices that are optimized according to usage requirements.

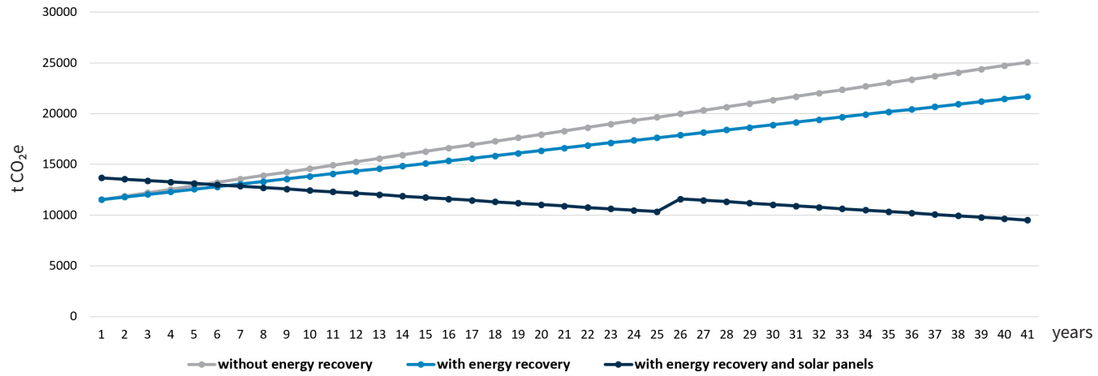
To minimize carbon dioxide emissions, Pesmel recommends the use of rooftop solar panels. As shown on the accompanying graph, harvesting on-site renewable energy to supply power needs makes a big difference, more than halving the CO2 emissions per handled tire, assuming average EU solar energy potential. The ASRS's electric infrastructure can also be utilized for rooftop solar power grid. The solar energy system can be included by Pesmel as part of the delivery.

"The ultimate goal is to create a system whereby more energy is produced than consumed."

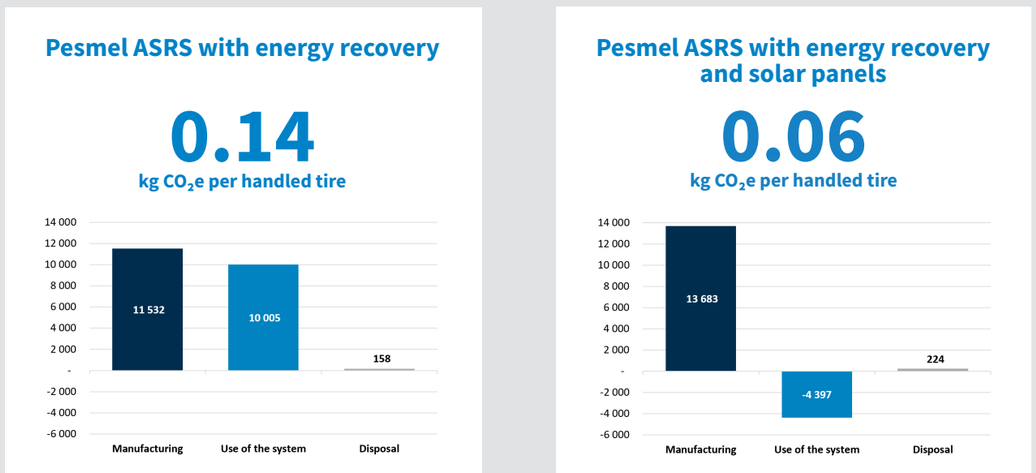
The climate impact summary showed that using the specified system results in carbon dioxide emissions per handled tire of 0.14 kg when solar panels are not installed. With their installation, the CO2 emissions drop to just 0.06 kg per handled tire.

The remaining emissions, representing less than 0,5 percent of the total ASRS investment costs, can be offset using certified emission reduction schemes, such as wind power, solar energy, or forest planting- or protection projects, resulting in a lifetime carbon-neutral tire warehousing solution.

Tire supply chains are very long, and distribution centers are vital parts of those chains, bringing the products almost directly to the end-consumer. By giving the possibility for carbon-neutral warehousing, Pesmel's ASRS has become an essential part of a sustainable tire logistics ecosystem.



CO2 emissions of the example ASRS over 40-years lifetime with different energy supply and recovery alternatives.*



Climate impact over 40-years lifecycle including manufacturing, usage and disposal phases in alternative ASRS solutions.*

***Third party verification:** Streamlined life-cycle assessment verified by Ilmastoapu Oy (www.ilmastoapu.fi)*