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Skeleton Technologies

Supercapacitors in Light Rail – 30% Energy Savings with KERS

In 2020, the Covid pandemic caused a decrease of about 6.4% in global carbon dioxide emissions, dropping the levels of greenhouse gas emissions to the level required to reach the Paris Agreement targets.

Unfortunately, the decline in emissions did not last long and by the end of 2020, **concentrations of the major greenhouse gases continued to increase**. As we start to come out of the pandemic and industry is ramping back to pre-Covid production levels, it serves as a good reminder of the scale of change necessary to stop or at least reduce the impact of

climate change. Change is almost always incremental, and it might be difficult to always be aware of how much progress we have made in a number of industries, rail included. Energy efficiency is one of the key criteria in any new rail project and the rail industry has done a significant amount of work already to reduce emissions

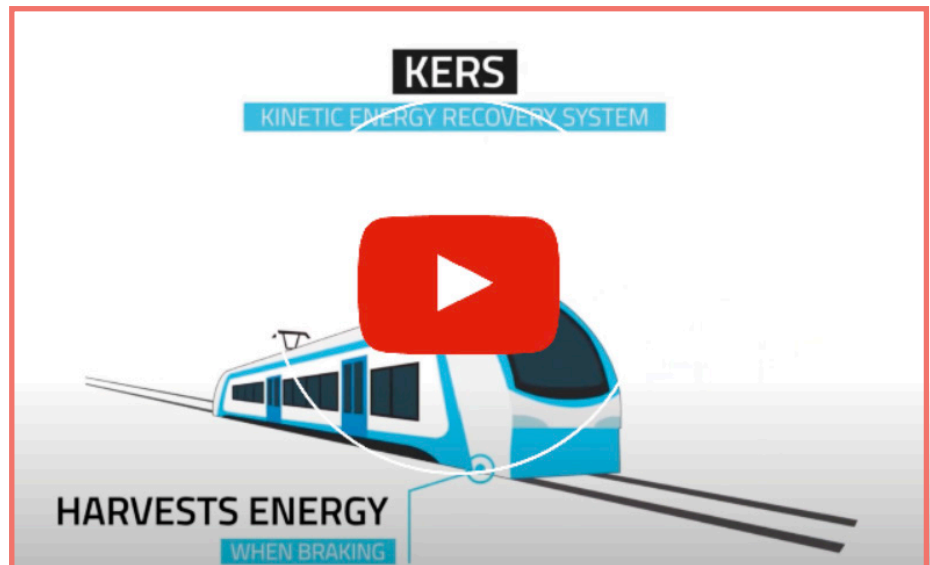


in the European Union, **with CO2 emissions dropping from 12 million metric tons in 1999 to just under 4 million metric tons of CO2 in 2019.** However, with global emissions still on the rise, and the Covid pandemic's impact seemingly and perhaps unsurprisingly not lasting, there is still a lot of work to be done.

At Skeleton Technologies, we are working with a number of light rail OEMs, supplying top of the class supercapacitor energy storage mainly for Kinetic Energy Recovery Systems (KERS) and peak shaving. With our first-generation SkelMod 51V supercapacitor modules, we've been able to decrease energy consumption and related carbon emissions by around 30% for a number of our customers by collecting braking energy and re-using for acceleration.

With our upcoming second-generation products, powered by our patented Curved Graphene raw material, the energy savings have the potential to double. These products are already being tested by some of our long-term

30%
Energy savings



customers and we are getting excellent feedback on the performance of the products. We are already working on further improvements on the key issue with supercapacitors – energy density. Our third-generation energy storage technology, the SuperBattery, will reach ten times the energy density of current supercapacitors, while maintaining high power and long lifetime.

Tobias Ragnarsson, Sales Director for the rail, transportation and heavy equipment sectors at Skeleton, highlights: *“The importance of trams in European cities is increasing with the push to reduce congestion and pollution, especially in larger urban areas. While trams are already a very energy-efficient method of public transportation, there are always ways to further reduce energy consumption and improve efficiency. Our first-generation supercapacitors, in the rail industry specifically the SkelMod 51V module, are offering 30% energy savings, and our next generations can increase savings and CO2 emissions even further, so we’re living very exciting times.*”

Last year we also received a rail certification for the SkelMod 51V module, which makes it the only rail-certified supercapacitor module on the market.”

In addition to the KERS and peak shaving applications, we're also working with a number of customers on wayside energy storage and catenary-free solutions, and of course engine cranking – an application where supercapacitors are perfect for due to the high power and more than one million lifecycles the technology offers.

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TECHNOLOGIES

The only rail-certified supercapacitor module for rail energy storage.

Decrease energy consumption by 30%
by capturing braking energy and re-using it for acceleration.



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