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Hitachi Energy and E.ON successfully pilot a circular value chain in distribution transformers in Sweden



The collaboration model enabled Hitachi Energy to use recycled insulation fluid in its transformers resulting in about 90 percent lower embedded carbon emissions than the alternative, virgin mineral oil.

In line with its purpose of advancing a sustainable energy future for all, Hitachi Energy successfully delivered distribution transformers using recycled insulation fluid developed in partnership with E.ON, Stena Recycling, and Starke & Sohn GmbH Mineralölwerk. The project exemplifies a complete value chain model for efficiently deploying circular economy concepts for sustainable production and consumption, particularly in electricity systems.

The new distribution transformers supplied by Hitachi Energy to E.ON use recycled insulation fluid (i.e., mineral oil) extracted from E.ON's old, decommissioned transformers¹.

The initial phase of this circular value chain pilot project involved E.ON recycling its old transformers to Stena Recycling for dismantling, based on the principles of maximum material recovery and safe waste disposal. The naphthenic-based mineral oil recovered by Stena was then delivered to Starke & Sohn GmbH Mineralölwerk for purifying using the Multiple-Selective-Refining technology and, in turn, supplied to Hitachi Energy. The quality and performance parameters of this recycled mineral oil meet the highest possible industry standards (IEC 60296: 2020).

“We are proud of this pioneering partnership model. Collaborations like these are crucial to enable a sustainable and electrified future.

Peter Hjalmar
Regional Manager South at E.ON.

Hitachi Energy deployed the recycled insulation fluid for ten distribution transformers designed, manufactured, and tested for E.ON at its facility in Lodz, Poland. The transformers were comprehensively tested following the customer requirements, including but not limited to short-circuit strength, heating, partial discharge, sound level, and oil analysis before and after finalized test sequence. The transformers have now been successfully installed in the Swedish grid.

"This is an exciting pilot with huge potential for contributing to the sustainability of the electricity grid in Sweden and countries alike. Using our distribution transformers with recycled insulation fluid reduces carbon emissions and other environmental impacts. It creates circularity for an otherwise finite resource," said Stephane Schaal, Head of Global Product Group, Distribution and Traction Transformers at Hitachi Energy.

Transformers are key components of power and distribution networks, and with electricity poised to become the backbone of the entire energy system, the demand for transformers is only growing. Today, around half a million tons of mineral oil is used worldwide in transformers due to their good insulation and cooling properties.

Mineral oil production involves extracting crude oil from mineral sources and refining it. Recycling mineral oil, when done appropriately, is far less energy intensive and has much lower impacts. It has a carbon emission factor of approximately 90 percent lower than virgin mineral oil². By using recycled mineral oil instead of new oil, there can be a reduction of about 5 percent at the transformer level in the carbon footprint from material extraction to manufacturing, while maintaining the same design as when using virgin mineral oil. Also, using recycled mineral oil allows to increase the total share of recycled content in transformers by about 18%.

Hitachi Energy recently invested in a significant [insulation fluid treatment equipment](#) at their Lodz research and manufacturing center in Poland. The new installation, which can also treat recycled insulation fluids, speeds up the fluid treatment process while saving energy and ensuring meeting the highest sustainability standards.

References

1 Based on the mass balance approach as defined by the [Ellen Macarthur Foundation for complex value chains](#)

2 Internal estimations by Starke & Sohn GmbH

Sustainability is at the heart of our Purpose at Hitachi Energy. We are continuously striving to fully integrate it within, across, and beyond our business strategy to deliver our own sustainability targets as well as helping our customers and other stakeholders achieving and exceeding their own.

Read more: [Hitachi Energy Sustainability Report | 2023](#)

Source:

<https://www.hitachienergy.com/news/features/2023/10/hitachi-energy-and-e-on-successfully-pilot-a-circular-value-chain-in-distribution-transformers-in-sweden>