

**Used transformer oil is a valuable resource because it can be processed to “as new” quality for re-use as insulating fluid**



Used transformer oil (UTO) is a valuable resource because it can be processed to “as new” quality for re-use as insulating fluid. Customers in the electricity transmission and distribution

markets as well as high-energy demanding industries can now take advantage of EOS transformer service offerings ranging from UTO collection to mobile and/or stationary transformer oil

regeneration and maintenance. These services are available all over Europe and help companies’ to meet their circular economy requirements and reduce their carbon footprint.



# Circular economy: Stop wasting valuable transformer insulating oil



The EOS-owned laboratory allows the testing of different parameters in order to evaluate the insulating oil quality

## EOS transformer service offerings available all over Europe range from oil collection to mobile and/or stationary oil regeneration and maintenance

There is limited awareness in many European countries that transformer oil regeneration is a viable process to enhance the oil quality to “as new” condition and extend the overall transformer performance and service life. Tom Larney, Vice President Electrical Oil Services (EOS) confirms: “With a challenging environment of increased demand on utilities and industries to ‘keep the lights on’ in an economic and environmentally friendly manner, within a framework of policies and regulations, asset managers must view recycling and regenerated transformer oil as trusted tools to achieve their objectives. The latest techniques for in-situ oil regeneration to ‘deep cleaning’ insulation systems to extend the life of transformers as well as the

option to re-use your own regenerated insulating oils are now both technically and economically viable options for consideration.” Unfortunately, many transformers are old or are poorly maintained. It is however easy to combine a regular four-year mandatory transformer check-up with oil sample testing to check the oil quality and take the appropriate steps if required. In the long term, these actions will save the asset manager money and extend the life of the transformer.

### Transformer’s insulation system defines transformer lifetime

It is important to mention that the insulating oil system and specifically the

condition of the paper of a transformer determines its performance and service life. A transformer, depending on its performance class, can cost between several thousand up to millions of Euros, and has to provide stable performance over many years. However, the insulating oil degrades during a transformer’s operational lifetime. The oil oxidises upon contact with oxygen, and elevated temperatures further accelerate this process. The formation of acid components or sludge may ultimately lead to a situation where the dielectric or, in extreme cases, the thermal characteristics of the insulating oil are impacted. In the worst-case scenario, the complete transformer may fail, resulting in an outage.

### Simple oil sampling ensures well maintained transformers

EOS recommends that the quality of the insulating oil be tested at regular intervals. A good option could be to include the oil



testing during one of the mandatory audits. As a first step, this requires the taking of an oil sample, which can expertly be performed by one of the EOS employees traveling to the customer's premises. This oil sample is then analysed at one of EOS own laboratories. If the analysis shows that the oil quality is insufficient, the experts will advise how to improve the insulating oil quality. Different technological options exist to do this ranging from normal drying, filtering and degassing with an oil-processing unit, on-site regeneration to even an oil change depending on the situation.

### **Benefits of re-used transformer oil - back and now**

EOS is a leading supplier of both reclaimed and unused electrical insulating oils and associated services for many decades. The business originated in the UK after World War II, when crude oil was a rare and a valuable resource. The country's industry had to find solutions

## **EOS offers a “closed-loop” model to the market, which allows used transformer oil to be regenerated to as-new oil quality for re-use on a sustainable basis**

to re-use the existing raw materials and the EOS closed-loop model was born. Today, customers such as the major Distribution Network Operators are still utilising this business model to regenerate their UTO for re-use in their transformers ranging from 11 kV to 132 kV distribution transformers. Martin Seipel, Managing Director of the Germany based Electrical Oil Services GmbH, explains: “Even if we still have enough crude oil today, the public is increasingly aware of the fact that existing resources must be treated in a sustainable manner. So why should used transformer oil be discarded, if there is an option to regenerate it in such a way that you can return it to an “as new” oil condition?”

### **Increased cost pressure as key driver**

The cost pressure with which public utility companies and industrial corporations are faced is mounting. “In recent years, the extension of transformer service life and the economic management of the insulating oil have slowly evolved into key asset management factors. Companies are considering the regeneration and recycling of insulating oil as a sustainable alternative to filling transformers with new, unused insulating oil especially for top-up or refurbishment activities,” confirms Tom Larney. The EOS mobile service units are an additional benefit to make the transformer



## With our mobile service units we can perform the oil regeneration without interrupting transformer operation

oil service attractive. Martin Seipel explains: “With our mobile service units we can perform the oil regeneration without interrupting operations. This represents an enormous advantage for our customers. It enables them to improve the insulating oil quality and to enhance

the transformer performance without having to interrupt their operations. It is an economic- and environmentally-sound method.”

### Acquisitions in Central Europe complete offerings to the market

Recently HCS Group, the heritage company of the EOS business, has heavily invested in order to expand the EOS activities across the European market. Two German companies were acquired in 2018. Martin Seipel states: “Now that we have access to the necessary infrastructure also in Central Europe, we can offer a complete service package to the market and can react flexibly to customer requests. The long experience of EOS in the field of closed-loop system management is now combined with the infrastructure and expertise of the acquired compa-

nies.” The first acquisition was completed during the summer and gave business in Germany access to additional experienced mobile transformer services and an own laboratory. The second acquisition related to a company specialised in the recycling of transformer and turbine oils using ecologically-sound processes at its production site in Duisburg. Both acquisitions complement each other, combining mobile services with stationary transformer oil regeneration and maintenance. Now EOS is in the position to offer the same comprehensive basket of services on mainland Europe as they have done for many years in the UK.

### Regeneration projects from industries to electricity companies

The EOS business is expanding and some major projects have been completed such as a major oil regeneration program at Tata Steel in the UK (see Transformers Magazine, October/2017) for example. Recently another major on-site regeneration project was completed at one of the key hydro-electric utility companies in France. EOS, with its team of experienced technical sales

#### EOS Services at a glance:

- Used transformer oil collection
- Insulating oil testing
- Mobile insulating oil processing service
- Mobile insulating oil regeneration service
- Oil refill / vacuum filling
- Unused insulating oil supply
- Off-site oil storage
- Expert consultancy and training

engineers, was able to secure several new contracts with large, renowned industrial companies across Germany. “We are very pleased about the business progress in Europe,” says Tom Larney and adds: “And moreover, we appreciate the positive feedback we receive from our customers related to our timely execution, project management and professionalism.”

## New developments ahead

Nevertheless, it is EOS ambition to expose more customers to the existing and new technological processes and opportunities to save valuable resources and help companies to meet environmental requirements and responsibilities.

## EOS “Closed-Loop” model as great example for circular economy

Besides insulating oil testing, mobile transformer maintenance and oil processing, EOS has introduced its so-called “Closed-Loop” model. In this model, used transformer oil is collected from customers’ sites, regenerated at EOS production plant to as-new oil quality, and fed back into the circular economy providing multiple benefits to both companies and the environment. “We are convinced that our “closed-loop” model to collect used transformer oil and the production of high quality insulating oil is an environmentally-sound and cost-efficient alternative to new unused insulating oil for consideration by all asset managers and engineers in Europe,” concludes Tom Larney.

## EOS Premium - high quality regenerated transformer oil

The EOS Premium grade has been developed to secure the future of insulating oil recycling. The new revised





IEC60296 Standard, expected to be published in 2019, will now include performance parameters for recycled or regenerated insulating oils similar to those for unused oils. This will allow customers to consider to substitute some of their unused (new) oil requirements with a quality regenerated alternative such as the EOS Premium grades which are available in both uninhibited and inhibited grades to meet customer oxidation stability requirements. EOS Premium can be used as a direct replacement for all customer maintenance activities or oil changes where new oil may be too expensive or unnecessary for the application. Asset managers can have all the green benefits at a cheaper price!

### Renewable Industry

Further potential of the EOS business can be seen in the renewable energy business. For example, reliability and performance capability of larger photovoltaic power plants depends to a large degree on the availability of their transformers. Many transformers of renew-

able energy plants have now reached an age where it is recommended to regularly check the insulating system and the oil. EOS together with a partner from the photovoltaic business have established a cooperation to support customers from the renewable energy business in order to enhance the performance and life of their transformers.

### Changes in energy supply benefit from cost-efficient solutions

With three locations now in Europe including the recently established Electrical Oil Services GmbH based in Hamburg, Germany, HCS Group is in a position to support changing market conditions. "In view of growing environmental awareness and the need for cost-efficient energy supply by electricity utilities, we are convinced that the recycling and re-use of regenerated transformer oil will gain importance across Europe," states Martin Seipel, Managing Director Electrical Oil Services GmbH.

### About Electrical Oil Services (EOS)

Electrical Oil Services (EOS) is a key brand of the HCS Group and a leading supplier of both regenerated and unused electrical insulating oils and associated services in Europe. In 2018 HCS Group acquired two businesses in Germany: A mobile transformer maintenance division and a company specialised in the recycling of transformer and turbine oils using ecologically-sound processes at its production site in Duisburg, Germany. Electrical Oil Services GmbH was founded in the same year to further expand the successful UK-driven EOS business in Continental Europe. Today, EOS has three locations in Europe and is in the position to offer a complete transformer service package to large and small customers in the electricity distribution industry all over Europe.