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Dear Readers,

As I write this text at the very end of the year, it is interesting to make a short review of the innovation presented and business events that have happened in 2019. Here are a few that in my opinion are related to the main trends in our industry.

The innovations are as follows:

Phase-change cooling transformer

A Chinese company announced that they developed the world's first 220 kV evaporative cooling power transformer, which uses a new type of non-combustible insulating heat dissipation liquid material – fluorocarbon. This liquid is a kind of low-boiling, non-combustible, environmentally friendly material used for insulating and cooling the transformer by its gas-liquid phase change.

Compact medium frequency transformer

Researchers from Ecole Polytechnique Federale de Lausanne have developed and built a compact medium-frequency transformer, rated for 100 kW and operated at 10 kHz. The idea is to enhance the flexibility and efficiency of smart grids and DC power distribution networks.

Advanced digitally connected transformer

A new version of Siemens' digitally connected transformer - the Sensformer - is based on a digital twin operation that simulates the behaviour of the physical asset in real time. It comes with a few useful tools that compare simulated and measured values.

Industry 4.0 in new transformers factory

Siemens will build its factory for production of distribution transformers in Guangzhou with applied Industry 4.0 standard. The factory, planned

to be put into operation in 2021, will be a model factory, suitable for an open innovation ecosystem for massive use of digital technologies such as digital power plant, industrial IoT, smart campus and connected mobility.

Robot for grid inspection

A small, remotely controlled robot, which can directly operate in the power boxes was used for the first time for grid maintenance in China. The robot is expected to be more widely used, with the aim of replacing part of the human operations gradually.

Bio-based dielectric fluid of ultra-low viscosity

Nynas claims that their new fluid NYTRO® BIO 300X, thanks to its ultra-low viscosity, enables up to 10 degrees lower hot spot temperature compared to average mineral oils and around 20 degrees lower compared to ester liquids, with a huge potential for thermal design optimization and improved over-loading capability.

While most of the innovations are digital-based, we can see that some of them are very disruptive innovations based on physics, that is physical properties of the materials.

There were major changes in the business event realm, with much bigger impact than the one we saw in the previous years:

Siemens to spin off Gas and Power

Siemens has announced its plans to spin off and give up the majority stake in its Gas and Power division, which is comprised of conventional power generation, power transmission, oil and gas, and related services businesses. This came shortly after Hitachi acquired ABB's Power Grids division in a \$11 BN deal.





Hyosung acquires Mitsubishi transformer production in U.S.

Hyosung Heavy Industries Corporation has entered into an agreement with Mitsubishi Electric Power Products Inc. to acquire their transformer factory in Memphis, Tennessee.

Cleveland-Cliffs buys AK Steel

Cleveland-Cliffs Inc. has announced that it has entered into a definitive merger agreement with AK Steel Holding Corporation to acquire all of the issued and outstanding shares of AK Steel common stock in a \$1.1 B deal.

CESI acquired KEMA Laboratories

DNV GL and CESI have signed an agreement to transfer the ownership of KEMA Laboratories to CESI.

Pfiffner acquired Haefely

Pfiffner International AG, a solution supplier for customers in the sectors of electrical energy and rolling stock, has acquired Haefely Test AG, a Swiss company that develops, produces and sells high-voltage test systems and instrumentation for electrical energy and general industry sector.

Megger acquired Power Diagnostix

Megger has acquired Power Diagnostix, a Germany-based company that develops and manufactures high voltage diagnostic equipment and provides diagnostic services for high voltage installations.

This edition brings you two interviews. In his interview, **Marek Szrot** talks about building a transformer service company, and **Zhongdong Wang** presents the largest and the most influential university research centre for transformers. We also bring you the usual columns from our two esteemed experts. **Paul Jarman** writes about transformers in the context of the energy system transition,

and **Marius Grisar** presents the third part of an overview of a century-long history of dissolved gas analysis.

Furthermore, we bring you articles on reduction of transformers vibration and noise through smart core manufacturing, and on core cutting lines innovation.

Miguel Oliva et al. write about transformer innovations in light of transitioning energy landscape marked by megatrends like renewable energy, digitalization, sustainability, energy efficiency, circular economy, etc.

Claes T. Bengtsson and **Joel A. Kern** describe how shunt reactors improve voltage stability and power quality, **Esa Virtanen** et al. write about special needs for transformers in special applications, **Sanjay Saxena** et al. talk about railway transformers, and **Mattias Viksten** et al. touch upon UHVDC and UHVAC transformers.

Ayman Sakr describes corrosion protection of core steel in dry-type transformers, **Georg Daemisch** explains mapping of transformer populations, **Manojmohan Subramanian** deals with inter turn fault localization using SFRA, and **François Devaux** discusses the history of transformers.

If you would like to comment on some of the articles or claims in this magazine, feel free to contact me anytime. In the end, I wish you a lot of success in the new year and, of course, a joyful reading.

Mladen Banovic, Editor-in-Chief



Bruno Melles appointed Managing Director of BU Transformers at ABB

Switzerland: Bruno Melles is appointed new Managing Director of Business Unit Transformers, Power Grids Division at ABB effective from October 2019.

Previously he served in ABB as Head of the Power Up Transformation program and Markets, also in Power Grids Division, which is one of the four ABB's divisions. He was also Head of Business Unit Medium Voltage Products, and Head of Business Unit Breakers and Switches. He served as a Vice President Overseas Export Sales Manager for three years, BA ATAP Regional Manager for North America region for a year and BA ATAP Regional Manager for Asia Pacific region for three years. Before that, he worked at ABB SACA SpA as US Area Manager in the Low Voltage Breakers Division for two years and Product Manager of the Air Circuit Breaker range for three years.

Source: Transformers Magazine



Expansion of MR management team to include Holger Michalka

Germany: Effective April 1, 2020, Holger Michalka will join the management team of Maschinenfabrik Reinhausen GmbH (MR).

He succeeds Michael Rohde, who will retire at the end of 2019. Holger Michalka comes from RITTAL, a leading systems supplier for enclosures. There he spent 15 years at home and abroad in various management positions, currently as Executive Vice President Sales Europe. The graduate in business administration (focus on logistics) will work for MR as Managing Director "Products & Operations". Wilfried Breuer is responsible for systems business and sales within MR's three-headed management team. Holger Michalka is responsible for the components business and production. Source, Photo: MR