Dear Readers,

I'll be honest. When we first decided to do an issue on the impact of digitalization and diagnostics on transformer monitoring, I was excited. Then I became skeptical: what kinds of articles and interviews would we get? It is potentially one of the segments that has seen most significant changes in transformer technology over the past few decades, yet I was not certain that it could carry an entire issue.

Transformer components, bushings, oils & fluids - our topics for the rest of the year, are pretty straight forward for the most part. We are familiar with the topics and know what to expect. With monitoring and diagnostics, not so much.

But to my great relief and to that of the TT team, our authors and experts came through for us. The overall result was more than I had anticipated and I believe you will enjoy the work of some of the best and brightest along with some new, next generation entrants as experts. I'll let the authors and interviewees speak for themselves, so I hope you enjoy this as much as I have enjoyed leading our editing team on your behalf.

I'd like to weigh in as well, but from a different perspective. I want to look to what the future might look like as a result of advances in digitalization, diagnostics and monitoring technology for power system overall, not just for transformers.

In 2018, pre-covid, when the world still met at conferences and expositions, I was at a reliability conference where I watched a presentation by Bentley Systems, a company heavily involved in the work of reliability and maintenance. It was a presentation on their work with Siemens on a Digital Twin substation. Since then, there has been much more information provided on the whole concept of digital twins, where a series of actual assets are mimicked through a digital twin, where simulations can be run showing the impact on a system or asset digitally, before it is experienced in real time.

Wikipedia defines a digital twin as "a virtual representation that serves as the real-time digital counterpart of a physical object or process. Though the concept originated earlier the first practical definition of digital twin originated from NASA in an attempt to improve physical model simulation of spacecraft in 2010."

When I saw the digital twin substation, I remarked to a colleague: "We are seeing the future... that is for those wealthy enough to make it happen." That might be a bit too skeptical, I realize, because most good ideas end up coming down in price as competition and advances in technology make it more cost effective. But in a very real sense, the creation of digital twins is really about simulating real time situations and seeing how a system or an asset reacts. Digitally "twinning" systems will become much more common place allowing us to determine what the impact will be on the whole system, when we make changes to one of the assets within that system.

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I firmly believe this is becoming the way power systems, both large utility scale and industrial scale, are diagnosed. Monitors, of all types and complexity, will be deployed throughout these systems to send real time condition information back to the digital twin for determination of the impact on the system.

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With that, I'll leave you to enjoy this digital issue of Transformer Technology, and as always, your feedback is greatly appreciated. We have created a TT Community hub with our TT website and producing these digital "digests" allows us to create audio and video content, which we share through the months and then along with the written content, we curate it all into this work.

I hope you enjoy reading it and forwarding it to your peers and fellow partitioners. Together we are building a Body of Knowledge unparalleled in our industry. Thank you for being part of our TT community.

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