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What are the emerging requirements for asset performance management systems?

High and extra-high voltage substations are important nodes in the electricity grid that allow energy to be transmitted, distributed, and transformed. A sudden complete or partial outage of the grid can have serious repercussions on the management of power flows.

The main requirements of grid asset operators can be summarized by the following four factors/needs:

- Availability of assets (circuit breakers, transformers, etc.)
- Prioritization, planning and optimization of the maintenance cycle
- Rapid restoration of operating conditions in the event of a fault
- Integration of field data into asset management systems connected to remote assistance available 24/7

The Digital Collaboration Architecture from Hitachi Energy transforms the way how services for high-voltage assets will be delivered in the future by providing real-time support and access to expertise and resources from anywhere in the world. It offers the same capabilities and expertise that our customers expect of typical onsite service, now available remotely and on-demand.

What are the preferred hardware and software architectures?

The strong value comes from the combination of available software and hardware solutions with the human expertise.

The Collaboration Center is outfitted with the latest technologies that enable remote support for high-voltage services such as installation and commissioning, troubleshooting, repairs, training as well as remote monitoring. The Digital Kit allow the users to exploit augmented reality.

Are the planned benefits already recognizable regarding cost reduction for operation and maintenance and increase of reliability?

Thanks to the advanced Digital Collaboration Architecture, it is now possible to carry out condition-based maintenance. The condition-based maintenance concept, based on the actual condition of the HV asset, reduces the need to carry out periodical inspections. The condition-based maintenance concept allows to reduce costs for maintenance, optimizes the equipment life cycle, but above all it allows to reduce the possibility of unexpected failures and consequential loss of production. In order to perform this type of maintenance it is necessary to make the HV asset connectable to IOT (to digitalize) and to ensure a continuous monitoring of the key functional parameters (KFP) of the asset (sense-communicate-store-analyze-control).

Thanks to the condition-based maintenance concept, we have seen that it is possible to identify possible anomalies and to intervene before they develop into critical situations such as equipment malfunctions or failures, with consequent outages.

Should rapid intervention still be required to fix possible anomalies, in this situation too, thanks to new digital technologies, it is possible to considerably reduce intervention times by using the Digital Kit that makes use of “augmented reality” connections.

The technical and economic benefits provided by “digitization” are therefore evident, since it can increasingly meet the main and common needs of users of High and Extra-High Voltage substations.