Paris Session 2022

Digital substation for EDF: Engineering approach and E-Monitoring development

Study Committee B5

Protection & Automation

Question 3.05 What are your expected benefits of using digital substation concepts and how to measure if the benefits can be realized?

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1st expected benefit: configuration internalization

• *EDF R&D developed a home-made System Configuration Tool (SCT) named eCS so that, for each new 61850 PACS project:*

  – EDF will create the Specification File (SSD)

  – And the Substation Configuration File (SCD)

• Thus, additional PACS modification (i.e. adding or replacing one IED, adding or modifying one or several substation data, adding an e-Monitoring sensor, etc.) will be possible without the help of the PACS manufacturer → less costs, more flexibility for the TSO/DSO.

2nd expected benefit: data increase and e-monitoring development

- *IEC 61850 PACS will enable a huge increase of data collection.*
- Consequence: e-Monitoring development will enable:
  - To avoid more HV material damages.
  - To have a better knowledge (state of health) of the HV/MV substation assets.
  - To develop predictive maintenance.

- For example: interesting data on a power transformer: windings temperatures, dissolved gas concentration, oil level, etc.

2nd expected benefit: data increase and e-monitoring development

- Simple and complex algorithms can be developed:
  - Simple threshold alerts.
  - Failure early detection alerts (where different data are correlated to be more precise).

•Example of a failure early detection based on 2 data: windings temperature and running power: