Paris Session 2022

Optimized Deployment for Online Partial Discharge Monitoring in Distribution Grids Contribution

SC D1 Materials and Emerging Test Techniques

PS-1 Testing, Monitoring and Diagnosis

Q1.08

Are there other examples of the application of PD monitoring in distribution grids? If so, what assets have been targeted and with what success?

Javier Ortego (Spain)

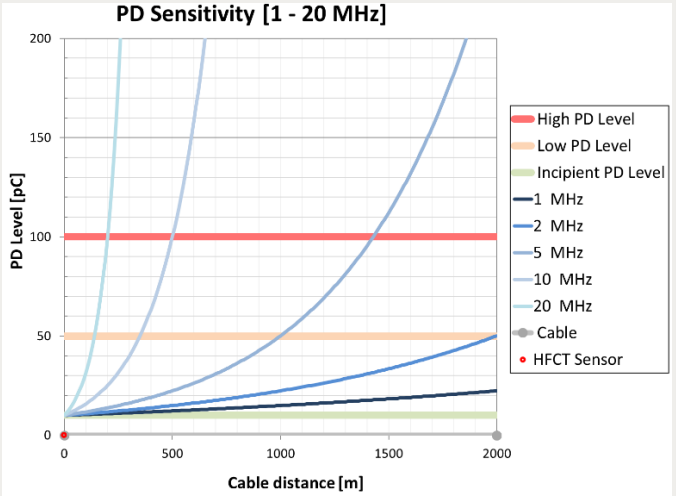
Ampacimon
Smart solutions for a dynamic grid

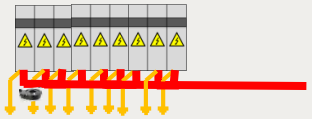
Online PD Monitoring Applications for Distribution Grids

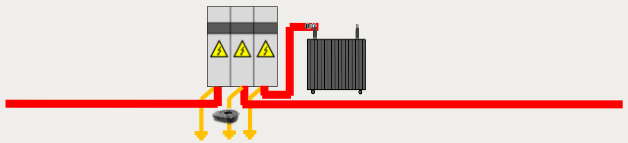
Predictive maintenance strategy applied by EDP Redes Spain (DSO) in collaboration with Ampacimon

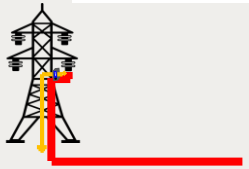
Requirements for an optimized deployment covering cables and the rest of assets (transformers/GIS/switchgear):

- HFCT sensor **good sensitivity** to cover > 1km cable
- Powerful automatic **denoising** to find attenuated PD pulses
- **Clustering parameters** to discriminate multiple defects
- **Localization method** to determine element affected
- Two steps approach:
  - Level 1: PD Detection
  - Level 2: PD Location









Online PD Monitoring Applications for Distribution Grids

Predictive maintenance strategy applied by EDP Redes Spain (DSO) in collaboration with Ampacimon

Commissioning and periodic maintenance applications:

	2015 - 2021	From 2022	By 2024
Data acquisition	DSO with **portable** PD equipment *(>1000 measurements >300 with internal PD in cable, GIS & transformer)*	DSO with **portable** PD equipment + **permanent** low-cost HFCT sensor	DSO with **permanent** monitoring IoT solution
PD Diagnosis	PD Expert (external services)	DSO with **AI tools** in **portable** PD equipment	DSO with **AI tools** embedded in **permanent** IoT solution
Preventive maintenance planning	DSO + PD Expert with **manual** analysis	DSO with internal **procedure**	DSO in **asset management system**

Online PD Monitoring Applications for Distribution Grids

CONCLUSIONS

- Online PD Monitoring application for distribution grid requires **HF measurements** to cover the **maximum number of assets** with the minimum infrastructure

- **Powerful denoising and clustering** done by AI tools are required to apply PD measurements in distribution grids with **high reliability** level using internal resources of the DSO

- Future solutions for permanent monitoring application should include **embedded AI tools**, **IoT** communication and other measurements like sheath current/temperature/humidity/fault