

# Paris Session 2022



## Circuit Breaker Monitoring for predictive maintenance: Return on experience

**A3:** Transmission and distribution equipment

**PS-2:** Decarbonisation of T&D equipment

**Q16:** “A general question to utilities: Which is the expected maintenance interval extension by applying condition-based approach in comparison to a time-based one?”

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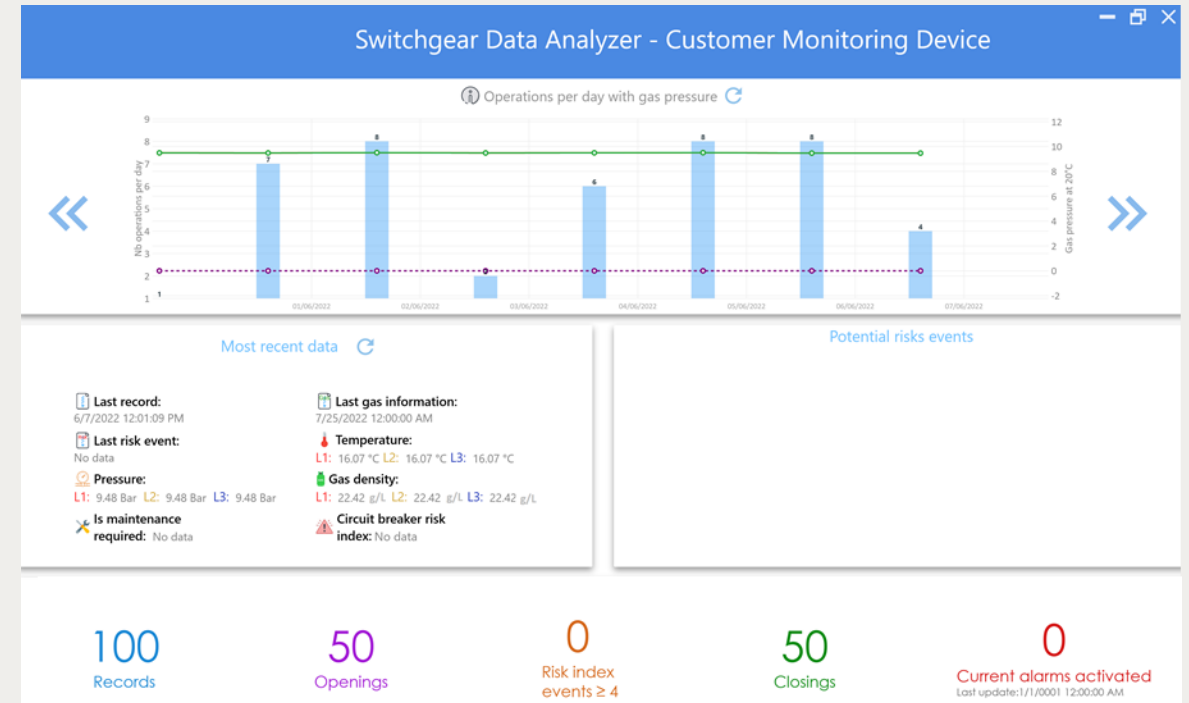
# Definition of key parameters to monitor for preventive maintenance

- Adaptation of the features to the circuit breaker application
- Use case: Pump Storage Power Plant
  - Multiple switching operations per day
- Required dedicated sensors based on 25 years of experience
  - Digital gas sensor
    - Smart density control: All type of gases based on Pressure & Temperature
  - Mechanical sensors
    - Mechanical ageing monitoring: Timings and strokes
  - Current sensors
    - Breaking chamber ageing monitoring: Electrical Wear monitoring
  - Coil current sensors
    - Control circuit monitoring: Health and wear of the coils



# Adaptation of maintenance actions based on monitoring results

- COMTRADES recording for each operation
- Records can be analyzed offline
- Benefit from the most up-to-date methodologies even on former devices
- Gives reliable and custom advices to users
- Recommendations are given up to 2 years ahead of maintenance need and fitted to the overall maintenance plan of the power plant



# Conclusion on predictive maintenance

- Stringent wear applications are not covered by traditional time-based maintenance
  - Aim is to offer maintenance recommendations based on the real needs
  - As a result, for GCB, monitoring is now considered as a part of the overall product
- Methodology could be extended to other critical applications
  - Based on laboratories results and various on-site REX
- Modular solution is bringing agility and correct sizing to the application needs
- Opportunity to extend periods between maintenance phases varies:
  - Circuit breaker application intensity
  - Overall maintenance strategy and organization of the user