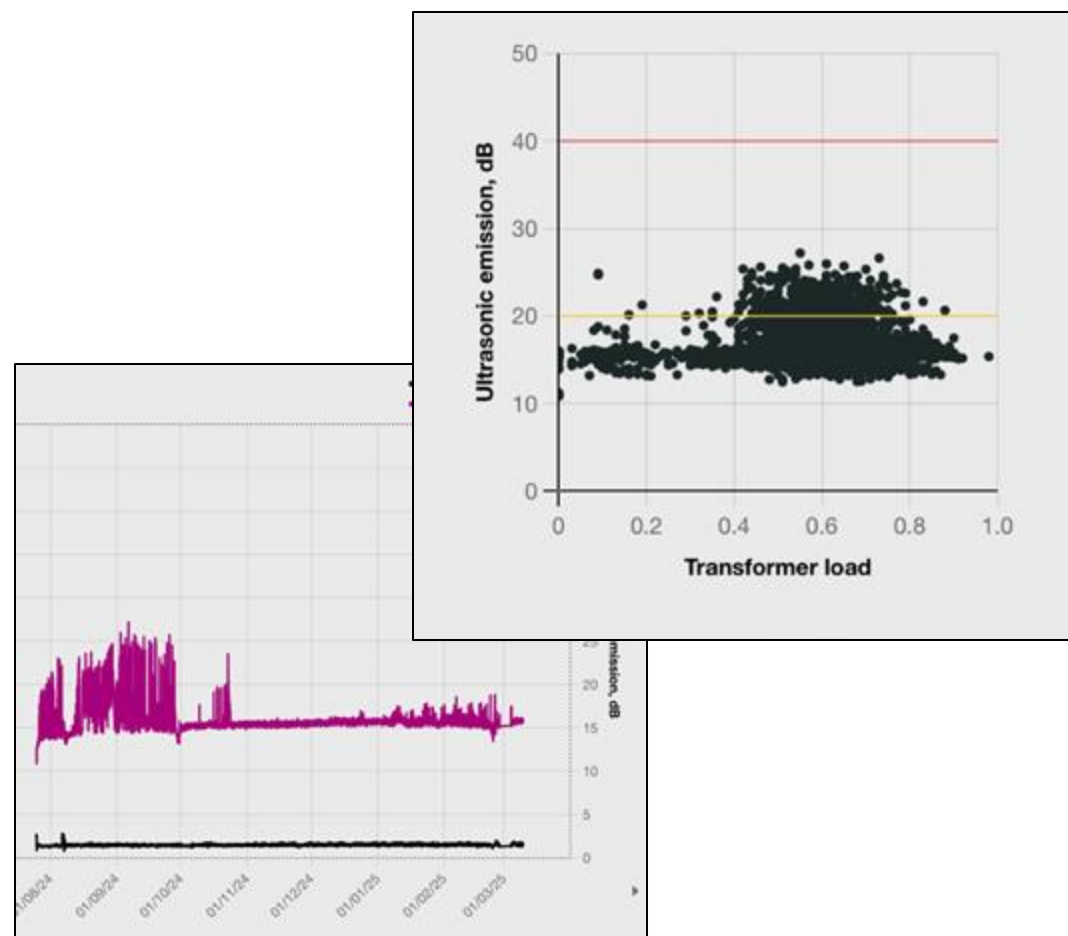
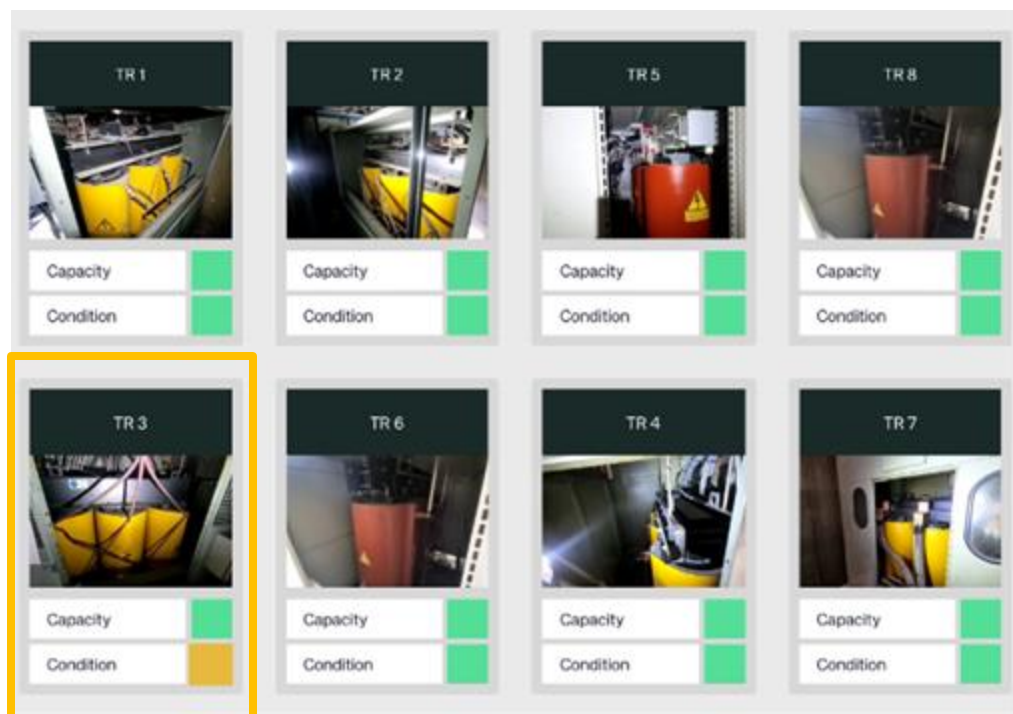


## Success Stories

Bandag – Early fault detection, partial discharge detected.

### Partial discharge detected on dry-type production transformer

- Mechanical state deteriorated significantly over 6 weeks
- Notification triggered
- ABB Belgium made maintenance call with customer



## Success Story – ELSE Finland, TRAFCOM

Digital monitoring solution ensures clean bill of health for Finnish hospital's power supply



### Who is the customer?

**End Customer:** HUS Kiinteistöt Oy

**Location:** Helsinki, Finland

### What did they buy?

5x Data Collector's for Preventing Outage on oil and dry-type transformers.

### Words from the customer

We are now getting uninterrupted real time data on the transformers, which wasn't possible with visual inspections, which could only tell if there was a leak or change in either the temperature of the unit or the sound it's making," adds Korhonen. We can monitor the transformers 24/7 and are immediately aware of any issues that may require our attention.

FULL STORY: <https://new.abb.com/news/detail/120918/digital-monitoring-solution-ensures-clean-bill-of-health-for-finnish-hospitals-power-supply>

## Success Stories

### Hexpol Rubber Compounding – Critical failure detected.

#### Critical transformer for securing production

- Electromechanical analysis shows possible winding deformation build-up
- Notification triggered
- SFRA test recommended



- No significant noises in electrical harmonics
- 3rd vibration harmonics close to threshold
- Ultrasonic emission levels do not indicate PD
- Sound Level in upper normal
- Temperatures normal

#### Recommended action

##### Early Signs of Core or Winding Related Resonances

- **Core or Magnetic Circuit Disturbance:** A high third harmonic is often a sign of anomalies in the magnetic circuit, such as a core joint looseness or problems with the clamping structure. These can cause variations in the magnetic flux distribution and increase harmonic vibration.
- **Winding or Structural Resonance:** This could point to a structural resonance at the third harmonic frequency or mechanical looseness within the transformer. Resonance can amplify specific frequencies disproportionately.

##### Possible winding deformation

- If the windings have undergone physical deformation (e.g., buckling, ovality, or displacement), their mechanical properties might change, causing them to resonate at specific harmonic frequencies. This resonance could amplify the vibration at the 3rd harmonic.
- Such deformations can arise due to:
  - Short-circuit forces in past events.
  - Manufacturing defects or improper clamping of windings.
  - Thermal expansion over time leading to loosened winding supports.

##### Perform these actions

- In this scenario, conducting **dissolved gas analysis (DGA)** is recommended.
- **Offline electrical test** (like SFRA – Sweep Frequency Response Analysis) can help determine if there is physical deformation of the windings or core



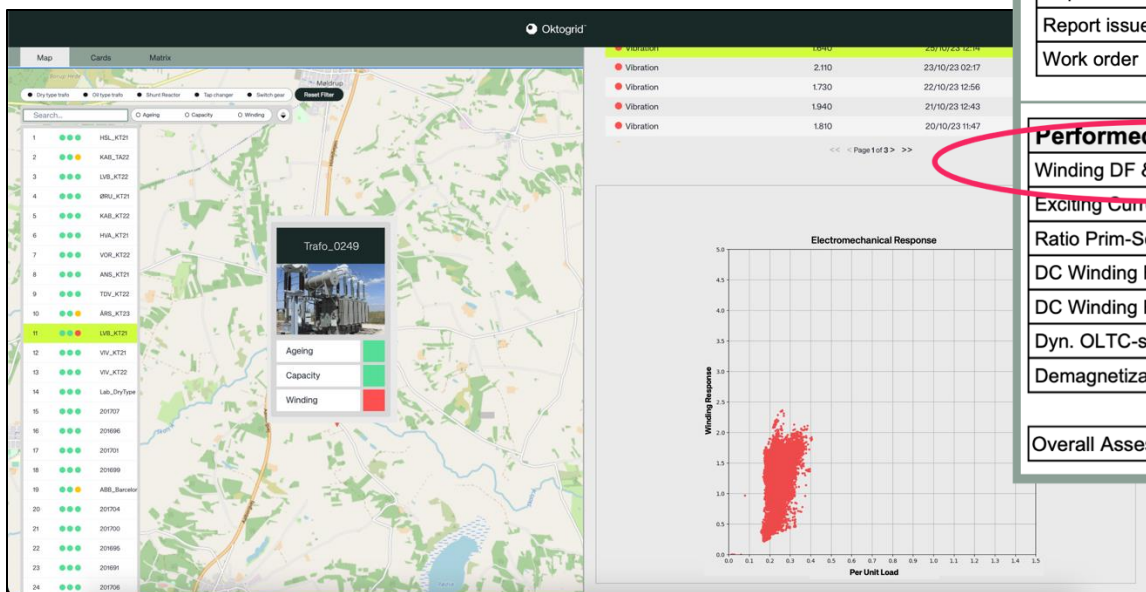
## Success Stories

N1 Danish DSO – Early fault detection, recommending electrical testing.



Early fault detection on distribution grid primary substation.

- Mechanical state deteriorated significantly over 6 weeks
- Notification triggered
- External maintenance team carried out electrical testing



**HITACHI**  
Inspire the Next  
**Hitachi Energy**

**Report ( )**

Client	N1	Transformer	
Execution date	2/13/2023	Reason of the job	Routine
Tested by		Location	
Approved by		Asset	Transformer
Report ID		Asset type	Three-winding
Report issue date	2/14/2023 4:32:17 PM		
Work order			

Performed tests	Assessment
Winding DF & CAP	Fail
Exciting Current	Manual investigate
Ratio Prim-Sec	Pass
DC Winding Resistance Prim	Pass
DC Winding Resistance Sec	Pass
Dyn. OLTC-scan (DRM) Prim	Pass
Demagnetization	Manual pass

Overall Assessment	Continued safe operation critical
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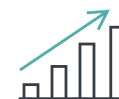
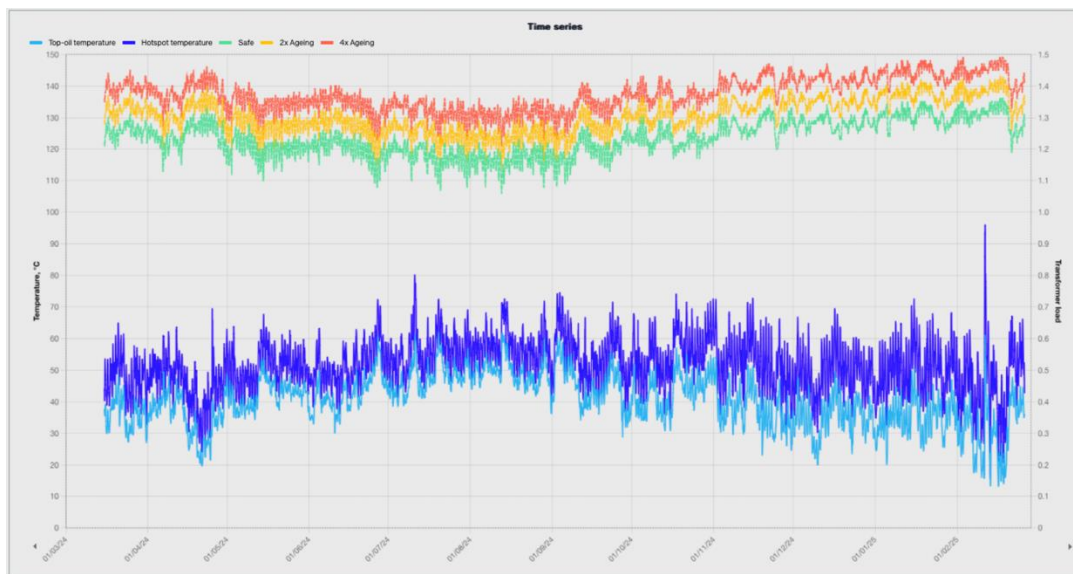
## Success Stories

Stedin Dutch DSO - Monitoring needed for safely overloading transformers.

**STEDIN**.NET

### Fleet of ageing transformers

- Thermal performance monitored across 20 transformers
- Analytics marked three transformers unfit for high loads
- Inspection of cooling system recommended for two transformer



### Optimise capacity

- Measure and monitor capacity potential
- **Optimise utilisation of transformer**
- Across 20 assets: **204 MVA unlocked!**



### Optimise life

- Monitor risk
- Establish and forecast PoF
- Across 20 assets: **138 years of useful life unlocked!**