

# WINDING HOT SPOT MONITORING

## THE OPPORTUNITY

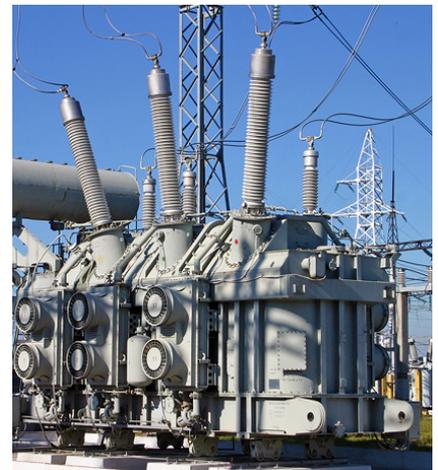
The unprecedented growth in electric power consumption has created increasing demand for effective management and monitoring of utility companies' most valuable assets — power transformers. Utility companies face many challenges when it comes to protecting and preserving the life of their transformers.

Monitoring the transformer winding hot spot is critical to safeguard your transformer from damage and extend its usage. Complex temperatures and harsh environments, such as high voltage and RFI and EMI emissions make accurately measuring hot spot winding temperature in transformers difficult.

Hot spots are the highest temperature area in the transformer based on flux leakage from the windings and can degrade the insulating paper making the transformer susceptible to failure. Since transformer life is dependent on the insulating paper, accurately monitoring temperature conditions is critical.

Conventional methods simulate or calculate this temperature, but do not accurately measure it. They can show up to 20°C difference from the actual hot spot temperature. In addition, top oil has significant time lag related to winding real temperatures.

Because transformer aging rate doubles for every 6°C over the temperature set point, inaccurate temperature measurements can lead to transformer damage and transformer loss of life.



## OUR SOLUTIONS

Fiber optic monitoring enables true hot spot measurement by sensing temperature directly in the windings. Winding temperature indicators infer hot spot measurement by measuring top or bottom oil temperature which significantly lags the real hot spot.

Advanced Energy pioneered the field of fiber optic winding temperature measurement more than 40 years ago and is a premier provider of direct, real time hotspot monitoring and control systems for the power utility industry.

Our reliable, accurate fiber pptic monitors quickly detect and respond to hot spot conditions, triggering alarms and relays to protect your most valuable assets. These direct measurement systems are immune to high voltage, RFI, EMI, and transformer oil or SF<sub>6</sub> gas.



Advanced Energy's Luxtron m924 Utility Module



Advanced Energy's Luxtron ThermAsset2

## YOUR BENEFITS

- Verify transformer design integrity and manufacturing quality
- Safely maximize normal loading without damaging insulation or reducing transformer life
- Achieve true dynamic loading capability
- Accurately establish a temperature baseline during manufacturing that can be referenced in the future
- Detect cooling system malfunctions that would not be detected by conventional methods
- Easily facilitate condition-based maintenance and inspection activities
- Allow for cooling system control directly from the Winding Hot Spot, therefore extending transformer life and controlling the hot spot temperature
- Enable Smart Grid programs by providing critical temperature data to support asset management
- Eliminate calibration and maintenance on temperature monitoring equipment



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PRECISION | POWER | PERFORMANCE

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