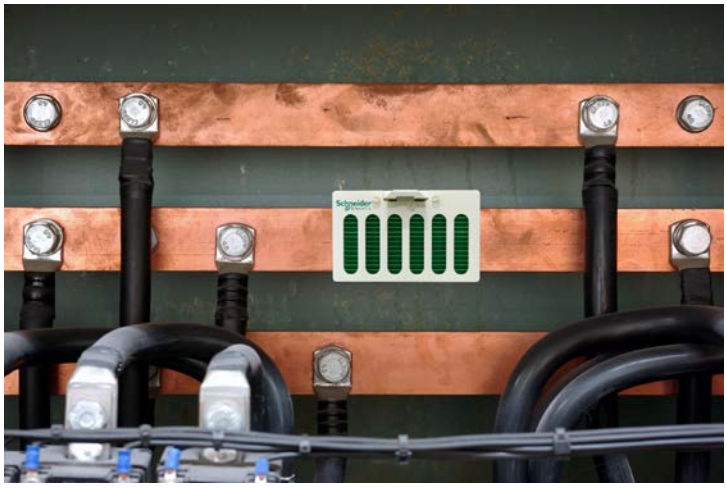
Hannover Messe, Hannover April 4-8, 2011, hall 8, booth D26

Battery-Free Wireless Sensor System Monitors Busbars and Busways

Resistive heat used to power continuous monitoring for increased safety

Freiburg, Germany, March 29th 2011 – Qnode is a wireless condition monitoring sensor and Micropelt's solution to increasing both operating safety and power availability in 24/7 production environments. The Freiburg, Germany, based leader in thermal energy harvesting has co-developed the self-powered temperature monitoring sensor with Schneider Electric, the French leader in medium and low voltage electrical power distribution. Degraded or loose joins of high current busway elements and likewise connections of current consumers to busbars are subject to improper assembly and they degrade over time. Any loose or corroded joint or connection causes increasing resistive heat before eventually a fatal burnout occurs when the load peaks. "Such failures can stop entire production processes with millions lost each day it takes to recover." said Fabrice Huré, head of Installed Base Services of Schneider Electric. "We want to help our customers in mitigating that risk without the drawbacks of common practice: Manual and thermographic inspection often interferes with continuous production, it cannot be applied under full load, and leaves large periods of non-attendance. Fiberoptic temperature sensors are an acceptable method of monitoring critical spots under galvanic insulation in medium voltage applications, but usually too costly in low voltage switchboards. Retrofitting wired sensors in such installations would cause both prohibitive cost and downtime."



Qnode wireless sensor system monitors busbars and busways.

Wireless temperature monitoring was identified as a potential solution allowing for both low cost and practically continuous coverage of all load situations. A wireless sensor would be small and easy to mount in both new and existing installations, targeting any number of monitoring points in a customer facility. Common wireless solutions, however, are powered by batteries whose maintenance would inevitably require regular shutdown of the electrical power system and consequently a production stop. "These reasons were compelling enough

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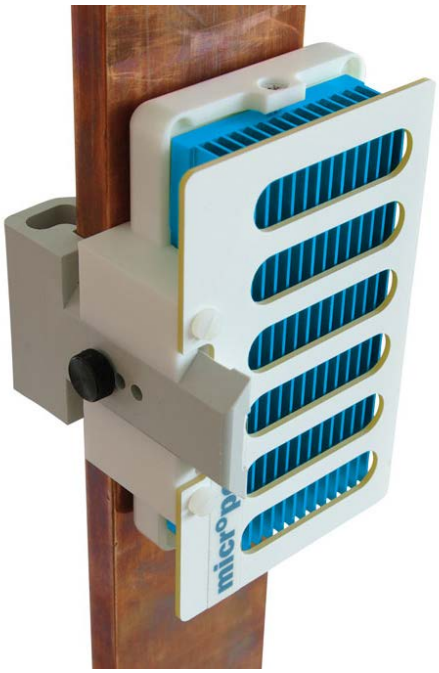
for us to look for a self-sustaining energy supply embedded in small, low-cost wireless monitoring sensors, concludes Schneider's Huré.

Thermal energy harvesting was identified as an ideal match, because any current load causes resistive heat which thermoharvesting can turn back to electric power. Micropelt's chip-scale thermoelectric technology generates 140 millivolts per Kelvin (K) of temperature differential. This permits highly efficient DC conversion and enough power to sustain ultra-low power (ULP) wireless devices on a duty cycle basis, where sensing and transmitting takes fractions of a second and occurs every minute or so.



TE-qNODE, a thermoharvesting wireless sensor which generates its power from the resistive heat of the device it is monitoring, is the result of the Micropelt and Schneider Electric collaboration. The Qnode in a matter of seconds slips over a busbar in a single-handed operation, being held in place by a solid clamp which can be adjusted to common bar sizes. If the temperature of the surface is 5 °C or more above the surrounding air temperature the embedded Micropelt thermoharvester generates the power to transmit the hosting busbar's temperature every second. "There is no faster and more cost efficient way to add security and reliability to power distribution systems in both new and retrofit installations", commented Dr. Joachim Nurnus, Micropelt's CTO.

"The application case is proven and the demand is obvious" says Burkhard Habbe, Micropelt's VP Business Development. "Now we want to commercialize solutions with system vendors, at best with an existing wireless signal infrastructure, based on standard protocols which match the given market requirements." Presently the qNODE uses Micropelt's simplified evaluation protocol which was designed for minimal energy consumption in service of thermoharvesting energy budget exploration. Productive solutions, according to Habbe, "will be based on standard or proprietary hardware and protocols with higher energy demand, but the qNODE shows exactly what's available."

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About Micropelt

Micropelt GmbH, Freiburg, Germany, develops, produces and markets the world's smallest and most effective thermoelectric elements for clean-tech micro energy harvesting, thermal sensing, cycling and cooling. The company employs 20 staff and currently commissions their first million-unit production facility, also located in Germany.

Micropelt's thermoelectric chips are based on a patented scalable thin film micro-structuring platform technology, which minimizes component size while maximizing power density for energy harvesting, cooling or thermal cycling applications. Process-inherent economies-of-scale break previous cost and price barriers of conventional thermoelectrics. Batteries become obsolete as cost-free electricity from waste heat powers wireless sensor networks for their entire life. Chip-thermogenerators also boast unprecedented sensitivity, resolution and dynamics in sensing heat flux and temperature change. For more information contact Micropelt or visit the website http://www.micropelt.com .

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