

Engineers develop new power line de-icing system

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Icy power lines in Paxton, Mass., on December 12, 2008. (photo by Wayne Nalbandian)

(PhysOrg.com) -- Dartmouth engineering professor and entrepreneur Victor Petrenko—along with his colleagues at Dartmouth and at Ice Engineering LLC in Lebanon, N.H.—have invented a way to cheaply and effectively keep ice off power lines.

The new proprietary technology is called a variable resistance cable (VRC) de-icing system. With only minor cable modifications plus some off-the-shelf electronics, the system switches the electrical resistance of a standard power line from low to high. The high resistance automatically creates heat to melt ice build-up or keep it from forming in the first place.

"The beauty of the VRC system is that it's fully customizable and is an affordable addition to the current manufacturing and installation process," said Gabriel Martinez, Ice Engineering's Vice President who studied under Professor Petrenko while earning his M.S. in engineering sciences from Dartmouth. "And it works without causing any service interruption whatsoever," he added.

"The technology builds on many years of research in materials science, power electronics, and ice physics with my colleagues at Dartmouth such as

Professor Charles Sullivan, an expert in power electronics and a co-inventor of the VRC de-icer," said Petrenko who is founder, Chief Technology Officer and Chairman of the Board of Ice Engineering.

Ice Engineering plans to install and test a full-scale VRC system prototype on a section of power line in Orenburg, Russia, in late January 2009. The company is also currently negotiating full-scale installations of VRC in other regions of Russia and in China.

Martinez says the changes in manufacturing and installation required to implement the VRC system would result in a less than 10 percent increase in overall cost. Since utility companies normally replace 3 percent of their cables every year, the system could be installed as part of the regularly scheduled maintenance process and still achieve a significant portion of the installation by the time the next major storm hits.

Furthermore, the life span of the de-icing system would match or exceed the life-span of the utility cable, approximately 30-50 years. The system would pay for itself during the next storm by practically eliminating the cost of fixing downed cables and power outages due to ice and snow, according to Martinez.

Another benefit to the VRC system is that utility companies using the system would have full control over its functionality, says Martinez. Time, temperature, and location can all be adjusted manually or set and controlled automatically with electronic sensors.

Provided by Dartmouth College

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