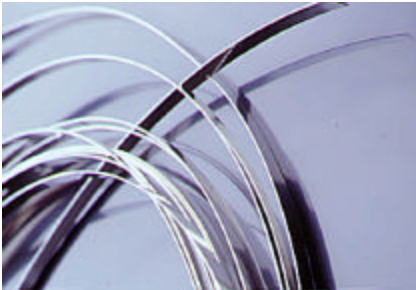


## SUPERCONDUCTIVITY: RELIABLE, ROBUST AND EFFICIENT POWER



Superconducting wire

High-temperature superconductivity (HTS) is a new technology poised to deliver reliability, robust capacity and efficiency to our nation's rapidly aging electric power infrastructure. Superconducting power applications include generators, transformers, cables, wire-making techniques, flywheels, and fault current limiters. The Superconductivity Program in the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability is partnering with industry to develop these superconducting power applications. When commercialized, these superconducting power applications will help maintain and increase U.S. competitiveness in this important new sector.

The phenomenon of superconductivity was discovered in 1911 by Dutch physicist Heike Kamerlingh Onnes (1853-1926). For his discovery, Onnes won the Nobel Prize in Physics in 1913. However, superconductivity occurred at very low temperatures (4 degrees Kelvin, or -452 F) and was not suitable for electric power applications.

In 1986, researchers Alex Müller and Georg Bednorz, working at the IBM research laboratory in Zürich, Switzerland, achieved a landmark breakthrough by discovering signs of resistance-free conduction of electric current at the unprecedented high absolute temperature of 35 Kelvin.

Time magazine reported in a 1987 cover story that this discovery was a "startling breakthrough" that could "change the world." Time added that "most scientists believe [that superconductivity] could lead to incredible savings in energy..."



Southwire cable test site in  
Carrollton, Georgia

Now, superconductivity is an essential component of our nation's future electric power infrastructure as we deliver ever-increasing amounts of power to our cities and high-technology industries that require absolutely dependable electric power.

Since the discovery of high-temperature superconductivity in 1986, scientists, industry, government and many other stakeholders have been working to move superconductivity from concept to reality. The U.S. Department of Energy's Superconductivity for Electric Systems Program has been in the forefront of these efforts, bringing together project teams that are demonstrating the feasibility of superconductivity in pilot projects across the country. Fact sheets on DOE's various superconductivity projects are available online at [www.electricity.doe.gov](http://www.electricity.doe.gov).

The United States is not the only country that seeks to leverage this important new electric power technology: Japan, China, South Korea and a number of European countries have active programs and aggressive goals for commercializing superconducting electric power applications. This shows that future international competitiveness will depend on how countries are able to leverage their national investments in high-temperature superconductivity.

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## ELECTED OFFICIALS ENDORSE SUPERCONDUCTIVITY

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High-ranking federal and state officials in the United States are aware of the importance of superconductivity for the future of our electric power infrastructure and its implications for our national competitiveness:



White House photo by Eric Draper

“[A]s we conserve energy at home and on the road, technology will help us deliver it more efficiently. New technologies such as superconducting power lines can help us bring our electrical grid into the 21st century, and protect American families and businesses from damaging power outages.”

—From speech by President Bush to the National Small Business Conference, April 27, 2005



“[Superconductivity has] the greatest chance of providing a real, huge increase in the capacity of transmission lines.”

—From statement by Senator Pete Domenici (R-N.M.), February 24, 2004



“This technology has the potential to solve several of our nation’s most pressing energy challenges”

—U.S. Senator Charles Schumer (D-N.Y.), in January 14, 2005 letter to the U.S. DOE



“We’re proud to support innovative projects like the HTS [high-temperature superconductivity] cable that offer the potential to enhance reliability and provide additional, affordable power for utility customers while protecting our environment.”

—From remarks by N.Y. Gov. George Pataki (R) at groundbreaking ceremony for new superconducting power cable project in Albany, N.Y., June 28, 2004

For more information, please visit [www.superconductivitynewsupdate.com](http://www.superconductivitynewsupdate.com)