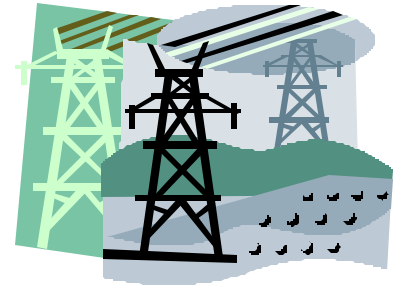


An Enabling Technology for a Clean Energy Future

HIGH-TEMPERATURE SUPERCONDUCTIVITY is a revolutionary new electricity technology with the potential to create a highly reliable and efficient electrical superhighway without bottlenecks or system gridlock. Thanks to their inherently low resistance losses, new superconducting power applications will have the potential to revolutionize the way we generate and receive electricity to create a superhighway for electricity much like what fiber optics did for the telecommunications industry.

North America's power grid is groaning under the strain of too many electrons vying for too little space on a transmission system that was not designed to handle the demands of a deregulated power market.

—from Reuters news report by Vibeke Laroi, 13 March 2000



WHAT CAN SUPERCONDUCTIVITY DO?

- ✦ **Conserve energy!** A staggering 7.34% of energy generated gets lost in transmission through heat losses and other circumstances—energy that never makes it to its destination. In the United States, the amount of electricity lost due to inefficiencies in the power delivery system is equivalent to all the electricity consumed in Africa. Superconductivity could cut this loss in half!
- ✦ **Promote renewable energy technologies!** In some areas, additional generation of electricity from renewable sources of energy such as wind, solar, geothermal and biomass might not be able to be used economically due to inaccessibility to the grid. However, superconducting technology can replace present grid segments with greatly enhanced capacity, thereby giving the grid more flexibility and the ability to accept more renewable generation.
- ✦ **Protect the environment!** Superconductivity will help lessen greenhouse gas emissions thought to contribute to climate change, and will save billions of dollars in energy bills—enhancing the economy and the environment alike. In addition, superconducting power equipment itself will be more environmentally friendly, containing no flammable oil for coolant or insulation.
- ✦ **Save money!** When superconducting materials become a standard component for electrical equipment and are fully integrated into the electric generation and utility sectors, the technology is expected to save \$8 billion per year in reduced energy losses. An additional \$8 billion can be saved with the installation of superconducting transformers and electric motors. That's a savings benefit total of \$16 billion per year from the full implementation of currently envisioned HTS electric power equipment! Utilities will have the opportunity to pass the savings on to their customers.

**High-Temperature Superconductivity:
Bringing New Power to Electricity**



Updated!!

High Temperature Superconductivity: the Products and their Benefits

What is the market potential for new high-temperature superconducting power applications? Originally published in 1998, this landmark market assessment report has been completely updated and revised for 2002. Written by Dr. L.R. Lawrence, Craig Cox, Jodi Hamrick and David Reed of the Alexandria, Virginia firm of Bob Lawrence & Associates, this report quantifies the benefits of superconductivity by examining five key classes of electrical equipment (electric motors, transformers, generators, underground cable and fault current limiters). It projects market entry and capture, based on historical entry of technologies considered analogous to high temperature superconductivity. Finally, the report enumerates the benefits that superconductivity will offer to the power grid, including dramatic cost savings, increased energy efficiency and enhanced environmental quality.

The Pollutant Emissions Reduction Potential of Superconductive Technologies

Government officials, industry regulators, environmentalists, utility executives and other key stakeholders hope to combat air quality problems in part through the use of new and efficient electricity technologies. This analytical report by Dr. L.R. Lawrence, issued in 2000, quantifies the tremendous savings in CO₂, NO_x and SO₂ emissions offered by the future commercial use of superconducting power products in the U.S. power grid.

This report shows how high-temperature superconductivity can play a vital role in reducing air pollutants and “greenhouse gas” emissions caused by the generation of electricity.

To be added to the “Superconductivity News Update” e-mail list, contact coxraig@att.net
These updates are issued approximately once a month.

**For copies of these reports and for information relating to superconductivity
please visit: www.ornl.gov/HTSC/htsc.html**