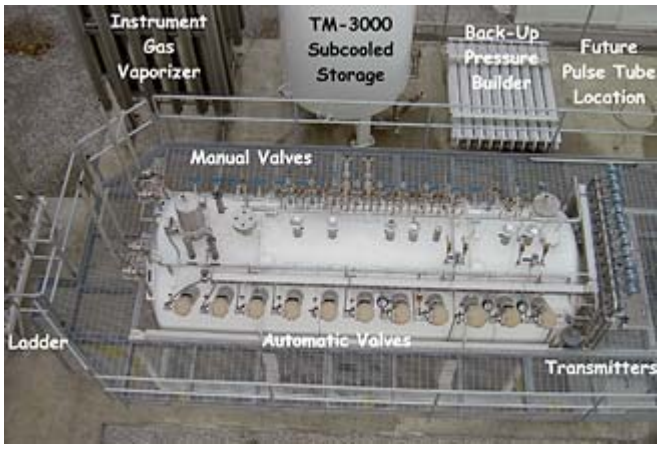
SUPERCONDUCTIVITY NEWS UPDATE
30 October 2006

In this issue:

New Superconducting Lines Deliver Power to Columbus Suburb
—Triax cable serves about 8,600 homes and businesses

A new technology that holds promise to transform the global transmission and distribution of electric power was formally energized on 18 September near Columbus, Ohio. The $9 million project uses a second-generation High Temperature Superconducting (HTS) cable system to efficiently deliver electric power to approximately 8,600 homes and businesses in suburban Columbus.

The Columbus project is the first demonstration of the new Triax HTS cable design, which dramatically reduces the cost of superconducting systems and brings the technology one step closer to commercial viability. The system was developed by Southwire Company and its partners, American Electric Power, Praxair, American Superconductor and the U.S. Department of Energy's Oak Ridge National Laboratory (ORNL).



Overhead view of the Bixby substation's cryogenics system.
Photo from www.supercables.com/Demonstration/demo.html

Approximately 200 meters (660 feet) of Triax HTS cable from Southwire are part of the system distributing electric power to residential, commercial and industrial customers through AEP's Bixby substation in Groveport, Ohio. The installation phase of the two-year demonstration project came in on time and on budget.

Superconducting cables, operating at extremely low temperatures, eliminate virtually all resistance to the flow of electric current. One Triax HTS cable can carry as much current as 18 large copper cables, with much less energy loss.

"This project demonstrates the potential role for superconductivity in modernizing our electricity system," said Secretary of Energy Samuel W. Bodman. "This new development allows power lines to increase capacity in congested urban areas while using less space. I'm pleased to be part of this excellent and innovative team."

"AEP has a long history of supporting innovation in power generation, transmission and distribution. The demonstration of the Triax cable at our Bixby Station is another example of how we seek to advance technologies to help increase the capacity of and ensure the reliability of our power delivery network," said Michael G. Morris, AEP's chairman, president and chief executive officer. "Over the next two years, this project will provide an invaluable, real-world test of state-of-the-art superconducting cable technology on an operating power distribution system."

Bixby substation, Columbus, Ohio
Photo from www.supercables.com/Demonstration/demo.html

Rapid advances in HTS cable design are continuing to lower the cost of superconducting systems, with the goal of making superconductivity feasible for commercial applications over the next few years. The Columbus project unveils an important advance toward this goal: the Triax HTS cable. Designed in a joint venture of Southwire and nkt cables, a European cable manufacturer, this second-generation cable design can carry up to 3,000 amps of power, approximately three times more current than other superconducting projects now energized or under construction.

"Superconducting cables have the potential to increase efficiencies in the delivery of electric power in the same way that an expressway can handle more traffic than a typical city street," said Stuart Thorn, president and chief executive officer of Southwire. "The Triax cable design is a major step forward, and we are excited to demonstrate its potential for delivering more power to more people."

Because HTS cables can carry more current at a lower voltage over short or long distances, large power transformers can be located farther away from urban centers, allowing urban planners to free up valuable real estate for development or green space. HTS technology also enables greater interconnectivity between electrical substations, creating redundancies that increase the reliability of the electrical grid.

For more information on the new HTS cable design and the Bixby substation demonstration project, visit http://www.supercables.com.

From Southwire press release
http://www.southwire.com/processGetArticle.do?commonId=72e2c46f1fdad010VgnVCM1000002702a8c0____

- "Supercables.com," a website maintained by the Triax high-temperature superconducting cable system partners (Southwire, American Electric Power, Praxair, American Superconductor, nkt cables and Oak Ridge National Laboratory), contains an excellent range of information on high-temperature superconductivity, and especially on superconducting cables and the Triax cable project. Apart from informational materials, links and graphics, this site shows a Flash movie depicting how superconducting technology can be applied in urban environments.
  - » Visit this site at http://www.supercables.com/index.html

- A 3-D animation of the superconductor coating process, produced on behalf of VIN Technology Services (http://www.vin-technology.co.uk/index.asp), can be viewed at http://www.youtube.com/watch?v=eJw5Tmr0r6A.

Dominic Lee Becomes Manager of Oak Ridge Superconductivity Program
—Previously served as Acting Manager

On 23 October, Robert A. Hawsey, the Director of Oak Ridge National Laboratory's (ORNL) Energy Efficiency, Renewable Energy and Electricity Delivery Program announced that Dr. Dominic F. Lee has assumed the post of Manager of the Laboratory's Superconductivity Program.

In his announcement, Hawsey noted that the ORNL Superconductivity Program Manager "is responsible for leading and

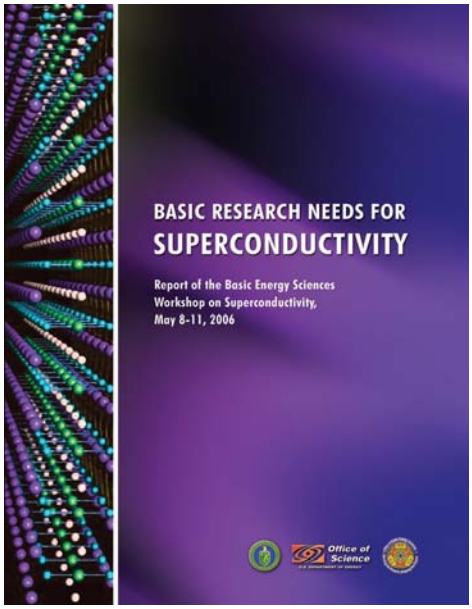
implementing the Laboratory's research and development (R&D) portfolio for the Department of Energy's (DOE) Superconductivity for Electric Systems Program in the Office of Electricity Delivery and Energy Reliability (OE). The program currently supports approximately 24 full-time equivalent staff members in three ORNL research divisions across two directorates."

Hawsey cited Lee's many achievements in his announcement:

> "Dominic Lee joined ORNL in 1994 as a post doctoral fellow and became a staff member in 1997 in the Materials Science and Technology Division. Dominic has been extremely productive in strategic and technology driven research and development, and has worked on a wide range of superconductors including bulk as well as first and second generation high-temperature superconducting wires. He was the principal investigator of various projects, which include two Cooperative Research and Development Agreements with U.S. superconducting wire manufacturers. In the last six months, Dominic has been responsible for the superconducting program management activities and is familiar with the needs of the OE sponsors, researchers and stakeholders. He holds a Ph.D. degree in Materials Science and Engineering from the University of Houston Texas Center for Superconductivity, a Master of Science in Mechanical Engineering from the University of Houston, a Bachelor of Science in Mechanical Engineering from the University of Notre Dame, and has worked with high temperature superconductors since their initial discovery.
>
> Dr. Lee is a member of the Materials Research Society and the American Ceramics Society, and has organized many superconductivity symposia and workshops. He also served as reviewer for U.S. and international grant proposals and for professional journals. Dominic jointly holds ten U.S. patents on high temperature superconductivity, and has published more than 180 review and original articles in the open literature, including two chapters in reference books. His work has received much recognition, which includes an R&D 100 Award, a U.S. DOE Energy 100 Award, a Council for Chemical Research Collaboration Success Award, a Federal Laboratory Consortium Award for Excellence in Technology Transfer, and an ORNL Development Accomplishment Award."

DOE Issues Report on Basic Research Needs for Superconductivity
—Office of Basic Energy Sciences Looks at all Aspects of Technology

The United States Department of Energy's Office of Basic Energy Sciences held a workshop in May 2006 to examine the prospects for superconducting grid technology and its potential for significantly increasing grid capacity, reliability, and efficiency to meet the growing demand for electricity over the next century.



At this workshop, approximately 100 participants from seven countries, nine national labs and 28 universities analyzed the current status of superconductivity, its "grand challenges" for the coming decades, its potential impact on materials science and the electric power grid, and the priority research directions with the greatest promise for revolutionary breakthroughs in the discovery of new superconducting materials with higher transition temperatures, increasing the current carrying ability of known materials, understanding the mechanisms for superconductivity, and the use of these materials for the next-generation electric distribution grid.

The report targets the general audience interested in energy, superconducting science and technology, advanced materials, and the power grid. Its short introductory and concluding sections capture the challenges and opportunities of the field, while the body of the report elaborates these themes in greater detail. A major conclusion of the report is that the rise of nanoscience with its rapid development of new techniques of nanoscale fabrication, characterization, theory and simulation presents an unusual opportunity for advancing superconducting science and technology.

The report of the Department of Energy's Office of Basic Energy Sciences on "Basic Research Needs for Superconductivity" is available at http://www.sc.doe.gov/bes/reports/abstracts.html#SC.

Is Superconductivity Dying?
—Part 1: Researchers Issue Dire Prediction

In mid-September, two German researchers ignited a lively debate among leaders of the international superconductivity community when they posited that high-temperature superconductivity is dying a "slow death" and could be a "dead field" within four years.

In their paper, Andreas Barth from the FIZ Karlsruhe and Werner Marx from the Max Planck Institute for Solid-State Research in Stuttgart reported that the number of papers in the field peaked in about 1990 and has been steady falling since then. By extrapolating the data, the researchers conclude that the numbers will drop to zero at some point between 2010 and 2015, provided that no groundbreaking discoveries are made in the meantime.

The Barth-Marx paper, entitled "Slow death for a hot topic" is described on PhysicsWeb at http://physicsweb.org/articles/news/10/9/8.

Is Superconductivity Dying?
—Part 2: Researchers Revise their Prediction

On 10 October, researchers Werner Marx and Andreas Barth revised their controversial paper on the "slow death of superconductivity," saying that they "stand by their data" but that "some things could perhaps have been better phrased."

In an article entitled "Superconductivity fights back" in the 10 October 2006 online edition of Nature, reporter Katharine Sanderson quotes Marx: "[t]he wording 'extrapolation to zero' was misleading and has been misinterpreted by some people…[w]e intended to say: if the decrease continues as in the past 15 years or so, basic research on cuprates would end around 2010-15." Sanderson adds that both researchers point out that "they are only making an observation about numbers, rather than a prediction about the field," and that Marx notes they are not "prophets" and that "science is no linear process."

From http://www.nature.com/news/2006/061009/full/061009-5.html (subscription required)

Is Superconductivity Dying?
—Part 3: U.S. Superconductivity Peer Review Papers Trending Slightly Upward from 1999 to 2006

Each year, the U.S. Department of Energy's Superconductivity Program holds a Peer Review, which brings together the nation's leaders in the superconductivity field. Each year's Peer Review spotlights the state of the art in superconductivity research and emphasizes quantifiable, real-world results. As described in the August 2006 edition of Superconductivity News Update (http://www.superconductivitynewsupdate.com/newsletters/SNUaug2006.htm#one),

> "[d]uring each year's Superconductivity Peer Review, reviewers score each project, with half the score determined by an assessment of the project's performance versus plans for the year, as well as research integration with other institutions. The other half is determined by productivity — whether world-class results were produced in the past year."

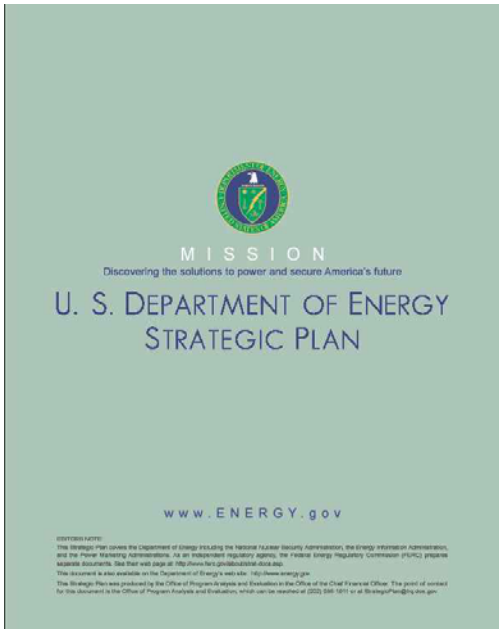
The number of papers presented at each Superconductivity Peer Review since 1999 has been relatively constant:

Year	Number of Papers Presented
1999	25
2000	22
2001	23
2002	27
2003	32

2004	36
2005	30
2006	31

The agenda and presentations from the 2006 Superconductivity Peer Review, held in July, are available at http://www.energetics.com/meetings/supercon06/agenda.html.

New Department of Energy Strategic Plan Addresses Energy Challenges



On 2 October 2006, the U.S. Department of Energy (DOE) announced (http://www.energy.gov/news/4279.htm):

"Secretary of Energy Samuel W. Bodman today released the Department's five-year strategic plan that focuses on the Department's role in powering and securing America's future. The plan addresses overall Department goals for developing and deploying new clean energy technologies, reducing the nation's dependence on foreign energy sources, protecting the country's nuclear weapons stockpile, and ensuring that America remains competitive in the global marketplace."

"The Department of Energy's strategic plan outlines a path forward to enhance our clean energy options and advance national security interests while protecting the health and safety of our workers and the public," Secretary Bodman said. "Building on the Department's rich and diverse history and the President's [Advanced Energy] initiatives, this plan details the steps necessary to keep our commitments, embrace innovation, and work together to ensure safe, secure, and environmentally responsible operations."

The Department of Energy updates its strategic plan in accordance with the Government Performance and Results Act of 1993 (GPRA). To access the Department's 2006 Strategic Plan, go to http://www.energy.gov/about/strategicplan.htm.

In the DOE's strategic plan, superconductivity features prominently in "Strategic Theme 1," entitled "Energy Security." The DOE strategic plan reports on page 8:

> "In the transmission and distribution (T&D) of electricity, the Department is partnering with industry to undertake research in developing cost-effective solutions in the areas of advanced sensors and high temperature superconductors

that will reduce line losses and have the capability to carry more electric current than conventional T&D lines."

American Superconductor Receives Follow-on Order for Windfarm Control Systems

—Windtec for PowerModule(TM) Systems to be Utilized in 450 Chinese Wind Turbines

American Superconductor Corporation announced on 10 October that it has received a follow-on order for 450 PowerModule(TM) PM1000 systems from Windtec Systemtechnik GmbH (Windtec). Windtec, based in Austria, is a developer and licensor of proprietary wind turbine system designs and a developer and supplier of wind turbine electrical systems. Windtec will package the PowerModule systems with other electronic components for one of China's largest domestic wind turbine manufacturers. This new order is a three-fold increase over the previous PowerModule order from Windtec, which was announced in February 2006.

"The global wind energy market has become a significant growth area for AMSC, and we expect this will continue for many years," said Greg Yurek, chief executive officer and founder, American Superconductor. "Windtec is a key channel to the Chinese market for our PowerModule systems. We expect to continue to work closely with them to meet the objective of China and additional fast-growing countries around the world to generate more zero-emission electricity from wind."

—From American Superconductor press release
http://phx.corporate-ir.net/phoenix.zhtml?c=86422&p=irol-newsArticle_Print&ID=913740&highlight=

American Superconductor Wins New HTS Wire Order from Korean Technology Developer

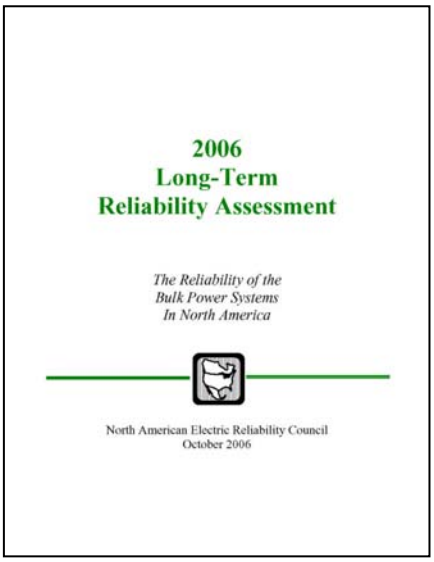
American Superconductor Corporation announced on 3 October that it has received an order for first generation (1G) high temperature superconductor (HTS) wire from the Korea Electrotechnology Research Institute (KERI). KERI, based in Changwon, South Korea, will utilize 22,000 meters of 1G wire to begin a 10-year project focused on developing superconductor magnetic energy storage (SMES) systems. This project is being funded by South Korea's Ministry of Science and Technology.

SMES systems provide backup electric power that is able to respond instantly to power fluctuations on transmission and distribution grids. KERI is developing SMES systems that utilize coils of HTS wire that can store and then release megawatts of power instantly to stabilize voltage in power grids. Until now, commercial SMES systems have only used low temperature superconductors (LTS) that need to operate at extremely low, cryogenic temperatures. SMES systems based on HTS wire are expected to operate at

five to 20 times higher temperatures, which would make them more efficient, rugged and affordable for power grid applications. To learn more about SMES, please see http://www.amsuper.com/products/powerConversion/104214300161.cfm.

—From American Superconductor press release
http://phx.corporate-ir.net/phoenix.zhtml?c=86422&p=irol-newsArticle_Print&ID=911368&highlight=

NERC Issues First Reliability Assessment as the Nation's Electric Reliability Organization



The North American Electric Reliability Council (NERC) was named the nation's Electric Reliability Organization (ERO) this summer, under the provisions of the Energy Policy Act of 2005.

On 16 October, Rick Sergel, NERC's president and CEO, submitted NERC's first reliability assessment to the U.S. government as the nation's official ERO to the U.S. In its 2006 Long-Term Reliability Assessment, Sergel reports that "the adequacy of North America's electricity system will decline unless changes are made soon."

NERC's 2006 Long-Term Reliability Assessment Report (ftp://www.nerc.com/pub/sys/all_updl/docs/pubs/LTRA2006.pdf) analyzes the adequacy of electricity supply and transmission reliability in North America through 2015, and calls for actions to improve bulk power system reliability. These actions include

- Addition of power generation facilities;
- New and upgraded transmission facilities;
- Stronger contracts and other arrangements for the reliable supply and delivery of fuel to power generation facilities;
- More "demand-side" measures such as business and consumer energy-efficiency programs; and
- Addressing aging workforce issues in the electric industry.

ABOUT THIS UPDATE

The High-Temperature Superconductivity News Update is compiled by Bob Lawrence & Associates Inc. on behalf of the superconductivity program and is issued periodically as

events warrant. Current and past issues are available at http://www.superconductivitynewsupdate.com/.

Please let me know if you would like more information or story ideas on any of these news items involving high-temperature superconductivity---a clean and capable new electricity technology for the 21st century. If you have any other comments or questions, please let me know.

Thank you very much.

Craig Cox
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