



July, 2013

*„Superconductor demand has been going-up strongly so that production capacity is the limiting factor now”,  
Traute Lehner, SuperPower Inc.*

## 2013 Progress in Superconductivity— Industry and Utilities are Stepping Up

After years of development, high temperature superconductors (HTS) are arriving at end user markets. 2013 held remarkable progress so far. Here we report on progress beyond rotating machines:

A project planned by the commercial partners RWE and Nexans, is poised to mark another milestone for superconductor power transmission. Under the name AmpaCity the consortium just broke ground for replacing a first 1 km 110 kV high-voltage cable in between of two transformer stations in the city of Essen, Germany, with a three-phase concentric 10 kV HTS cable. Both the old and the new cable transport up to 40 MW. The new cable will need much less space—not only for the cable itself, but also for now obsolete transformer stations. The installation is scheduled to complete still in 2013. RWE anticipates a greatly enhanced security of supply from the superconductor cable and considers retrofitting the whole 110 kV city ring of approximately 30 km length.

According to Nexans, a leading manufacturer of both conventional and superconductive cables, “the project could herald a whole new dimension in the restructuring of inner-city networks”.

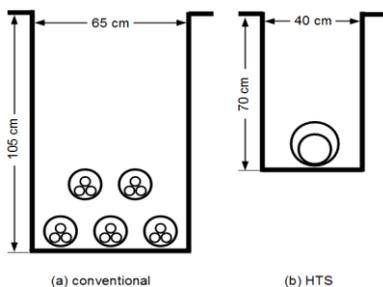
### Facts:

- Superconductors are consistently entering into OEM markets
- Until the end of 2013 a superconducting cable will power the city center of Essen, Germany
- Industrial process heaters using superconductors run since 2008
- Fault current limiters are available commercially and in utility service for some time now.

### Already Commercial: In Use and of Use

A quiet superstar is the Magnetic Billet Heater. This industrial process heating device is renowned for its ability to heat up metal billets rapidly and very homogeneously. The ability to heat precisely to the point is crucial to metallurgical quality and consistency. Next to these advantages comes energy savings of 50% relative to any arrived electric heating system. This specialty application of superconductivity is spearheaded by mid-sized machine company Bültmann that obtained technology elements created by the ECO 5 Team. Magnetic heaters run in the light and heavy metals industry since 2008 and have processed millions of metal slabs up to a ton each in factory environments that have heat, dust, and vibration.

Modern fault current limiters also rely on variable reactance superconductivity. They can be used to protect grid assets like transformer and switchgear and they can overcome the fault current bottlenecks when it comes to integrating distributed generation—like powerful wind turbines integrated to weak rural grids. Such fault current limiters are offered by aforementioned Nexans and by the British mid-sized firm Applied Superconductor. In this case the magnet technology here was also developed by the ECO 5 Team. Just to name a few electric utilities, superconductive fault current limiters have been tested and operated by Southern California Edison, Northern Powergrid, Scottish Power, Electricity North West, RWE, and Vattenfall.



According to RWE and Nexans, HTS makes cable installation more practical.

## Why ECO 5?

---

*„ The ECO 5 Team has leading expertise in integrating simple to use superconductive systems. We design functional, not fancy.”*

---

The ECO 5 Team has a strong strategic and operational heritage; our engineers worked extensively for operating companies and understand the priorities that clients have in the development and delivery of projects.

Within one compact organization, we have an unrivalled range and depth of knowledge and expertise of all aspects that are vital in delivering a sound project.

For further information please contact:

Dr. Carsten Bühler

ECO 5 GmbH

Bornheimerstraße 33b, Innenhof

53111 Bonn, Germany

Tel: +49 228 62961770

Fax: +49 228 62961774

E-Mail: [carsten.buehrer@eco-5.de](mailto:carsten.buehrer@eco-5.de)

<http://www.eco-5.de>

### **ECO 5 Team: Engineering Services for Highly Efficient Power Systems**

- Rotating Machines
- Coils and Magnets
- Inductive Heating Systems
- Cryo Technology
- Materials Science
- Grid Expansion and Protection.

As an engineering provider, the ECO 5 Team is specialized in the development of high-efficiency power systems. Our focus is on renewable energy generators for wind, hydro, and wave power. Beyond these fields, core competencies lie also in fault protection of high-voltage grids and inductive metal heating. In these areas we contribute highly specialized know-how in the application of industrial-grade superconductors as well as in more conventional copper and permanent magnet solutions. Strategic and marketing competencies complement the technical expertise.

We manage customer projects from strategic line up, feasibility analysis up to prototyping. In technical expertise and tools we cover materials science aspects, multiphysics FEA, and 3D CAD. Supporting these activities, we offer our competence in the areas of cryo technology, plant and process safety, and the analysis of IP rights pertaining to a technological development.

## Disclaimer and Copyright

While we make every effort to keep the information on our Fact Sheets current, we accept no liability whatsoever for the content provided. The content and works provided herein are governed by the copyright laws of Germany. Duplication, processing, distribution, or any form of commercialization of such material beyond the scope of the copyright law shall require the prior written consent of its respective author or creator.