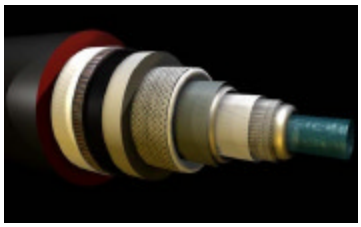
Press Release

28 May 2001

Today, for the first time in the world a superconducting cable enters service in a public electricity supply grid.

Energy savings, increased grid capacity and cheaper electricity for consumers are in prospect as a result of new technology that is about to undergo full-scale testing in Copenhagen.

From 11.45 today, for the first time anywhere in the world, superconducting cables will be used to supply electricity to consumers. Some 150,000 residents in the Amager district of Copenhagen will in future have their electricity supplied by this new technology.



Until now, superconducting cables have only been tested - by laboratories and by the organisations across the world that have been competing for more than a decade to develop the technology for practical application.

"We have focused on placing ourselves among the five technologically leading manufacturers of supercables. Not specifically on being first past the post", says Dag Willén, Project Manager of NKT Research.

And indeed, for a long time it looked as though first place would go to a project in Detroit. But in the end Danish technology proved quickest to overcome the legion of theoretical and practical challenges posed by supercable development.

5-7% energy saving

Discovered as far back as 1911, the phenomenon of superconductivity occurs at extremely cold temperatures and causes almost all electrical resistance - and thus also energy loss - to disappear. However, within the last 15 years new materials have been discovered that only require cooling with liquid nitrogen (minus 196° Celsius). The Danish technology group NKT has been involved in the research race since the end of the 1980s.

With widespread use of superconducting technology in grid 'highways' energy consumption can be reduced by 5-7%, which means an equivalent reduction in CO_2 emissions from electricity generation.

But supercables can also become part of a simplification of the electrical infrastructure. This is because they can transmit massive currents, something which can further be utilised to reduce the number of voltage levels (fewer transformer substations). At the end of the day this will enable cheaper electricity for consumers.

Three 30 metre supercooled cables

Copenhagen's new supercable is only 30 metres long, but that is ample for practical full-scale testing in the public supply grid. The cable is installed at 'Amager Substation', a central hub in the Danish capital's energy supply system.

The supercable is capable of supplying electricity to the whole of Amager district and will be tested under all operating conditions. No operating experience exists elsewhere of

supercables installed in a public supply grid, and in particular the use of extremely cold liquid nitrogen to cool the cable is a totally new element in electricity supply.

The new cable has three phases, ie. it consists of three separate superconducting cables each 30 metres long spliced into the grid where the voltage is 30 kV. The supercable has a 2000 Amp current rating.

The future electrical infrastructure

The increased energy consumption expected in the future would demand expansion of the power network and in many cases – especially in the industrialised part of the world – also investments in replacement of existing networks. As technology evolves high capacity supercables at still more competitive prices will gradually play a more important role in the future infrastructure.

City of Copenhagen's Environmental Mayor Bo Asmus Kjeldgaard stresses the importance of Copenhagen pressing ahead with development of new environment-friendly technology: "All new technology is expensive at first. Like solar cells in the past, superconducting material is currently very expensive. That means it will have to come down in price to compete with conventional technology. But I am certain that if this project produces the right results, we will see the superconducting material used not only in cables but also, for instance, in coils and transformers."

The supercable project

The actual power transmission in supercables takes place through superconducting tapes. These tapes are the key component of the cable, and the NKT subsidiary company NST (Nordic Superconductor Technologies) is among the world's three or four leading manufacturers of these products. The tapes are used in a large number of electrical applications, such as engines, generators, current leads and MRI scanners.

The high tech superconducting cable was fabricated by NKT's cable company NKT Cables, and will now undergo full-scale testing by Copenhagen Energy.

Superconducting tapes are slender and fragile but can carry massive currents.

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