



REVOLUTIONIZING THE WAY THE WORLD USES ELECTRICITY®

Secure Super Grids™ Systems

- **Solutions for Smart Grids in cities and metropolitan areas**
- **New proprietary power grid technology utilizes AMSC's 344 superconductors**
- **Able to conduct more than 10 times the power of copper cables of the same size**
- **Automatically and instantaneously suppresses fault currents in power grids**
- **Reduces electrical equipment damage and associated costs for utilities**

The unique power grid technology from American Superconductor (AMSC) enhances the reliability and security of electric power infrastructures in urban and metropolitan areas by integrating a proprietary surge-suppressing capability and high capacity high temperature superconductor (HTS) power cables. This combination of increased current carrying capability and surge suppression allows utilities to interconnect their electrical grid systems without increasing the fault current levels, creating a Secure Super Grids™ system.



Cable example that utilizes surge suppressing superconductor technology from AMSC

Load growth on power grids in densely populated areas requires utilities to increase the capacity of their systems by adding substations, networking their distribution systems, replacing overloaded transformers, constructing new overhead or underground transmission lines, bringing new generation on line or otherwise improving the power system. These improvements can result in a corresponding increase in fault current. Increasing fault current levels can reach a point where they will exceed the ratings of circuit breakers or switches. In extreme cases, the fault current can damage or destroy expensive utility infrastructure, including bus bars, capacitor switches and in-rush reactors and distribution-level transformers. The cost and disruption that results from replacing this equipment can be enormous.

Under different conditions, a utility can increase the reliability of its distribution system by interconnecting multiple, previously isolated systems to create a more tightly meshed network. By more closely interconnecting the systems, the impact of losing one or more components due to age, severe weather, motor accidents or willful destruction is minimized. However, further interconnection inherently results in increased fault currents and may require the replacement of fault current sensitive equipment, making the reliability improvement financially painful.

The strategic installation of AMSC's Secure Super Grids technology, that includes high capacity HTS cables with ancillary controls and components provides a simple way to increase power flows, suppress fault currents and increase grid efficiency. Secure Super Grids technology incorporated as part of a system upgrade or distribution networking project allows utilities to significantly increase load-serving capacity and reliability with a minimal increase in fault current.

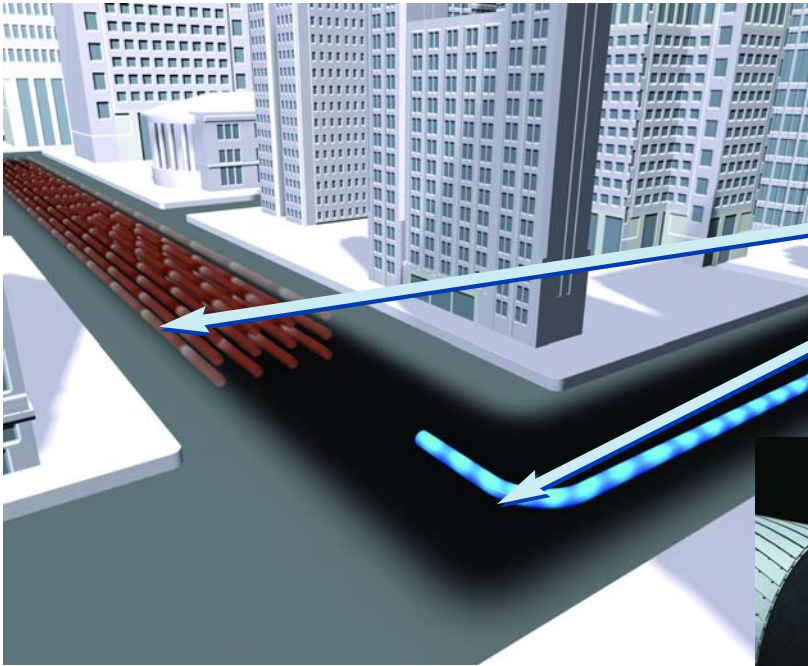
Secure Super Grids systems leverage the inherent current limiting characteristics of superconducting materials to instantaneously suppress spikes in current, preventing damage to fault current sensitive equipment while keeping electric power flowing to customers

Return on Investment for Utilities

AMSC's Secure Super Grids systems reduce the capital costs of new substation equipment and, in some cases, eliminate entire substations by interconnecting new and existing distribution and transmission capacity. In addition, the compact size of HTS cables allows utilities to utilize existing underground cable duct spaces and corridors to minimize new property procurement and construction costs.

Return on Investment for Consumers

The economic impact of blackouts can be devastating. AMSC's Secure Super Grids technology is able to maximize power availability to meet growing demand and keep centers of commerce on line.



How it Works

To see high capacity Secure Super Grids technology in action, please go to www.amsc.com/products/hydra.html

Multiple Traditional Copper Power Cables...

...Replaced by One Power Equivalent HTS Cable

The Compelling Benefits of AMSC's Secure Super Grids Technology

Because of the ability of superconductor wire to carry more than 150 times the electrical current of copper wires of the same size, HTS power cables are able to transmit many times more power than copper cables of the same diameter. Power cables under the streets of our cities today are made from copper wires. Typically, these systems are contained within conduits or tunnels but need to be spread out due to the heat created by electrical resistance. This consumes a substantial amount of underground "real estate" that is needed for power, gas, water, sewer and telecommunications networks. Power cables using AMSC's surge suppressing superconductor technology have a significant additional advantage — the ability to instantaneously suppress power surges, or "fault currents," which are caused by short circuits that result from events such as lightning strikes.



To View Animations of AMSC's Secure Super Grids Technology

Please visit www.amsc.com/products/hydra.html

To set up a meeting with AMSC's Network Analysis Team and learn how Secure Super Grids technology can increase the security and efficiency of your power network, please contact htscable@amsc.com.



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