New Tools to Break the Gridlock:

Advanced Materials and Grid Technologies to Maximize Use of Existing Rights-of-Way

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John B. Howe, VP Electric Industry Affairs

American Superconductor

Presentation Overview

- Introduction of AMSC
- Physical factors limiting power grid capacity
- Overview of grid technologies employing advanced power electronics and high temperature superconductors
- Application case studies: examples of problems, solutions and realized benefits
- Future grid technology developments in the pipeline based on continuing advances in superconductivity

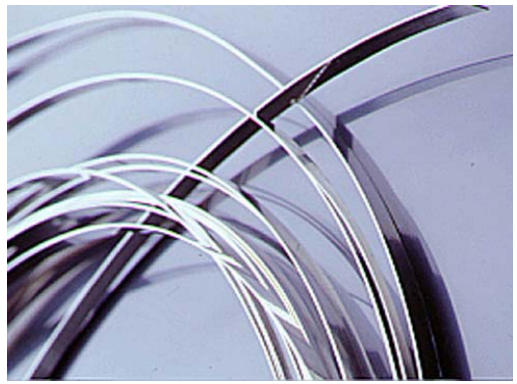
American Superconductor Corporation (AMSC): Company Overview

Market/Ticker:	NASDAQ/AMSC
Founded:	1987
Headquarters:	Westborough, MA
Other Locations:	Devens, MA
	Middleton, WI
	New Berlin, WI
Employees:	263
Patents owned/licensed:	700+

Products for electric power, transportation, industrial, medical and defense markets

AMSC's Two Core Products

- High Temperature Superconductor (HTS) Wires



HTS Wires

- Solid-state Power Electronic Converters (PowerModule™)

Power Electronic Converters

Revolutionary increases in cost effectiveness, power density and efficiency

Physical Factors Limit the Delivery Capacity of Today's Electric Power Grids

- *Voltage (Stability) Ratings*
  - Higher loading, combined with changing load composition (e.g., increased use of air conditioning), has raised the risk of "fast collapse" post-contingency (e.g.,line outage, plant trip)
  - Prudent operating practice requires that many lines be operated well below thermal limits – but at significant cost
- *Ampacity (Thermal) Ratings*
  - Conventional conductors have limits based on inherent physical properties of materials
  - Overload leads to line sag / degradation / failure
- *Controllability*
  - Conventional AC power systems are free-flowing
  - DC lines require expensive conversion equipment

AMSC's Advanced Grid Solutions: Boosting Capacity With Minimal Siting Impact

- D-VAR®
  - Patented statcom technology
  - Proven & commercial -- ±40 systems installed worldwide
- SuperVAR®
  - World's first HTS wire-based equipment installed on the grid
  - Prototype undergoing acceptance testing on TVA grid
- VLI Superconductor Cable
  - Long Island Power Authority 138kV demonstration project to be commissioned in 2006
  - Commercially available by end of decade
- Future HTS applications
  - Fault Current Limiters, Transformers
  - Other applications beyond electric power

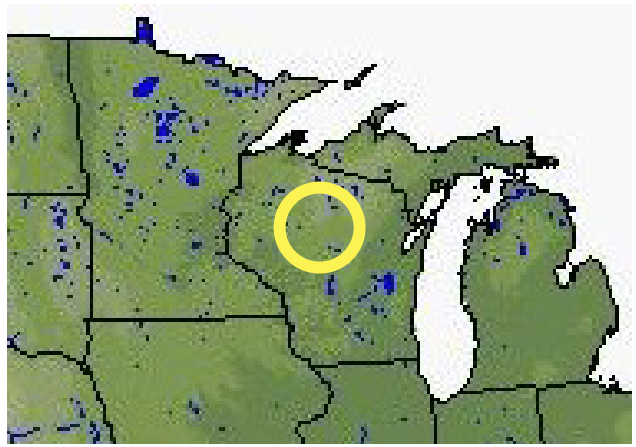
New materials enable new solutions to meet today's customer requirements

AMSC's D-VAR (Dynamic Volt-Ampere Reactive): Product Overview

- High power inverters (STATCOM) providing 10s to 100s of MVARs
- Lowest cost, quickest installation – no environmental permits required
- Easily located inside existing distribution substations
- No need for operator control -- 24x7 remote monitoring by AMSC
- Highly reliable, proven track record -- >99.6% fleet availability (2002-05)
- "Just-in-time grid capacity" enables a wide range of applications

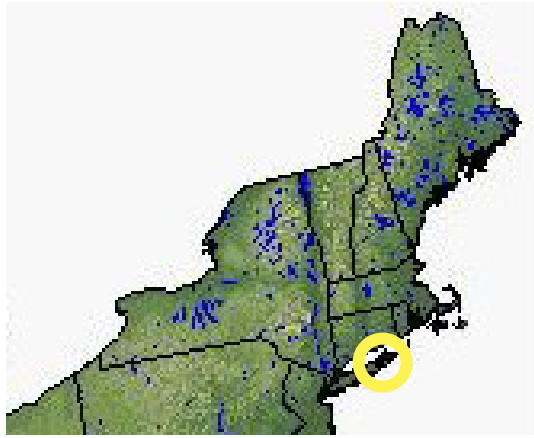
Using D-VAR to Assure Reliability Pending Completion of a Major Grid Upgrade

- Customer: Wisconsin Public Service, 2000 (Subsequently American Transmission Company)
- Problem: Slow post-contingency voltage recovery in remote area of grid (Wisconsin's "Northern Loop") already targeted for reinforcement by major new line
- Solution: Six D-VAR systems installed at distributed locations throughout affected area
- Result: Thousands of discharges; 15-20% increase in local grid capacity has helped to keep system reliable in the face of rapid load growth, six-year delay in completion of 345 kV regional grid upgrade



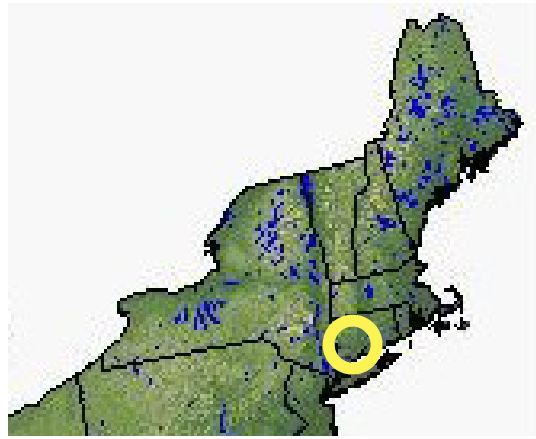
Using D-VAR to Reduce Reliance on Costly Reliability-Must-Run ("RMR") Generation

- Customer: Long Island Power Authority, 2003
- Problem: Growing dependence on shunt capacitors and high-emission RMR generation raises cost of operation and risk of voltage collapse
- Solution: One D-VAR system and switched cap banks installed at voltage-limited east end of radial system
- Result: Voltage stability enhanced; RMR generation reduced by several hundred hours per year (yielding valuable emission credits)



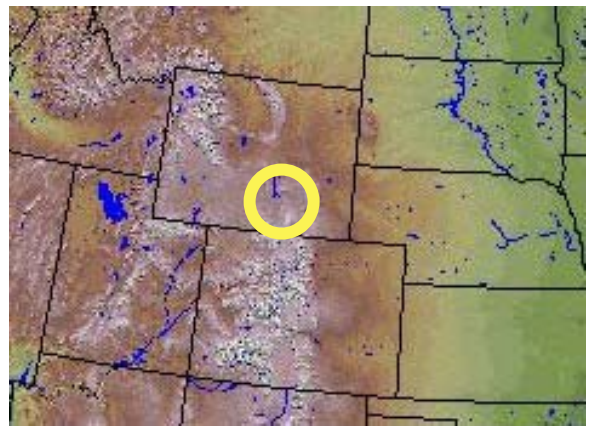
Using D-VAR to Increase Transfer Capability Into a High-Cost, Congested Load Pocket

- Customer: Northeast Utilities / CL&P, 2003
- Problem: Rapid load growth, generator retirements and lack of HV reinforcement cause costly voltage constraints within densely-settled SWCT load pocket
- Solution: Three D-VAR systems and switched cap banks (offering dynamic range from -50 to +130 MVAR) installed at two substations
- Result: ISO-NE raises transfer limits into SWCT over existing 115kV lines by 100 MW (±5%), yielding savings to CT customers of $10Ms per year



Using D-VAR to Provide Stable Interconnection For Large-Scale Wind Farm in Remote Area

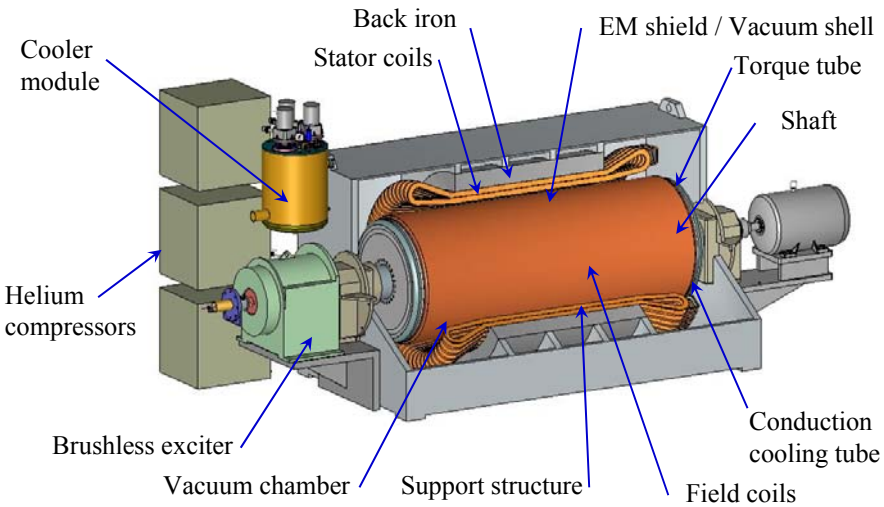
- Customer: Pacificorp, 2002
- Problem: Construction of large (135 MW, 170 turbine) wind farm in remote area drives need for local grid reinforcement to prevent costly, disruptive drop-outs
- Solution: One D-VAR system and switched cap banks installed at wind farm site
- Result: D-VAR system provides smooth and continuous compensation to assure reliable interconnection (note: D-VARs are now employed at ten wind sites in U.S., Canada, U.K.)



Using D-VAR to Provide Targeted VAR Support For a Large Industrial Customer in a Remote Area

- Customer: BC Hydro, 2002
- Problem: Large lumber mill customer in sparsely-settled, remote community imposes huge VAR demand on radial system
- Solution: One D-VAR system placed on BC radial line
- Result: Needs of all customers are met, effectively and cost-effectively, without the need for costly long-line reinforcement

SuperVAR® Dynamic Synchronous Condenser: Product Overview



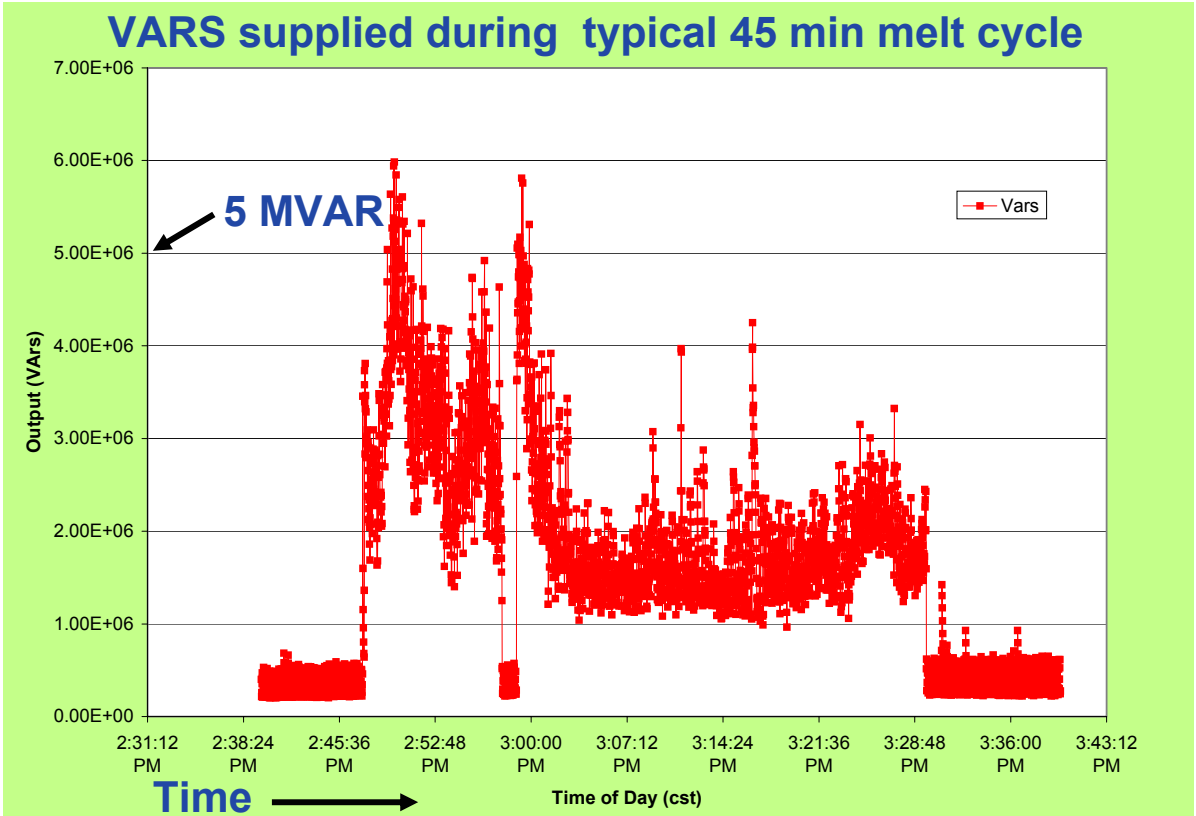
SuperVAR – *rotating machines platform*

- World's first commercial product based on HTS technology
- TVA: launch customer; ordered first five production units
- Successfully tested on the Ohio power grid
- Advanced prototype to TVA, delivered in August 2004, is now undergoing final grid testing

Commercial introduction expected in 2006

Dynamic Synchronous Condenser - Operation on TVA Grid to Mitigate Flicker

- Machine installed on TVA grid in Gallatin, TN
- Synchronized 10/10/04
- ±8 MVAR capability verified
- Machine reacts quasi-instantaneously to transients due to arc furnace operations

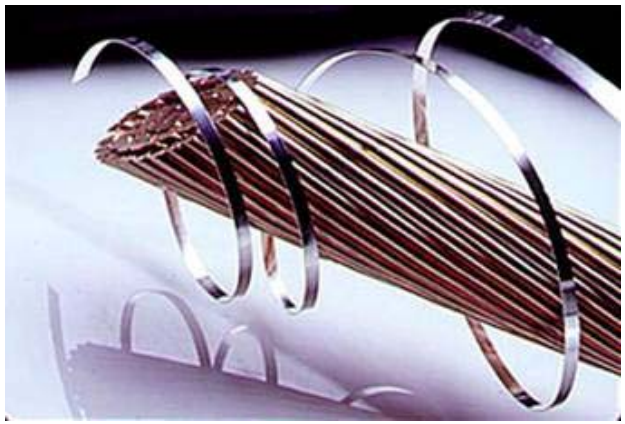


Courtesy of TVA

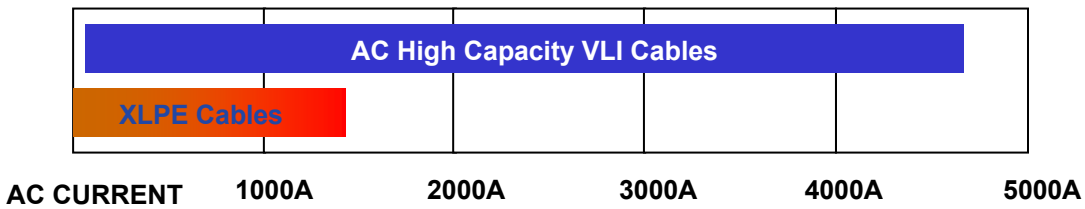
SuperVAR® machine successfully supporting arc furnace, reducing grid disturbance

American Superconductor

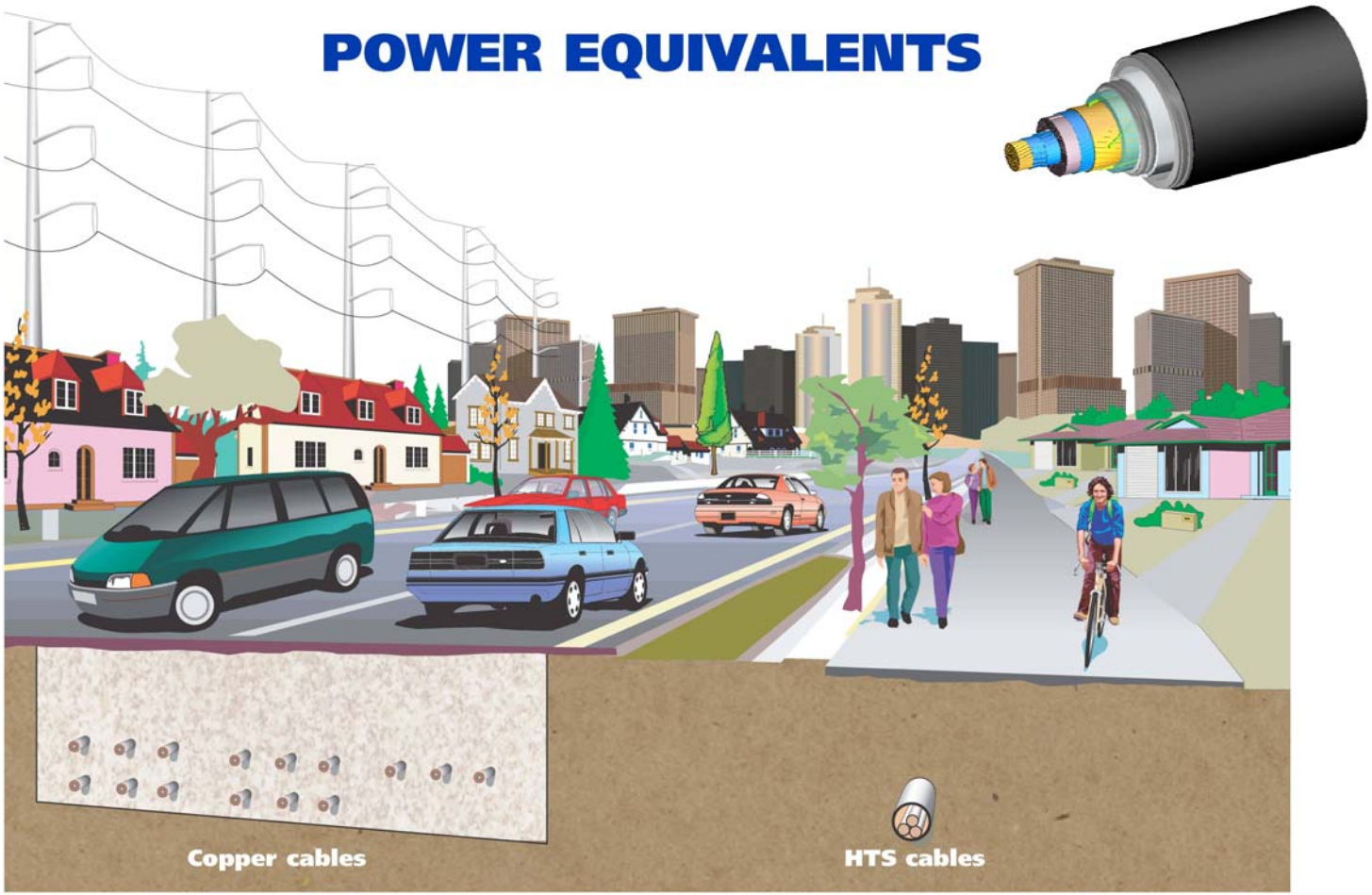
VLI (Very Low Impedance) Superconductor Cable: Product Overview



- Power Carrying Capabilities 3x to 10x Greater than Copper Cables
- HTS Wire Enables a Core Geometry that Provides:
  - Low Conductor Resistance
  - Low Inductance
- Environmental Compatibility
  - Underground Placement
  - No Electromagnetic Field
  - Thermally Independent of Environment
  - Nitrogen Cooling Fluid (Inert) – No Oil



HTS Cable Offers a High-Performance Solution for Power-Dense, Costly Urban Areas

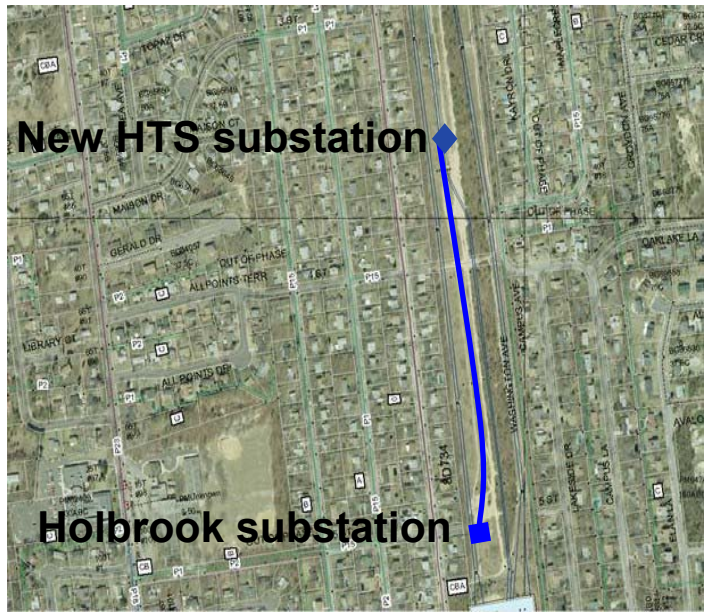


Minimal footprint of HTS cable greatly expands the range of available rights-of-way

USDOE Superconductivity Partnership Initiative: Long Island Power Authority Cable Project

- Electrical Characteristics
  - Design Voltage/Current – 138kV/2400A ~ 574MVA
  - Design Fault Current – 69,000A @ 12 line cycles (200ms)
- Physical Characteristics
  - Length ~ 600m (~155km HTS conductor)
  - Cold Dielectric Coaxial Design
- Hardware Deliverables
  - Three ~600 m Long Phase Conductors
  - Six 161kV Outdoor Terminations
  - One 161kV Splice (Laboratory Test)

    (No splices for grid installation required)
  - One Refrigeration System + Laboratory Pulse Tube System



LIPA Holbrook Substation
Brookhaven, Long Island

Fall 2006: World's First Installation of a Transmission Voltage HTS Cable

Nexans | LIPA Long Island Power Authority | Department of Energy, United States of America | AIR LIQUIDE | American Superconductor™

HTS Cable Demonstrations Underway Worldwide

2004: Yunnan, China (InnoPower)

2004: Chubu Electric (Furukawa)

2004: Korea (LG Cable)

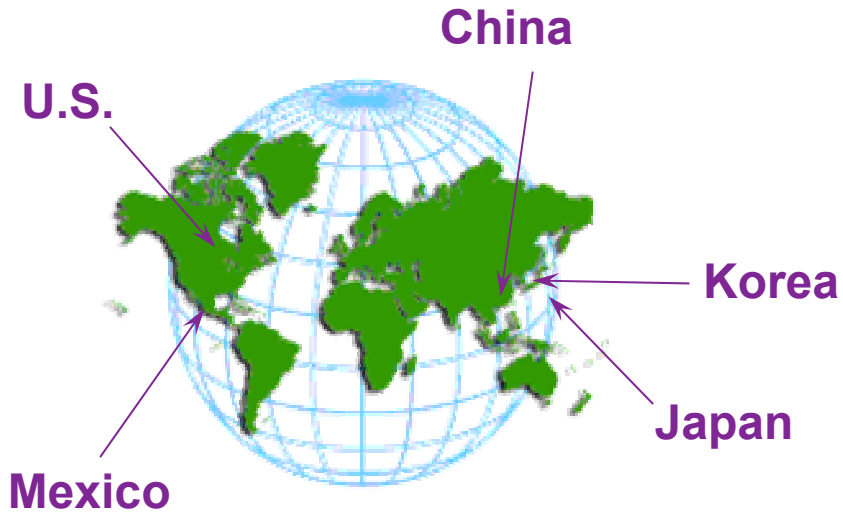
2005: Lanzhou, China (Chang Tong)

2005: Mexico City (Condumex)

2005: Niagara Mohawk
(Sumitomo Electric)

2006: Keyspan / LIPA (Nexans)

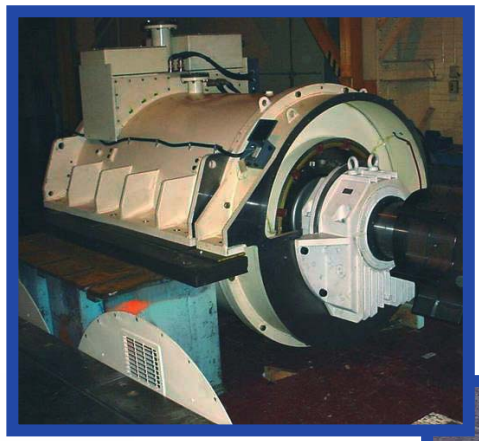
2006: American Electric Power (Ultera)



All projects are using 1G wire – AMSC is the dominant HTS wire supplier

HTS Wire:
Building Block for a New Industry

Power Cables



Motors,
Generators

Synchronous Condensers

Fault Current Limiters

Maglev

HTS wire enables a wide array of efficient, compact, easily sited equipment

American Superconductor™

Thank You!
Questions?

jhowe@amsuper.com
www.amsuper.com