



10MW Class Direct Drive HTS Wind Turbine

**Cooperative Research and Development
Final Report**

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Cooperative Research and Development Final Report

In accordance with Requirements set forth in Article XI.A(3) of the CRADA document, this document is the final CRADA report, including a list of Subject Inventions, to be forwarded to the Office of Science and Technical Information as part of the commitment to the public to demonstrate results of federally funded research.

CRADA number: 08-00312

CRADA Title: 10MW Class Direct Drive HTS Wind Turbine

Parties to the Agreement: American Superconductor

Joint Work Statement Funding Table showing DOE commitment:

Estimated Costs	NREL Shared Resources
Year 1	\$200,000
Year 2	\$00.00
Year 3	\$00.00
TOTALS	\$200,000

Abstract of CRADA work:

This paper summarizes the work completed under the CRADA between NREL and American Superconductor (AMSC). The CRADA combined NREL and AMSC resources to benchmark high temperature superconducting direct drive (HTSDD) generator technology by integrating the technologies into a conceptual wind turbine design, and comparing the design to geared drive and permanent magnet direct drive (PMDD) wind turbine configurations. Analysis was accomplished by upgrading the NREL Wind Turbine Design Cost and Scaling Model to represent geared and PMDD turbines at machine ratings up to 10 MW and then comparing cost and mass figures of AMSC's HTSDD wind turbine designs to theoretical geared and PMDD turbine designs at 3.1, 6, and 10 MW sizes.

Summary of Research Results:

Based on the cost and performance data supplied by AMSC, HTSDD technology has good potential to compete successfully as an alternative technology to PMDD and geared technology turbines in the multi megawatt classes. In addition, data suggests the economics of HTSDD turbines improve with increasing size, although several uncertainties remain for all machines in the 6 to 10 MW class.

Subject Inventions listing: None

Report Date: 1/27/2011 Responsible Technical Contact at Alliance/NREL: Walter Musial

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