



**NSF GRID MODERNIZATION
ENGINE IN THE CAROLINAS**

ACCELERATING GRID TECHNOLOGIES. SECURING AMERICA'S ENERGY FUTURE.

Led by University of North Carolina at Charlotte with partners across North and South Carolina, **the NSF Grid Modernization Engine in the Carolinas is a two-state innovation ecosystem to modernize America's electric grid** – tackling urgent national security risks, driving economic growth and creating a skilled workforce.

STRATEGIC PILLARS

USE-INSPIRED RESEARCH & DEVELOPMENT

Rapidly advancing technologies to protect U.S. energy security

FASTER DEPLOYMENT

Cutting deployment timelines using world-class testbeds at UNC Charlotte, Clemson University, Duke Energy and the Electric Power Research Institute

BREAKING BOUNDARIES

Organizing the region's stakeholders to address the adoption barriers to innovative grid technology

CUTTING-EDGE SOLUTIONS

Accelerating grid-enhancing technologies, distributed energy resources integration, microgrids development, high-voltage, direct current transmission, grid-edge automation, and nuclear construction

RESILIENT INFRASTRUCTURE

Strengthening cybersecurity protections while reducing reliance on foreign suppliers

TRANSLATION OF INNOVATION TO PRACTICE

Moving solutions from the lab to the marketplace

INDUSTRY PARTNERS ALREADY INVESTED

Duke Energy (\$20M), Dominion Energy (\$10M), Siemens (\$150M transformer facility), eVAC Magnetics (\$500M rare-earth facility)

ONSHORING CRITICAL SUPPLY CHAIN

Siemens' new facility will produce 81 large power transformers annually and create 1,700+ jobs; eVAC Magnetics will build the first U.S.-based rare-earth magnet facility, reducing reliance on China

ECONOMIC ENGINE

Projecting more than \$2 billion worth of economic impact in the Carolinas while fueling participation in a \$4 trillion global energy market

STRATEGIC ADVANTAGE

The Charlotte-Columbia-Greenville-Charleston corridor offers world-class logistics, a major port and one of the world's busiest international airports

WORKFORCE DEVELOPMENT

Building the skilled energy workforce America needs

TRAINING PIPELINE

STEM pathways from K-12 to apprenticeships, community and technical college programs and university research opportunities

TARGETED MOBILITY

Upskilling in counties with the lowest economic mobility ensures rural communities directly benefit

WORKFORCE TRANSITION

Automotive manufacturing workforce shifting into grid technologies

JOB CREATION

Projected to create and retain over 20,000 jobs across the Carolinas in high growth energy sectors

CRITICAL FOR DEFENSE

Supporting the secure, reliable energy infrastructure needed for U.S. military bases, hospitals and emergency services

THIS WILL CHANGE ENERGY IN THE UNITED STATES.

The **Carolinas Grid Engine** directly supports securing U.S. energy independence, protecting national defense and critical infrastructure, driving job creation and economic mobility, and delivering a replicable national model for grid modernization.

THE NATIONAL CHALLENGE

EXPLODING DEMAND

Manufacturing facilities and data centers are driving electricity demand at the fastest pace seen in decades

FRAGILE INFRASTRUCTURE

U.S. transformers average 40 years old, with deployment timelines of 15+ years

DANGEROUS RELIANCE ON CHINA

10% of critical U.S. transformers imported from China in the last decade; 69% of rare-earth production controlled by China

NATIONAL SECURITY AT RISK

Grid cyberattacks surged 70% in 2024, averaging 1,162 per week

THE CAROLINAS ADVANTAGE

RESEARCH LEADERSHIP

UNC Charlotte's Energy Production and Infrastructure Center (EPIC), Clemson's Duke Energy eGRID, Clemson's EDGE mobile grid emulators, EPRI and Duke Energy's Smart Grid Lab anchor innovation in the region

INDUSTRIAL STRENGTH

North Carolina has the Southeast's largest manufacturing workforce, while South Carolina ranks among the nation's leaders in foreign direct investment, particularly in manufacturing jobs

PRO-BUSINESS CLIMATE

Both states consistently rank top 5 nationally for business and manufacturing competitiveness



INVESTMENT TODAY ENSURES AMERICA'S ENERGY SECURITY TOMORROW.

**LET'S
CONNECT**

Contact us if you are interested in learning more about how to engage with the NSF Grid Modernization Engine in the Carolinas.

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