
CLEANcarolinas
The Future of Clean Energy Innovation
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DEVELOPMENT AWARD
cleancarolinas.io

“Clean energy is here because the private sector economy believes that is where the world is headed, and that is where their customers want to be in the coming years.”

Chris Chung, CEO of the NC EDP, NC Clean Energy Champions Awards Luncheon

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“No reason we should not grab our unfair share of these jobs and investment for the people of North Carolina.”

Chris Chung, CEO of the NC EDP, NC Clean Energy Champions Awards Luncheon

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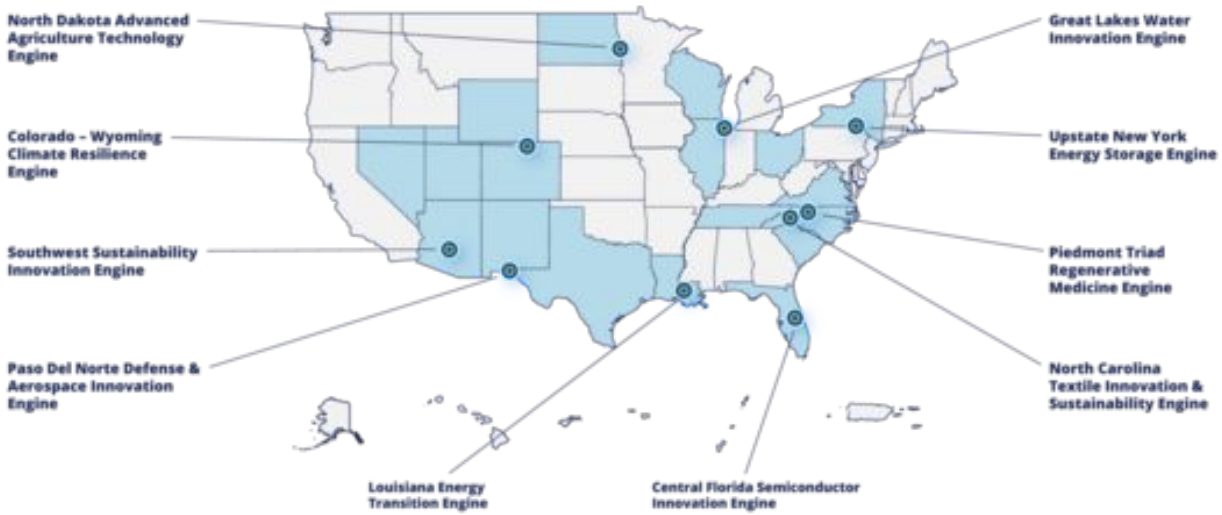
But how? NSF Engines Program



Type 2 Engine Awards – (10)

Type 1 Developmental Awards – (44)

- NSF Directorate of Technology, Innovation, and Partnerships (TIP)
- Regional Innovation Engines program: Authorized in "CHIPS and Science Act of 2022"
- Type 1 Developmental Awards ($1M for 2 years)
- Type 2 Innovation Engine Awards (up to $160M over 10 years)

CLEANcarolinas Type 1 Partners

Contracted Partners

Letter of Collaboration Partners

- SC Dept of Commerce
- Siemens Energy
- Dominion Energy
- Santee Cooper
- Duke Energy
- SC Tech. College System
- SC Ports Authority
- Coastal Carolina University
- SC Office of Resilience
- SC Energy Office
- SC State University
- NC A&T University
- CORE SC

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Louisiana Energy Transition Engine (Louisiana), led by Louisiana State University, aims to enable a clean energy transition for the state by advancing research and commercialization efforts in the areas of carbon capture, the use of hydrogen as an alternative fuel, carbon dioxide as a feedstock, and sustainable water and sustainable manufacturing for clean energy to promote pathways to decarbonization across the state of Louisiana.

Lead organization: Louisiana State University.

Region of service: Louisiana (entire state).

Competitive advantage: Louisiana is currently the global leader in carbon dioxide emissions per capita due to the strong presence of the hydrocarbon industry in the state, emitting 50 tons of CO_2 per year per capita. Because of this challenge, researchers, industry partners and public sector partners in the state are driving some of the most transformative efforts to enable a clean energy transition for the state as the nation and world work to meet aggressive goals to decarbonize. This NSF Engine has identified critical research and development topic areas that must be advanced to drive clean energy innovations and get closer to a net-zero carbon future. It will pursue those goals while cultivating an innovation ecosystem of tech companies that support the nation's transition to clean energy, while also driving economic growth through job creation and training opportunities in the clean energy sector.

NSF award: NSF-2315727

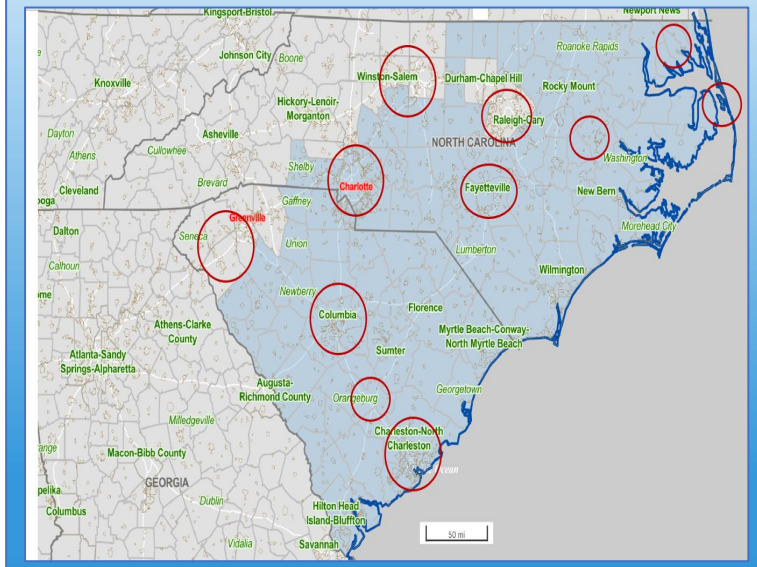
Key technology areas
Advanced energy and industrial efficiency technologies, advanced materials, artificial intelligence, disaster prevention and mitigation, robotics and advanced manufacturing.

CLEANcarolinas Regional Innovation Engine (North & South Carolina), will support the development of the clean energy resource basin of both states by advancing research and commercialization in the areas of advanced manufacturing for a clean energy supply chain, modeling and simulation to support grid modernization, power semiconductor technologies needed to interconnect ocean energy to the grid, and inclusive education and training to improve upward social mobility.

Lead organization: University of North Carolina Charlotte

Region of service: Counties in North and South Carolina comprising the Charlotte MSA eastward to the coast, including innovation clusters in both states.

Competitive Advantage: North and South Carolina combined are a vast clean energy resource basin, including developed resources such as hydro and nuclear, maturing resources such as solar, onshore wind, and bioenergy, and yet to be tapped resources such as offshore wind and marine energy. The economies of both states have been growing among the fastest in the country due to an increasing population and direct investments in advanced manufacturing of aircraft, automobiles, and energy storage facilitated by being top-ranked for business. However, this story of economic success has challenges: (1) new and existing manufacturers and their customers have economic sustainability goals that demand access to clean energy; (2) the transition to electric transportation may not maintain the current automotive manufacturing base; and (3) under participation in the economic benefits of the growth in too many historically disadvantaged communities. This NSF Engine has identified critical research and development in digital engineering topic areas that must be advanced to drive clean energy innovations and achieve the net-zero carbon emission goals for the electric utilities in the state. CLEANcarolinas will pursue an innovation-district strategy in the Charlotte Metropolitan Statistical Area to support the development of a supply chain for offshore wind throughout the Carolinas, which has more total development potential than any other region on the Atlantic Seaboard. CLEANcarolinas will promote training and education in the Eastern third of both states to allow under-resourced communities to compete for jobs in construction, operation, and maintenance that will be plentiful in the coastal regions. CLEANcarolinas will invest in the digital workforce needed by the innovation district to attract innovative existing companies and spawn successful startup companies.



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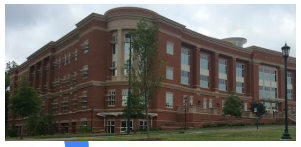
CLEANcarolinas is a Two-State Engine

Innovation District for Digital Engineering

- Public/Private Development in Charlotte Metro Area

E4 CAROLINAS



UNC Charlotte

- Duke Energy Smart Grid Lab
- High Bay Structures Lab
- Siemens Large Manufacturing Lab
- ROI Cyber Test Beds
- Urban Institute
- CAPER

NC State University

- FREEDM Center
- NC Clean Tech Center
- CAPER

\+ NORTH CAROLINA DEPARTMENT of COMMERCE

- NCTOWERS
- NC Board of ST&I
- NC Marine Industrial Park Authority

Coastal Studies Institute

- Jeanette's Pier

CAPER
Center for Advanced Power Engineering Research

- Duke Energy
- Dominion Energy

ECSU ELIZABETH CITY STATE UNIVERSITY FOUNDED 1891

ECU

Original Equipment Manufacturers

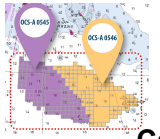
Siemens Energy
- Digital Advanced Manufacturing

Carteret Community College

- Clean Energy Skilled Workforce
- NCTOWERS

FAYETTEVILLE STATE UNIVERSITY

SC STATE UNIVERSITY 1896



\+ South Carolina Department of Commerce

SC Research Authority

- Commercialization
- Industry Engagement

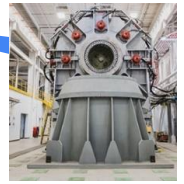
- SC NEXUS Tech Hub
- PowerSC

Carolina Long Bay Offshore Wind Development

- Duke Energy
- TotalEnergies Renewables

Trident Technical College

- Clean Energy Skilled Workforce



Clemson Charleston

- Dominion Energy Innovation Center
- Duke Energy eGRID
- CAPER

Eastern Counties know they are part of the Clean Energy Resource Basin…

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And they want more than tax revenue and rent on the land.

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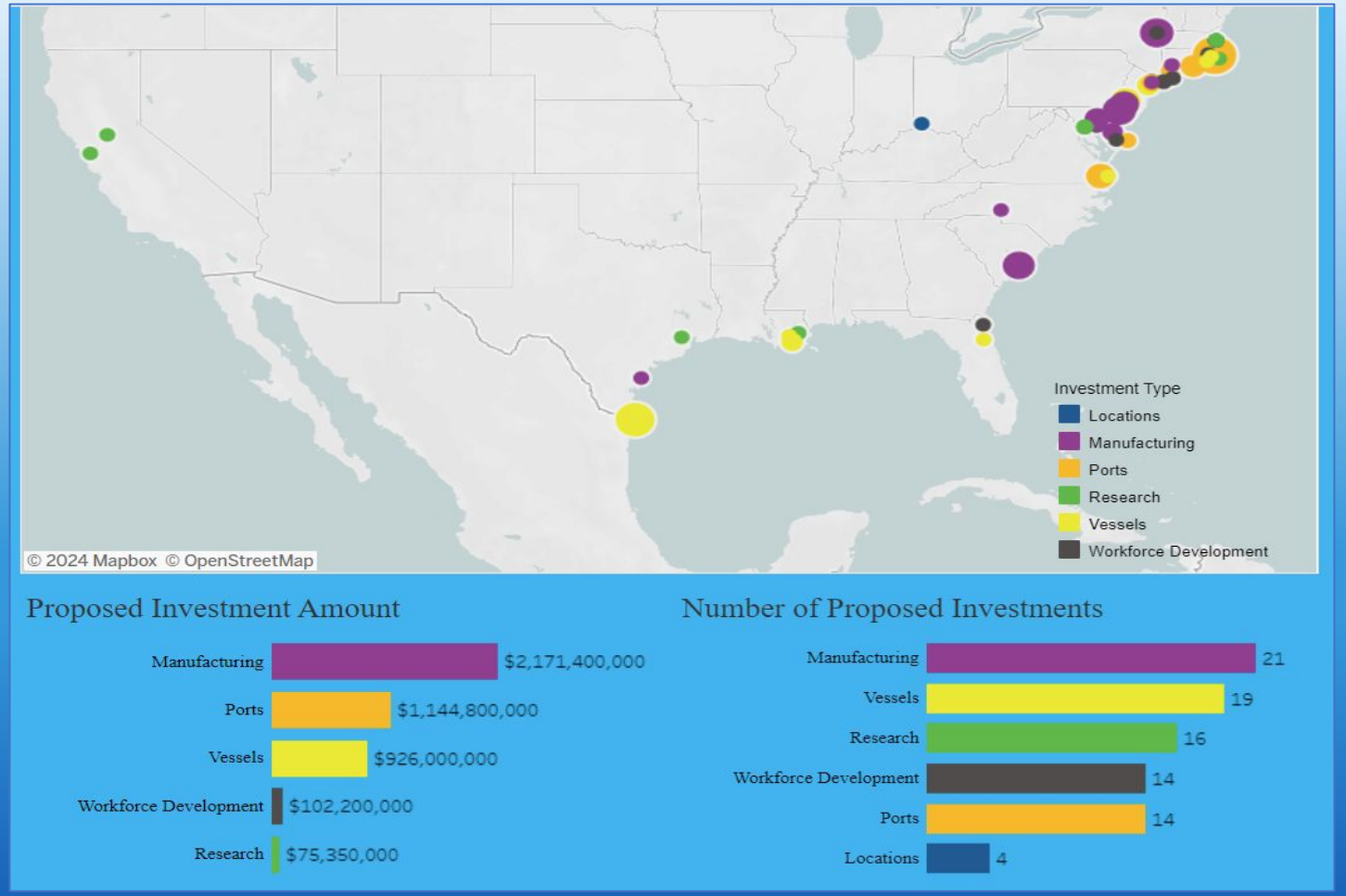
Offshore Wind Tier 2-3 Supply Chain is Already Developing in the Carolinas



Source: https://cleanpower.org/facts/offshore-wind/

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Addressing the Challenges with Innovation and Education

Digital engineering is the enabling technology of the 21st century.

- *MAKE: Attract clean energy manufacturing to the Carolinas with advanced digital manufacturing and user test facilities to accelerate qualification.*
- *CONNECT: Leverage the region's global dominance in power semiconductor design, manufacturing, and application for HVDC transmission to shore.*
- *MANAGE: Transmission & Distribution co-simulation to build a carbon-neutral electric grid that remains affordable and reliable so community ESG's are feasible.*
- *USE: Secure edge-of-grid IOT for flexible load and smart building energy management to integrate more variable renewable energy onto the grid.*
- *TRAIN: Innovation in education and training for an inclusive clean energy workforce of the future.*

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Governance Board Steering the Type II Proposal

1. *Jennifer Mundt, NC Assistant Secretary of Commerce for Clean Energy.*
2. *Dr. John Hardin, Executive Director of the NC Office of Science, Technology, and Innovation.*
3. *Bob Quinn, Executive Director of the SC Research Authority.*
4. *Catherine Hayes, Manufacturing Industry Manager, SC Research Authority.*
5. *Jeffrey Merrifield, Chair of the Board of Directors, E4 Carolinas.*

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Industry and Government Support

CLEANcarolinas Innovation Engine will realize our regional potential to become national clean energy innovation leader. Success will depend on:

Support from legislatures, policymakers, government officials, executives and companies to promote and support CLEANcarolinas vision and objectives.

We seek interagency cooperation and investment to promote the CLEANcarolinas Type 2 proposal in time for submission in the late Fall of 2024.