

# GO WITH THE WIND.

NORTH CAROLINA'S OFFSHORE WIND ENERGY INDUSTRY



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# GO WITH THE WIND.

The winds off North Carolina's coast powered the Wright Brothers' first flight in Kitty Hawk in 1903, and they've been going strong ever since. In 2017, North Carolina brought its first utility-scale wind project online, the Amazon Wind Farm U.S. East, which is the first coastal wind farm to be built in the Southeast and is far larger than any other wind farm in the region. North Carolina offers tremendous potential for additional wind energy development offshore.

As offshore wind projects begin emerging along the U.S. East Coast, North Carolina is organizing to become a key player in this sector. The state boasts three offshore Wind Energy Areas defined by the Bureau of Ocean Energy Management and is creating partnerships with neighboring states to develop a robust offshore wind regional supply chain.

The Southeast Atlantic Coast is positioned to become a long-term leader in this industry. The offshore wind resource potential along the coasts of Southeastern states is almost double that of the Northeast in shallow waters. The region offers low labor costs in manufacturing and construction, major R&D facilities and universities, and a business-friendly environment. Come see why North Carolina is an ideal location for the offshore wind industry.

## NORTH CAROLINA INDUSTRY LEADERS



NUCOR®



HAWES



UNITED  
CHEMI-CON

Röchling



## NORTH CAROLINA'S OFFSHORE WIND ADVANTAGE

#1

### OFFSHORE WIND ENERGY POTENTIAL

In 2010, the National Renewable Energy Laboratory released a report that found North Carolina had 297 GW of offshore wind capacity at 90 meters above the surface within 50 miles of the coast, the largest resource potential of any state on the East Coast.

70+

### WIND ENERGY SUPPLIERS

According to the Southeastern Wind Coalition, the wind energy industry has a strong supply chain presence in North Carolina with more than 70 active suppliers and nearly 30 of them producing components for the wind power sector. These companies are eager to engage this new market.

1,000+

### WIND MANUFACTURING EMPLOYEES

North Carolina is home to nearly 30 manufacturers of wind turbine components from blades, towers and turbine nacelles to raw components such as fiberglass and steel. These companies, including industry leaders such as SAERTEX and Nucor Steel, employ over 1,000 people, according to the American Wind Energy Association.

7

### WIND ENERGY R&D PROJECTS

The U.S. Wind Energy Technologies Office leads the nation's efforts to develop innovative technologies. The Office's R&D portfolio includes seven active wind energy projects in N.C. valued over \$16 M. Entities involved with these projects include ABB, Duke Energy, the National Renewable Energy Laboratory, and PPG.



Spanning farm fields in Pasquotank and Perquimans counties in North Carolina, the Amazon Wind Farm U.S. East, powered by Avangrid Renewables at Desert Wind, is one of the largest commercial-scale wind farms in the southeastern United States. The farm has 104 turbines with a total capacity of 208 MW. The energy generated is delivered into the electrical grid that supplies both current and future Amazon Web cloud data centers.



## COMING TO THE SOUTHEAST ATLANTIC OCEAN

In 2017, the U.S. Bureau of Ocean Energy Management (BOEM) awarded a 122,405-acre lease to Avangrid Renewables for the development of a Wind Energy Area (WEA) off the coast of Kitty Hawk Coastal Reserve in North Carolina. The project has a potential capacity of up to 2.5 gigawatts. In early 2020, the company's site assessment plan was approved by the Bureau of Ocean Energy Management.

Dominion Energy is beginning construction on the Coastal Virginia Offshore Wind (CVOW) project to create the second offshore wind power project in the nation and the first owned by an electric utility company. The project includes the development of two 6-megawatt wind turbines on a 2,135-acre site located 27 miles off the coast of Virginia Beach. Dominion Energy has contracted with a global wind leader - Ørsted Energy of Denmark - for construction of the two turbines. The L. E. Myers Company will perform onshore construction work.

# PLENTIFUL AND SKILLED WORKFORCE

## 5,130,000+

### LABOR FORCE

Largely fueled by domestic in-migration, North Carolina has one of the largest labor forces in the U.S. From 2010-2018, North Carolina was among the top three states for net migration.

## 475,000+

### MANUFACTURING EMPLOYEES

North Carolina has the largest manufacturing workforce in the Southeastern U.S. In the last five years, the state's manufacturing workforce has grown by 4% and is projected to continue growing.

## #2

### STEM

North Carolina is home to more than 25,000 Science, Technology, Engineering, and Math grads annually, ranking second for STEM grads in the Southeastern U.S.

## 45,000+

### ENGINEERS

North Carolina's engineering workforce has grown 18% over the past five years, leading the nation for engineering job growth.

## LABOR SUPPLY FOR TOP TURBINE MANUFACTURING OCCUPATIONS

North Carolina offers wind energy developers an abundant and affordable supply of labor. NC's turbine manufacturing industry wages are about 4% below the national average.

OCCUPATION	NC 2019 JOBS	NC JOB GROWTH (2015 - 2019)	NC MEDIAN ANNUAL EARNINGS	US MEDIAN ANNUAL EARNINGS
INDUSTRIAL ENGINEERS	9,370	21%	\$82,888	\$87,027
MECHANICAL ENGINEERS	8,318	25%	\$82,742	\$87,360
INDUSTRIAL MACHINERY MECHANICS	12,211	16%	\$49,608	\$52,332
ASSEMBLERS AND FABRICATORS	53,604	3%	\$28,558	\$31,532
METAL AND PLASTICS WORKERS	59,113	6%	\$37,485	\$39,073
FIRST-LINE SUPERVISORS OF PRODUCTION WORKERS	21,607	6%	\$58,552	\$60,424

# UNMATCHED BUSINESS ENVIRONMENT

#1

**BEST STATE FOR BUSINESS**

- Forbes (2019)

#2

**TOP STATE BUSINESS CLIMATE**

- Site Selection (2019)

#3

**BEST STATE FOR BUSINESS**

- CNBC (2019)

#3

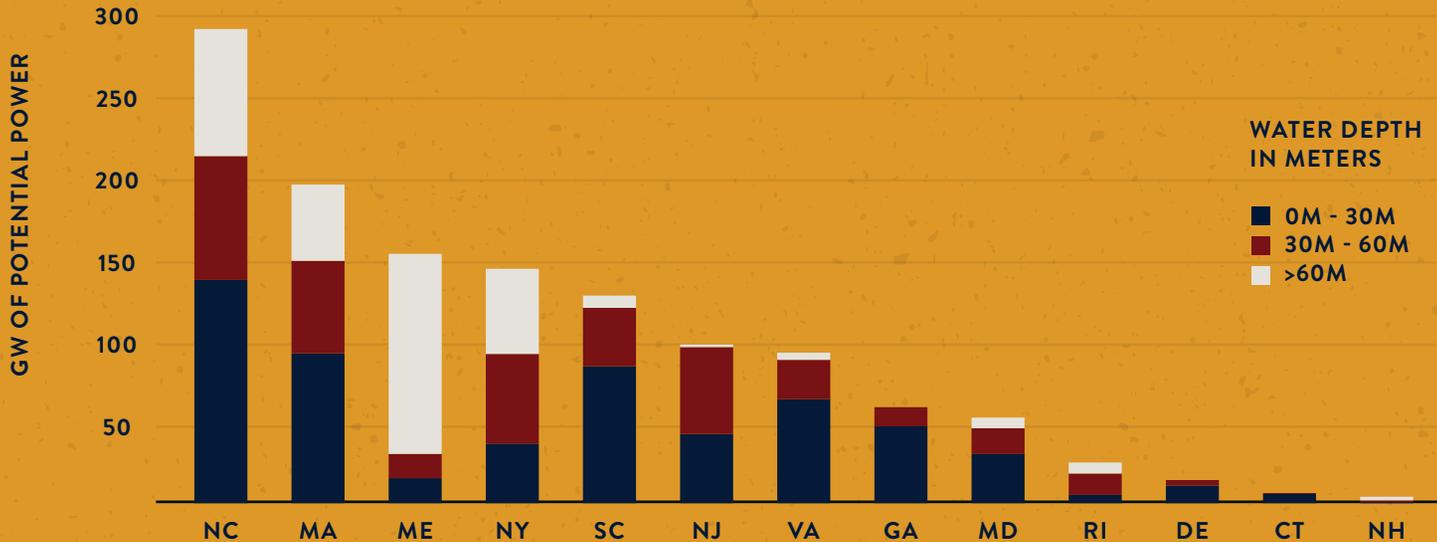
**COMPETITIVE LABOR ENVIRONMENT**

- Area Development (2019)

## OFFSHORE WIND RESOURCE POTENTIAL IN GIGAWATTS

The technical potential along the coasts of Southeast states is significant, almost double that of the Northeast in shallow waters. As technology evolves and prices continue to decline, the Southeast Atlantic is positioned to become a long-term leader in the industry. North Carolina's geographic location is favorable to serve all markets along the East coast, for both immediate and future demands.

Source: "National Assessment of Offshore Wind Energy Resources," National Renewable Energy Laboratory, 2010.



## LOW ELECTRICITY COSTS

NC's industrial electricity costs are **about 10% below the national average.**



# NORTH CAROLINA OFFSHORE WIND SPEEDS

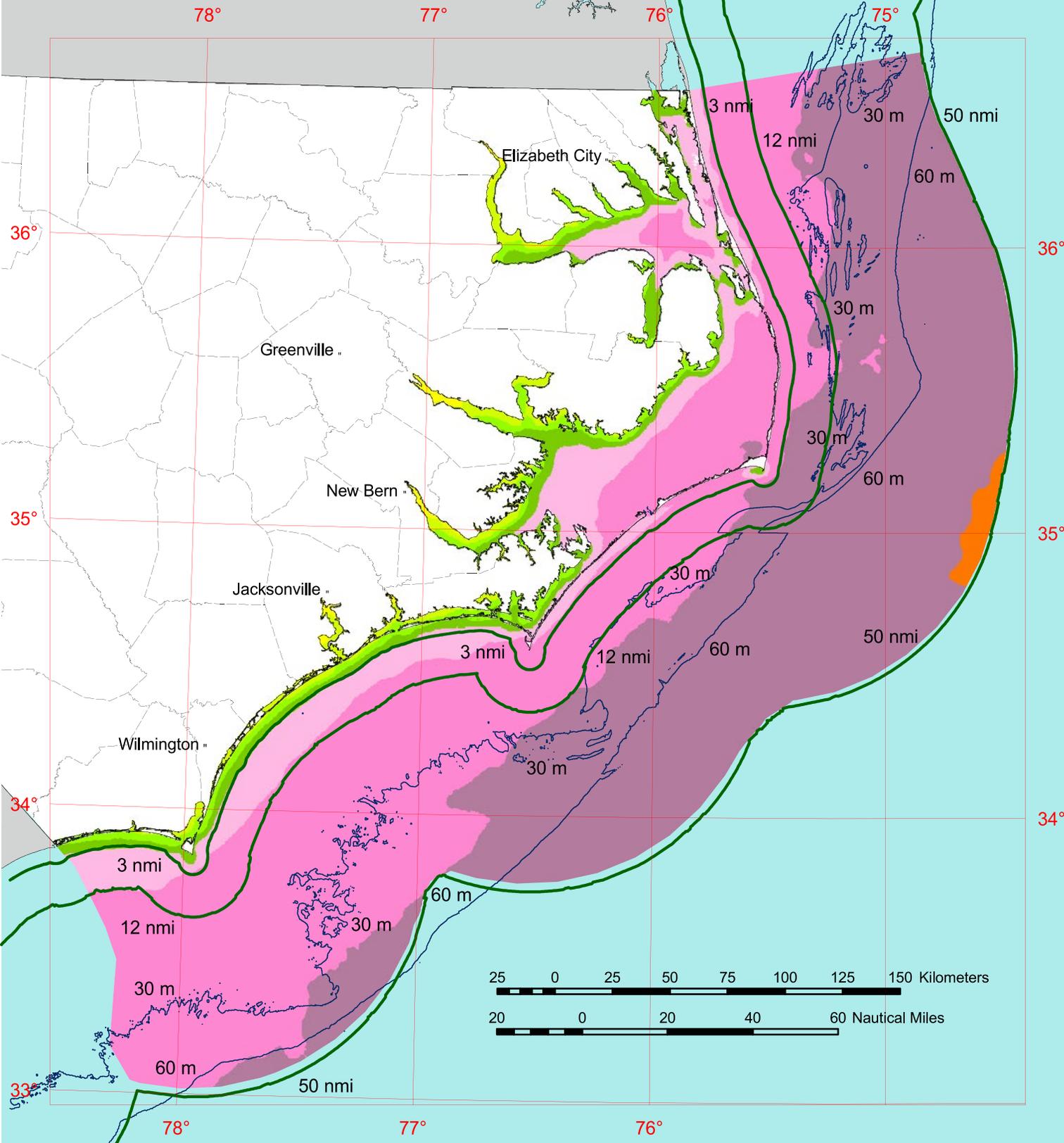
## Contours

-  Water Depth (Meters)
-  Distance from Shore (Nautical Miles)

The annual wind speed estimates for this map were produced by AWS Truepower using their MesoMap system and historical weather data.

## Wind Speed at 90 m

	m/s	mph
	11.5 - 12.0	25.7 - 26.8
	11.0 - 11.5	24.6 - 25.7
	10.5 - 11.0	23.5 - 24.6
	10.0 - 10.5	22.4 - 23.5
	9.5 - 10.0	21.3 - 22.4
	9.0 - 9.5	20.1 - 21.3
	8.5 - 9.0	19.0 - 20.1
	8.0 - 8.5	17.9 - 19.0
	7.5 - 8.0	16.8 - 17.9
	7.0 - 7.5	15.7 - 16.8
	6.5 - 7.0	14.5 - 15.7
	6.0 - 6.5	13.4 - 14.5
	0.0 - 6.0	0.0 - 13.4





# EXECUTIVE ORDER 80 – CLEAN ENERGY PLAN & WORKFORCE ASSESSMENTS

In October 2018, Governor Roy Cooper announced *Executive Order 80: North Carolina's Commitment to Address Climate Change & Transition to a Clean Energy Economy*. Under EO 80, the Department of Environmental Quality released a State Clean Energy plan, which includes several recommendations supporting offshore wind and a coordinated effort with regional states to develop a robust offshore wind industry and energy market.



## LOWER EMISSIONS

Reduce electric power sector greenhouse gas emissions by 70% below 2005 levels by 2030 and attain carbon neutrality by 2050.

## AFFORDABLE ENERGY

Foster long-term energy affordability for North Carolina's residents and businesses by modernizing regulatory and planning processes.

## ECONOMIC OPPORTUNITIES

Accelerate clean energy innovation, development and deployment to create economic opportunities for both rural and urban areas of the state.

# THE PERFECT CLIMATE FOR GROWING TALENT

Home to three Tier 1 universities and the #1 city for Millennials, North Carolina is where bright, young people are helping business boom. North Carolina offers one of the nation's most renowned education systems, supplying companies a pipeline of skilled workers and unparalleled access to R&D resources.

## UNIVERSITIES

### UNDERGRADUATE AND GRADUATE DEGREES

North Carolina has 53 colleges and universities. From Appalachian State University in the mountains to East Carolina University near the coast, the publicly-funded University of North Carolina System draws students from all over the world to its 17 campuses. The state's three Tier 1 research universities: North Carolina State University, Duke University, and the University of North Carolina at Chapel Hill, are at the cutting edge of education and R&D. Renowned private institutions, such as Wake Forest University and Davidson College, also call North Carolina home.

## COMMUNITY COLLEGES

### VOCATIONAL DEGREES

The North Carolina Community College System (NCCCS) is the nation's third-largest community college system, pioneering the nation's most advanced vocational and technical programs. In the 2017-2018 academic year, there were 681,187 students enrolled across the NCCCS's 58-campus system, including 124 remote campuses. In fact, every North Carolina resident lives within a 30-minute drive of a community college, making high quality education accessible to the state's growing workforce.



## MILITARY WORKFORCE

### 4TH LARGEST MILITARY POPULATION IN THE U.S.

About 20,000 military personnel in North Carolina are projected to re-enter the civilian workforce each year. The state is home to over 400,000 veterans under the age of 65. Veterans bring a unique set of skills, a strong work ethic and experience working with heavy equipment in adverse work environments.

## NCWORKS

### CUSTOMIZED TRAINING PROGRAMS

NCWorks is a free, customized job training and recruiting program for new and expanding businesses. The program offers comprehensive training via our state's community colleges as well as customized curricula tailored to address the specific needs of manufacturers. In FY 2017-2018, NCWorks trained more than 36,000 employees from over 1,000 companies across the state.

## INDUSTRY RESOURCES

### TARGETED INDUSTRY SUPPORT

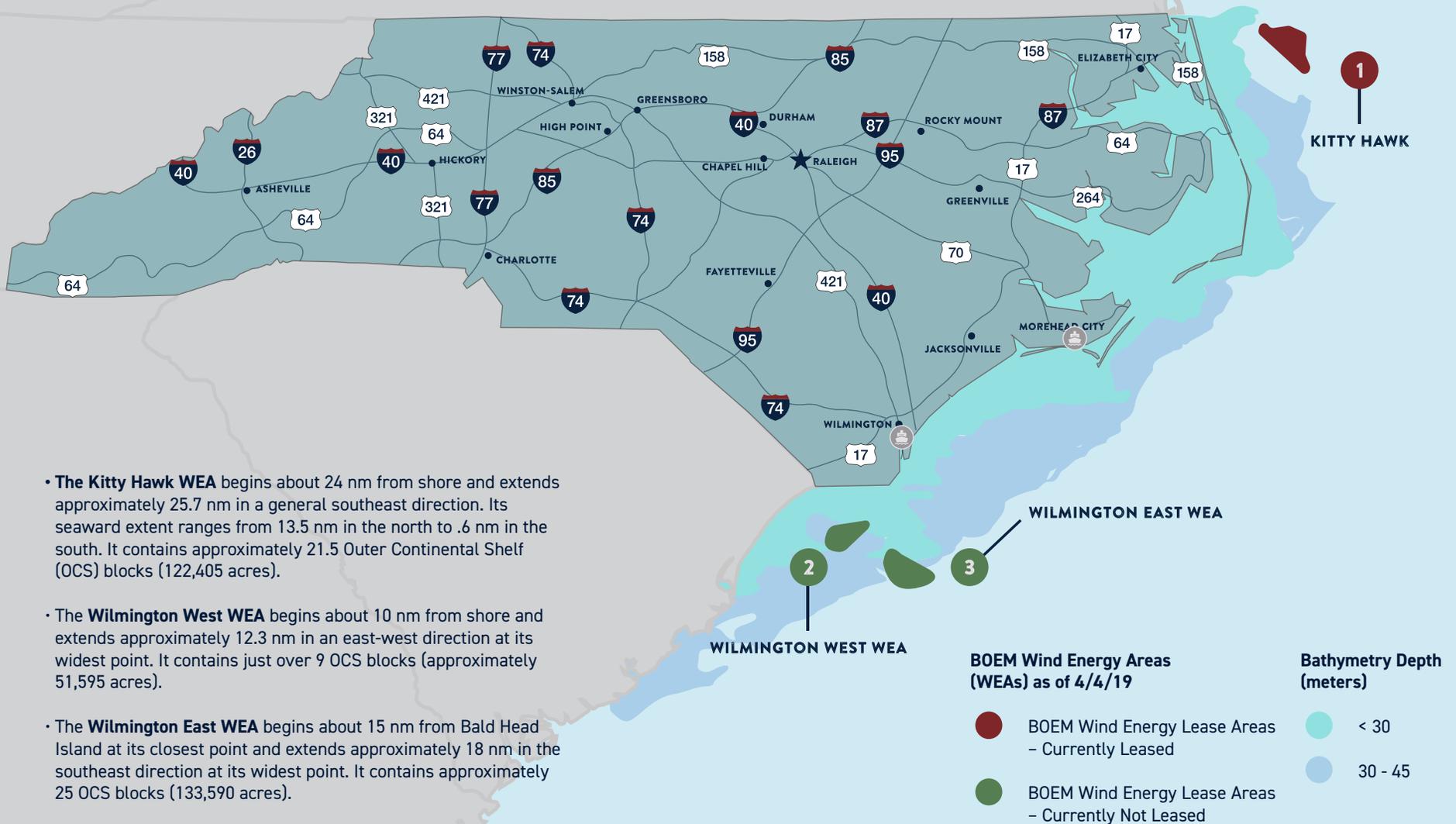
North Carolina has numerous initiatives and research centers that support the offshore wind industry. Examples include:

- In 2018, North Carolina formed an **Offshore Wind Strategy Team** - composed of state government officials and subject matter experts - to identify opportunities to pursue this growing industry.
- In 2018, Governor Cooper announced **Executive Order 80: North Carolina's Commitment to Address Climate Change & Transition to a Clean Energy Economy**. Under EO 80, the State released a Clean Energy Plan, which includes recommendations supporting offshore wind and a coordinated effort with regional states to develop a robust offshore wind industry.
- **ABB**, an industry leader in power transmission and distribution, has a principal research facility located in Raleigh, NC where they are conducting a Department of Energy-funded National Offshore Wind Energy Grid Interconnected Study.

Governor Roy Cooper addressing the N.C. Climate Change Interagency Council in October 2019, upon the release of the N.C. Clean Energy Plan. Two months later, at the *Offshore Wind: Spotlight on North Carolina Conference* in Raleigh, Governor Cooper discussed how N.C. plans to boost its competitiveness with respect to the offshore wind energy industry. Strategies include creating partnerships with industry, the public, and neighboring states, and conducting an assessment of the offshore wind supply chain and ports and related infrastructure.

# OFFSHORE WIND ENERGY AREAS IN NC

North Carolina boasts three offshore Wind Energy Areas (WEAs) designated by the Bureau of Ocean Energy Management (BOEM), one of which has been leased and is being developed by Avangrid Renewables.



# GO BIG. SPEND LESS.

## 2.5%

### CORPORATE INCOME TAX

North Carolina has the lowest rate among the 44 states which levy this tax. NC uses single sales factor apportionment.

## 4.75%

### STATE SALES & USE TAX

Counties levy an additional 2-2.75%. Sales tax exemptions are available for manufacturers, large fulfillment centers, and data centers.

## 5.25%

### PERSONAL INCOME TAX

The standard deduction is \$10,750 for single tax payers and married couples filing separately, \$21,500 for married couples, and \$16,125 for heads of households.

## NONE

### STATE PROPERTY TAX

There is no state-level property tax. Real and personal property taxes vary by local government. In 2019, N.C. had the 6th lowest commercial and 10th lowest industrial effective property tax rates in the U.S.

## INCENTIVES

Targeted, performance-based incentive programs complement North Carolina's competitive cost structure. The Economic Development Partnership of North Carolina (EDPNC) helps companies navigate the incentive process.

### JOB DEVELOPMENT INVESTMENT GRANT (JDIG)

JDIG is a performance-based, discretionary incentive program that provides cash grants to new and expanding businesses to help offset the cost of locating or expanding a business facility in North Carolina. Companies can qualify for a JDIG based on the project location, number of jobs, and average wage. The grant amount is based on a percentage of the personal income tax withholdings associated with the new jobs. A company can use JDIG funds for any purpose.

### ONE NORTH CAROLINA FUND (ONE NC)

One NC is a discretionary cash-grant program that allows the Governor to respond quickly to competitive job-creation projects. The local government must provide an incentive to match the One NC funding. Awards are based on the number of jobs created, level of investment, location of the project, economic impact of the project, and the importance of the project to the state and region. Awards may be used in new or existing buildings for installation or purchase of equipment, structural repairs and/or renovations, construction and/or improvements to utility lines.

### PUBLIC INFRASTRUCTURE & TRANSPORTATION PROGRAMS

North Carolina offers a number of different programs to fund public infrastructure development, including the Community Development Block Grant Economic Development Program, Utility Account, Rural Division's Economic Infrastructure Program, NCDOT's Rail Industrial Access Program, North Carolina Railroad Company's NCRR Invests program, and the NC Department of Commerce's Joint Economic Development Program with the NCDOT.

### BUILDING REUSE PROGRAMS

North Carolina offers two different programs that provide grants to renovate and upfit vacant industrial and commercial buildings including:

- Community Development Block Grant Building Reuse Program
- Rural Division's Building Reuse Program

### OTHER INCENTIVE PROGRAMS

- NCWorks Customized Training Program
- Foreign Trade Zones

# MARKET ACCESS & TRANSPORTATION INFRASTRUCTURE

North Carolina's robust transportation infrastructure connects companies to domestic and international markets. Ten airports offer commercial services, including four international airports that connect North Carolina to major cities in the U.S. and abroad. North Carolina also has the second-largest state-owned highway system and major controlled-access arteries such as I-95 (running the length of the East Coast), I-85, and I-40 (running from NC to California). Two deepwater seaports and an integrated rail system ensure that North Carolina companies can easily reach suppliers and customers.

## ROADS

### SECOND-LARGEST STATE-OWNED HIGHWAY SYSTEM

North Carolina's roads stretch for more than 90,000 miles (145,000 km). The state's central East Coast location offers easy access to the country's most important transportation corridors.

Major controlled-access arteries include:

- I-95, running the length of the East Coast
- I-40, linking North Carolina to California
- I-85, stretching through the manufacturing heart of the Southeast

## PORTS

### TWO DEEPWATER SEAPORTS IN-STATE WITH ON-DOCK RAIL

North Carolina's ports offer fast turn times and capacity for ships carrying up to 10,000 TEUs. Inland terminals in Charlotte and Greensboro provide easy market access.

North Carolina companies also enjoy easy access to the Port of Norfolk and the Port of Charleston.

#### Port of Morehead City

- General cargo and bulk handling facility
- Channel depth of 45 feet M.L.L.W.
- 1M sf of covered storage
- 4 miles from the open sea
- 150 adjacent acres available for development
- No air draft restriction in channel

#### Port of Wilmington

- Container and general cargo operations
- Channel depth of 42 feet M.L.L.W.
- On-terminal cold storage facility and 1M sf of covered storage
- 125 acres of open storage area
- 26 miles from the open sea
- 150 additional acres available for development

## AIR

### THE WORLD'S 7TH BUSIEST AIRPORT IS LOCATED IN CHARLOTTE

Ten airports offer commercial services, including four international airports that provide easy access to global markets. International airports include:

- Charlotte-Douglas International Airport (CLT)
- Raleigh-Durham International Airport (RDU)
- Wilmington International Airport (ILM)
- Piedmont Triad International Airport (GSO)

## RAIL

### TWO CLASS 1 CARRIERS

North Carolina has more than 3,200 miles (5,100km) of track. Two Class 1 carriers, CSX Transportation (CSX) and Norfolk Southern (NS), offer direct service to North American markets and to all major ports along the U.S. East Coast.

- Intermodal service hubs in Charlotte (NS, CSX) and Greensboro (NS)
- Direct intermodal service from Port of Wilmington to CSX terminal in Charlotte
- Major rail yards in Lexington (NS) and Hamlet (CSX)
- 19 regional railroads, including six that connect to both NS and CSX railroads



North Carolina's Port of Morehead City is just four miles from the Atlantic Ocean. Situated near the port is Radio Island, a 150-acre site perfectly suited for port industrial development. Efforts to develop dynamic waterfront infrastructure for assembly, testing and staging for offshore wind equipment are active in N.C., further fueling attention to the sector.



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