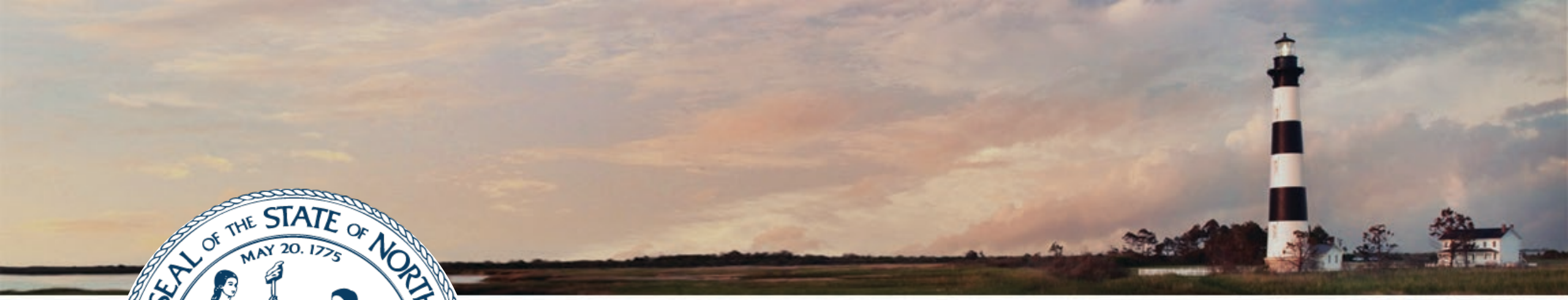


CLASS 30 - LEADERSHIP NORTH CAROLINA
ENVIRONMENT SESSION
THURSDAY APRIL 13, 2023

Connecting the Dots

NORTH CAROLINA
DEPARTMENT of
COMMERCE

Our mission is to improve the economic well-being and quality of life for all North Carolinians.

To do that, the Department works closely with local, regional, national and international organizations to propel economic, community and workforce development for the state.

What if I told you…

A Win-Win-Win for North Carolina

1. Regulated and supported by government
2. Jobs in every trade/occupation (10K+)
3. Potential $100B economic investment
4. Renewable, carbon-free energy
5. Improved air quality/public health benefits
6. Investments in underserved, under-resourced communities

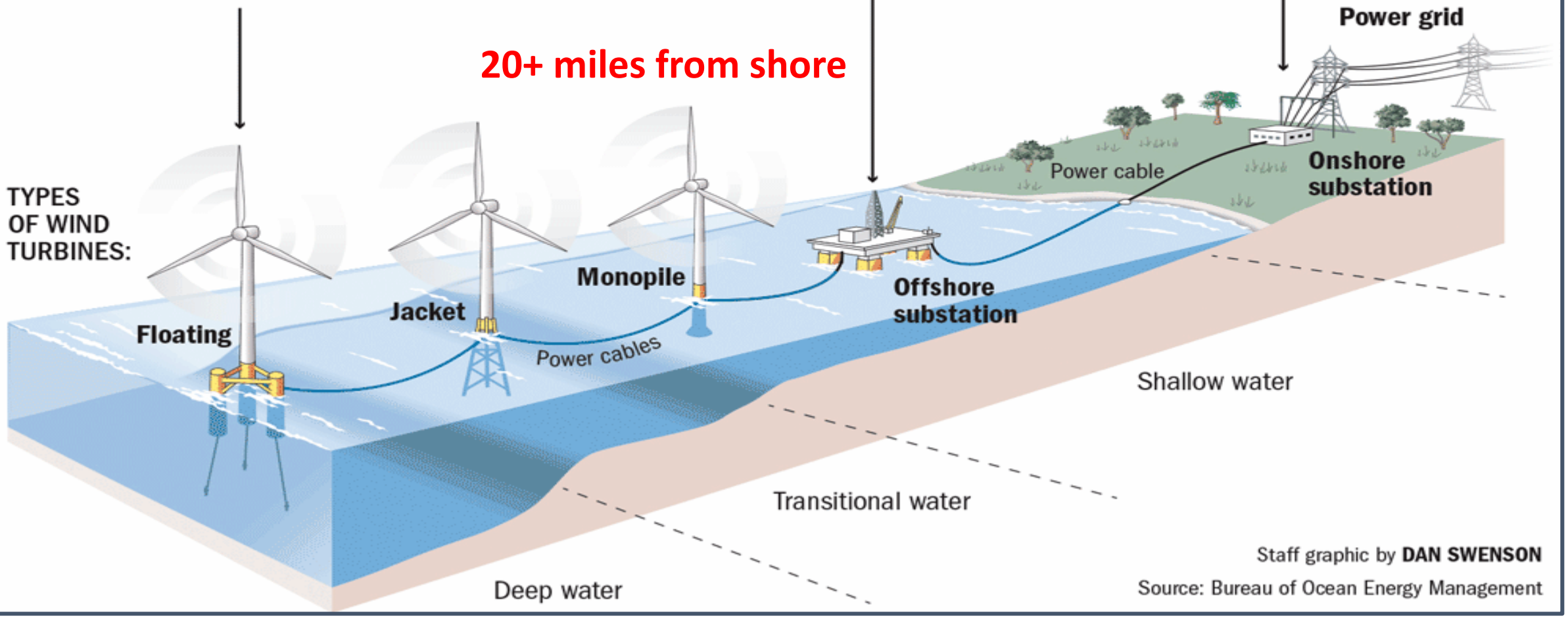
What is this mystery industry?

How an offshore wind farm works

Turbines are often placed in groups in areas with optimal wind speeds. Most are stationary or fixed to a location in shallow water, but floating turbines could be used in deep water and hauled into port during hurricanes.

Energy captured by turbines is transmitted by cables to substations.

Electricity flows to an onshore substation linked to the power grid.



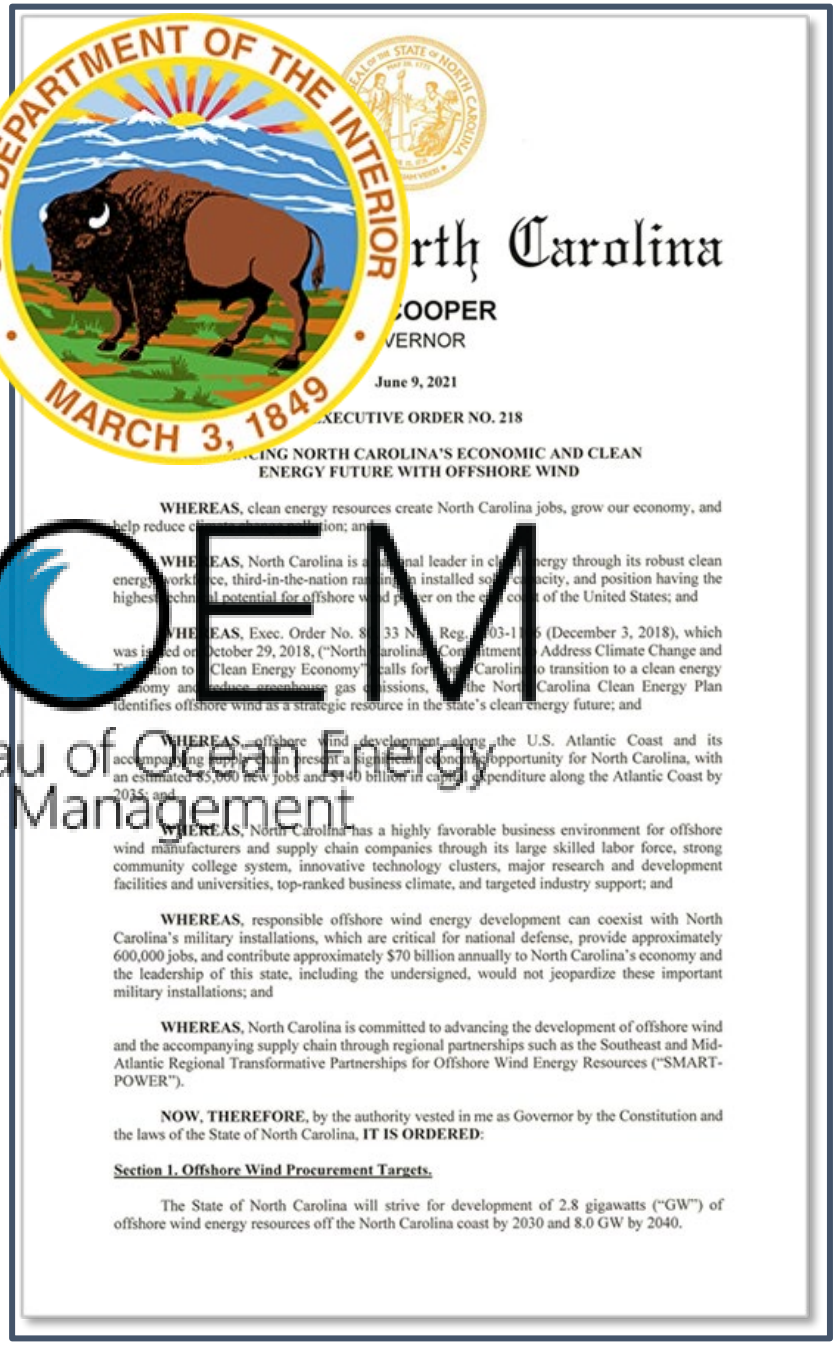
Staff graphic by **DAN SWENSON**

Source: Bureau of Ocean Energy Management

Offshore Wind
1. Regulated and Supported

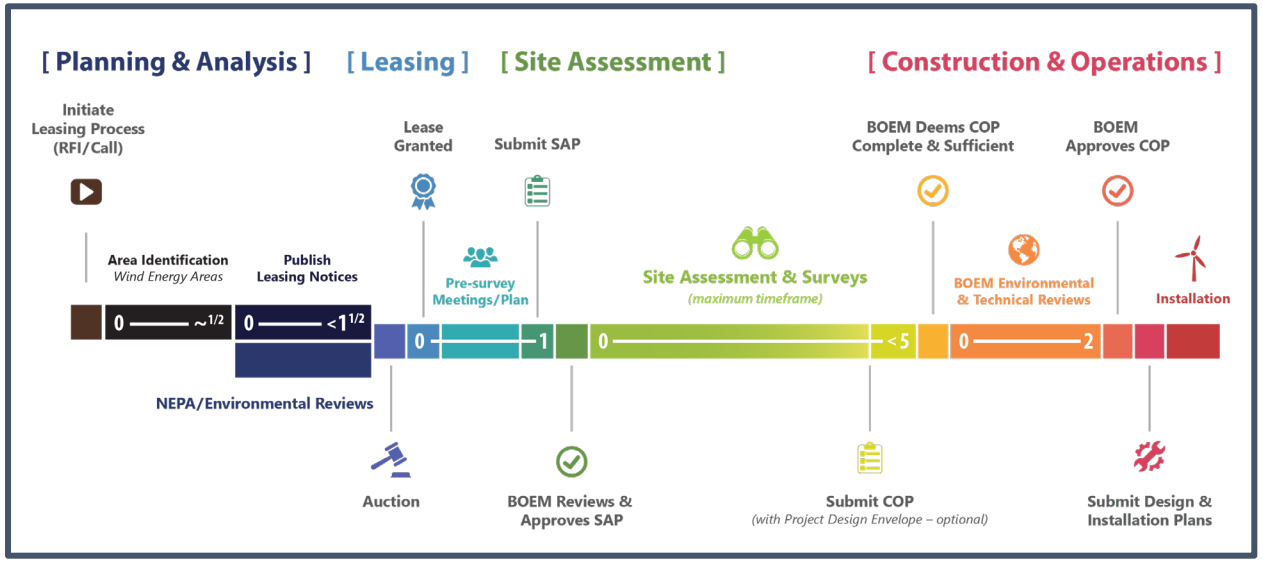
- **Federal Government**
  - OCSLA; Bureau of Ocean Energy Management (Interior)
  - 30 GW by 2030; 100 GW by 2050
  - Inflation Reduction Act

- **State of North Carolina**
  - DEQ, Commerce, Utilities Commission, etc.
  - EO 218: 2.8 GW by 2030; 8 GW by 2040
  - H951, G.S. 143 Article 21C



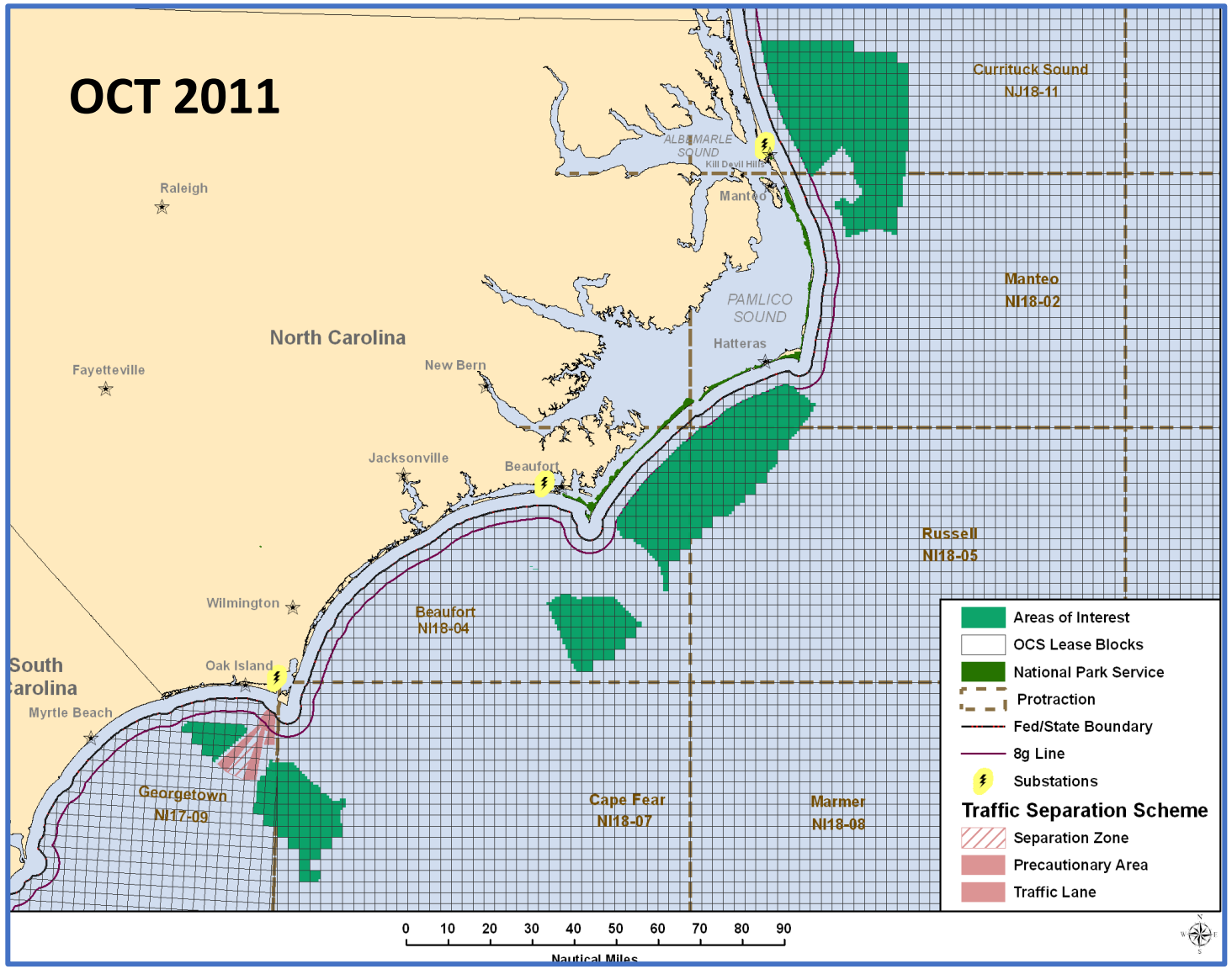
Offshore Wind
Federal Jurisdiction *(mostly)*

- **Federal Government**
  - Bureau of Ocean Energy Management (Interior)
  - Responsible for activities in the Outer Continental Shelf
    - Oil and gas
    - Renewable energy
    - Sand / mineral resources
  - Robust deconfliction process prior to any leasing
    - Results in the identification of “Wind Energy Areas”



7 – 10+ years from planning to operations

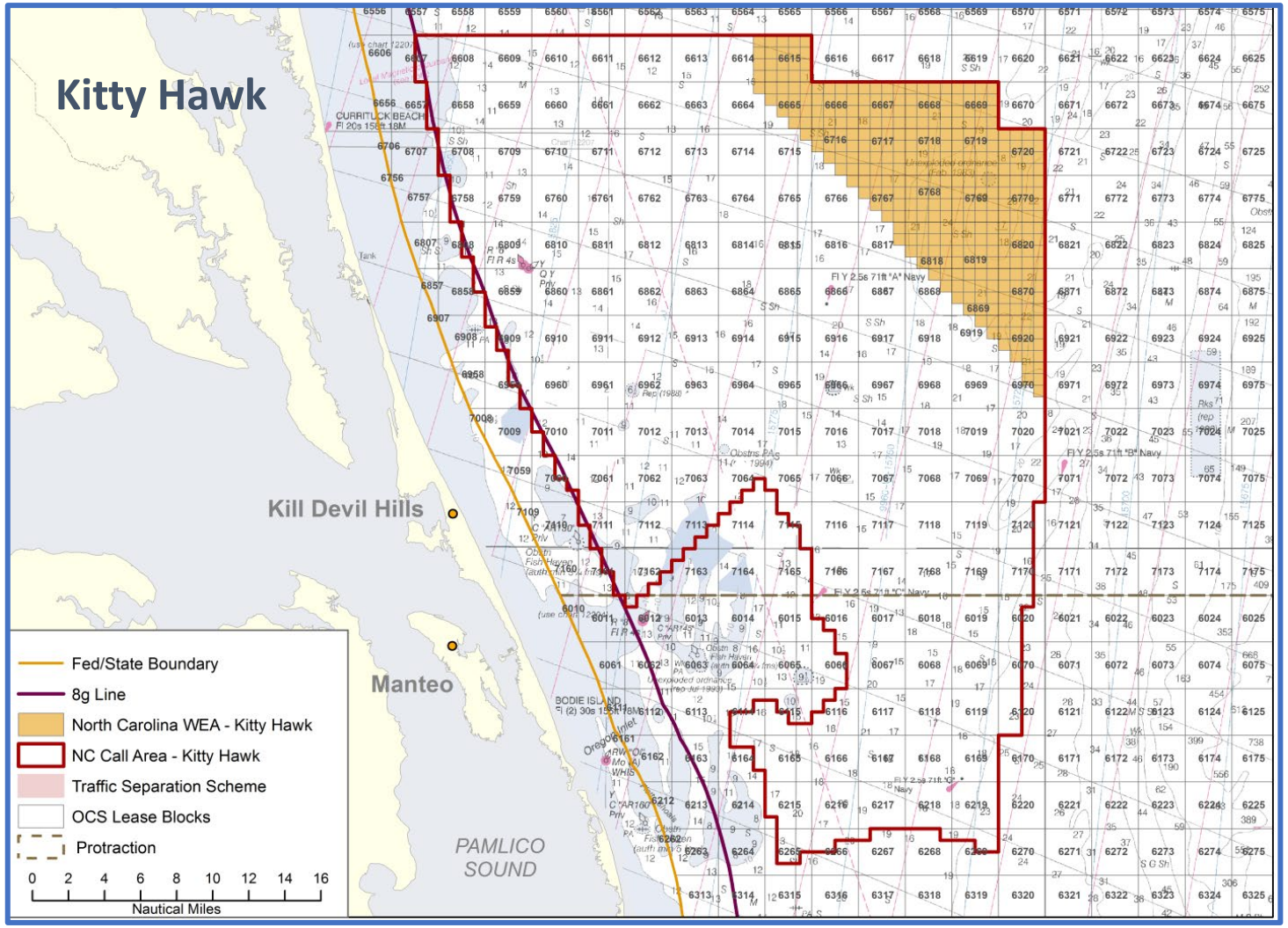
NC Wind Energy Area (WEA) Identification *(aka DECONFLICTION)*



- October 2011
- 5 Areas of Interest

https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/NC/Fifth-Task-Force-Meeting/History-Presentation-Final.pdf

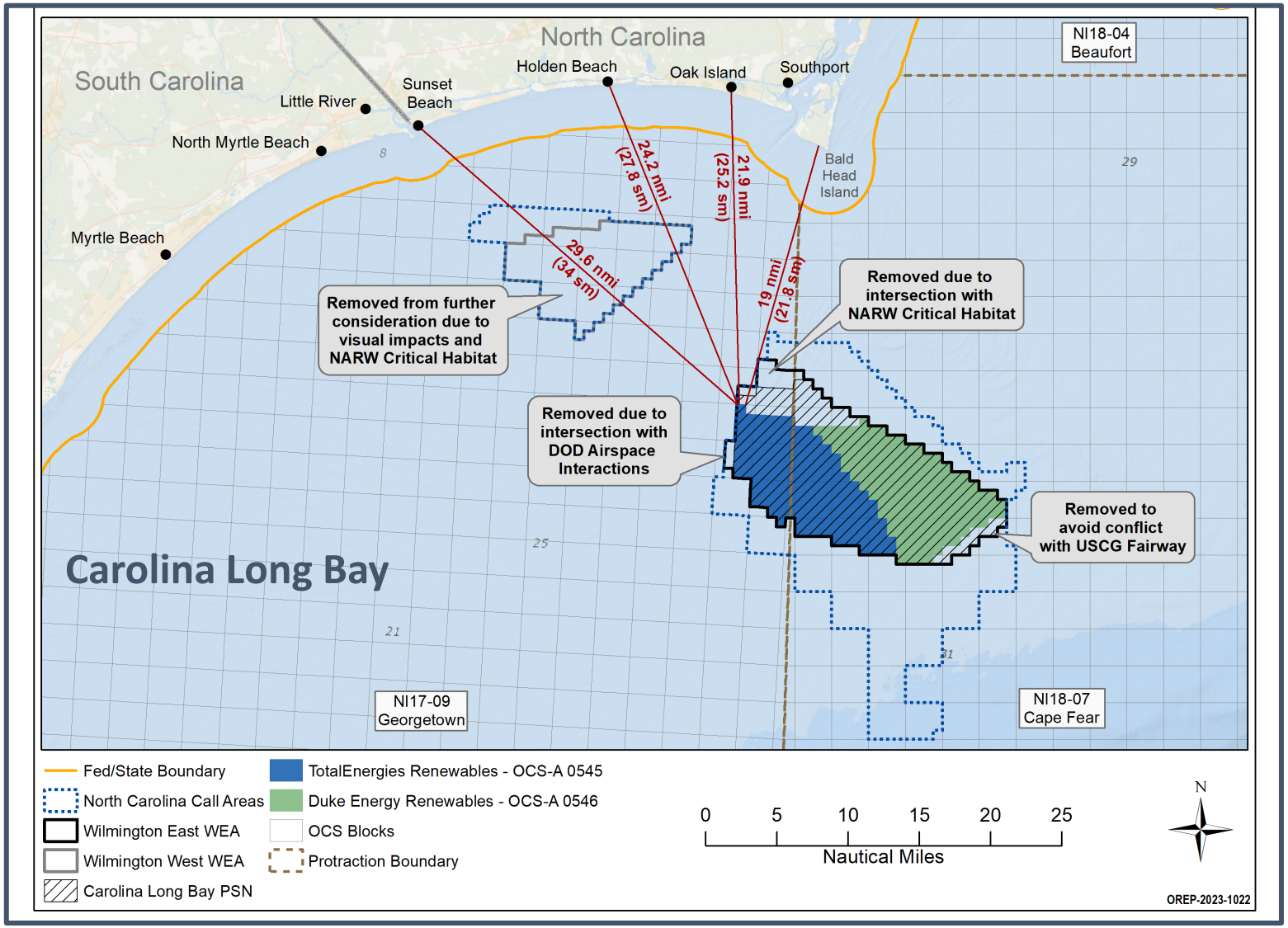
NC Wind Energy Area (WEA) Identification *(cont'd)*



- **August 2014**
- **WEAs announced**

https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/NC/Fifth-Task-Force-Meeting/History-Presentation-Final.pdf

NC Wind Energy Area (WEA) Identification *(cont'd)*



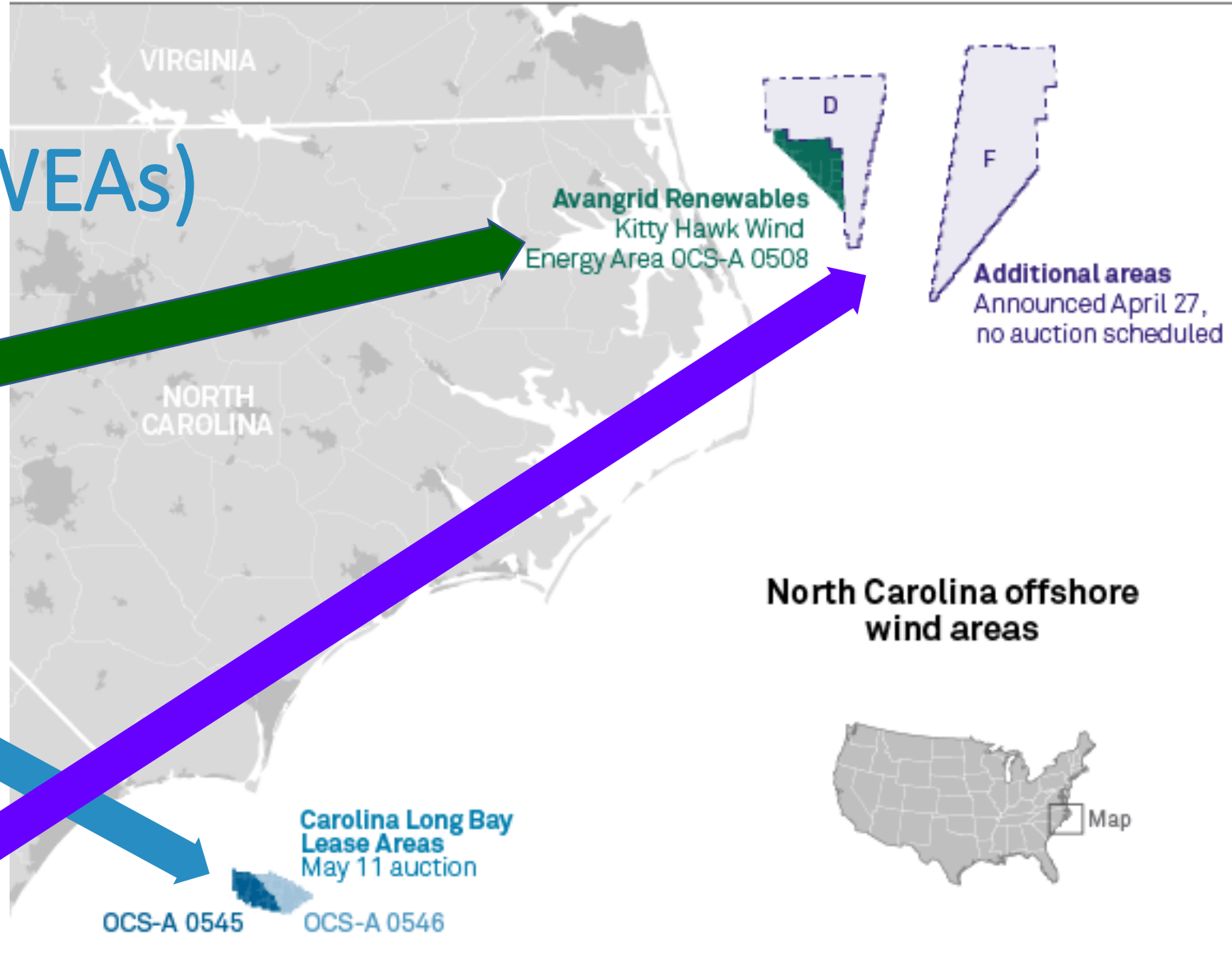
August 2014 to March 2022

North Carolina's Wind Energy Areas (WEAs)

Kitty Hawk
Avangrid Renewables

Carolina Long Bay
Duke Energy Renewables Wind & TotalEnergies

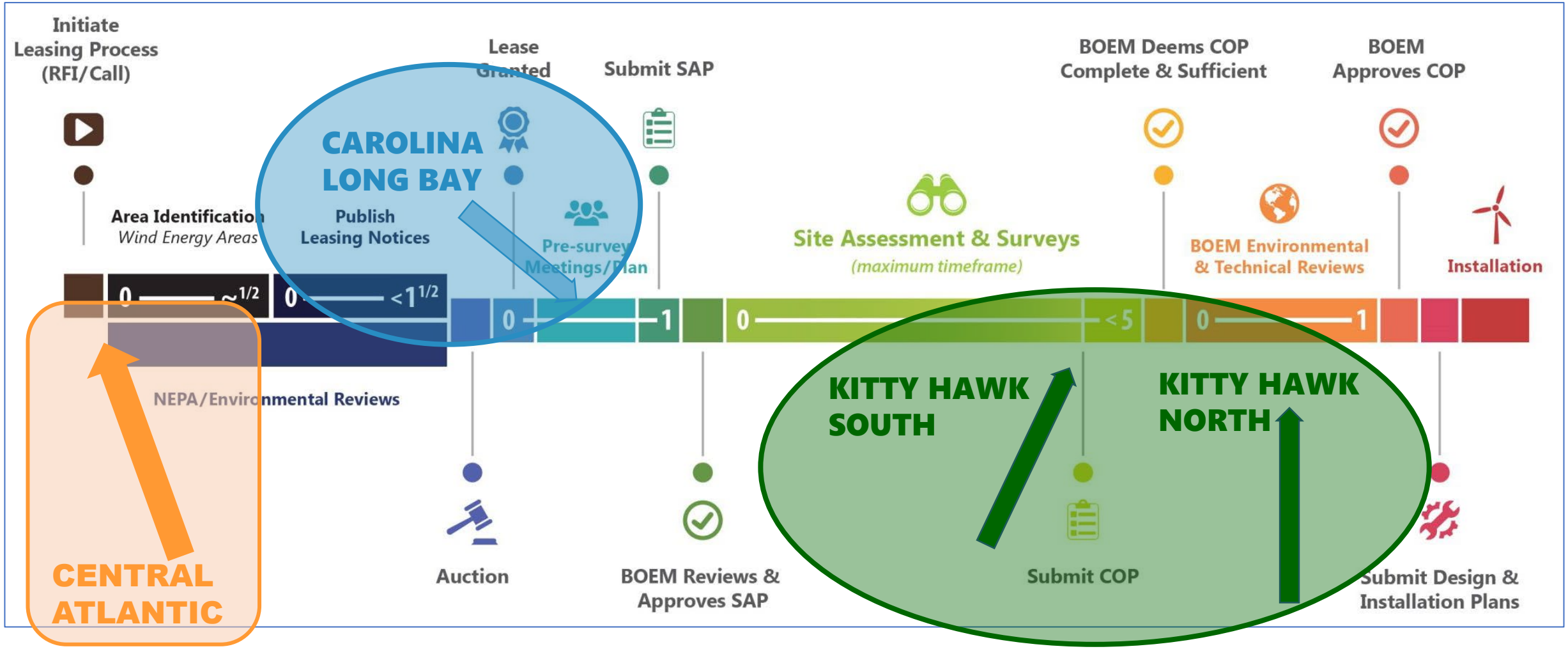
Central Atlantic
Under review/evaluation



As of May 5, 2022.
Map credit: Joe Felizadio
Sources: U.S. Bureau of Ocean Energy Management

BOEM Renewable Energy Development Process

Timeline for Area Identification to Leasing to Operations



Offshore Wind
A Win-Win-Win for North Carolina

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2. **Jobs in every trade/occupation (10K+)**
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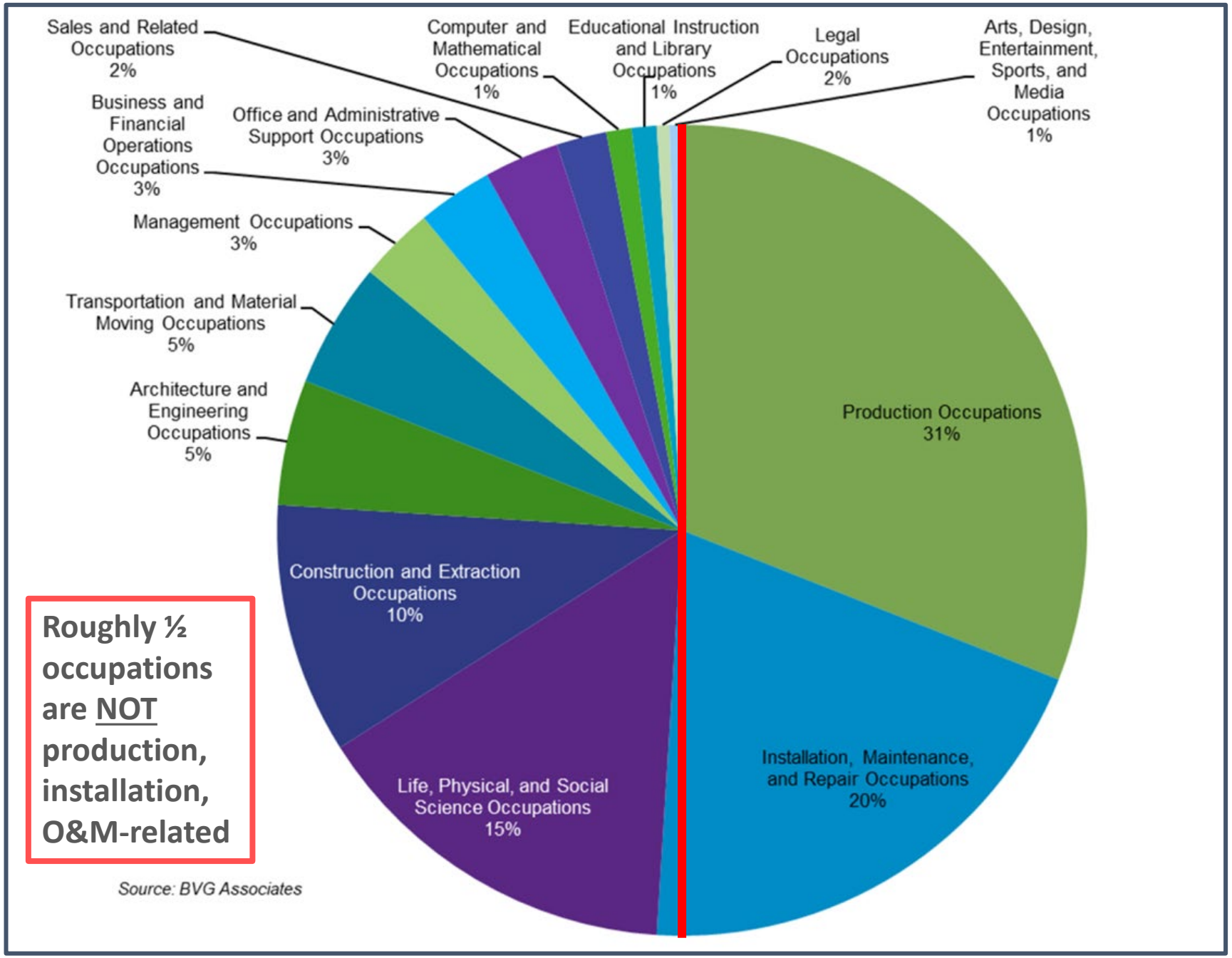
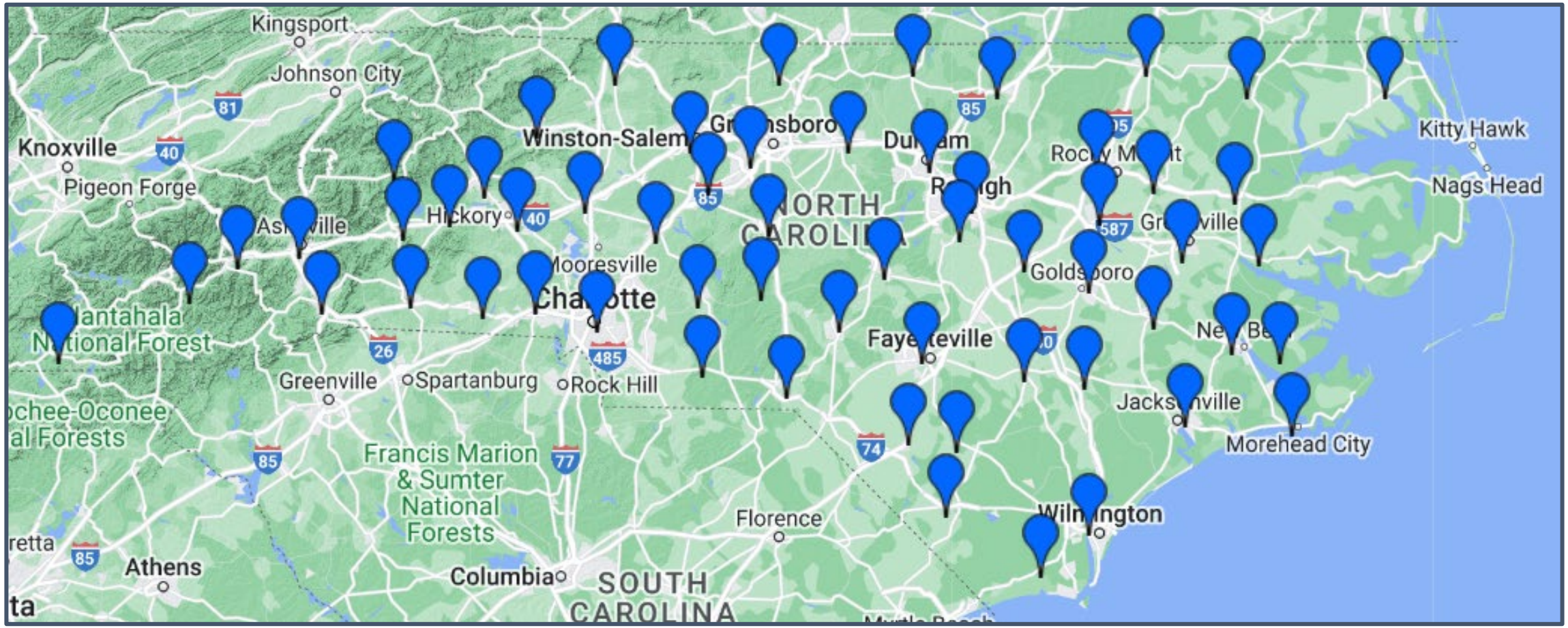
Offshore Wind

2. Jobs in Every Trade / Occupation

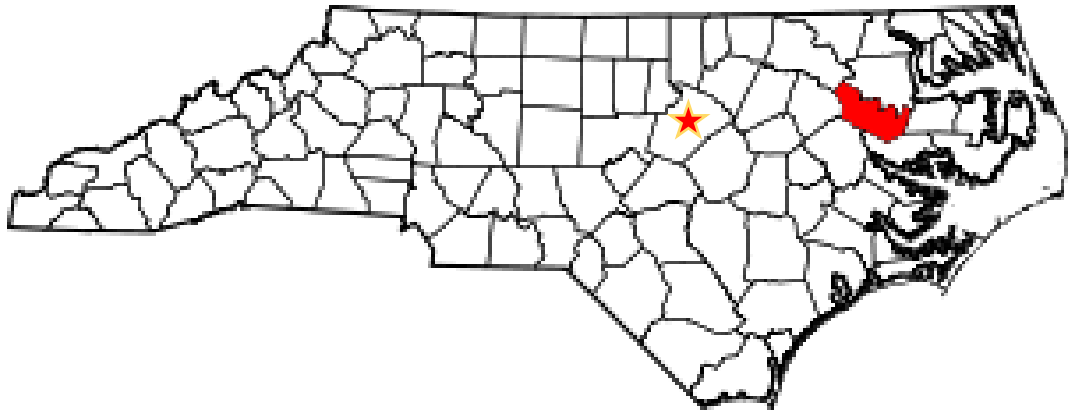


Training, Transitioning, and Reskilling
Creates opportunities for people to STAY in NC



Training, Transitioning, and Reskilling
Creates opportunities for people to REMAIN in Rural NC, i.e.

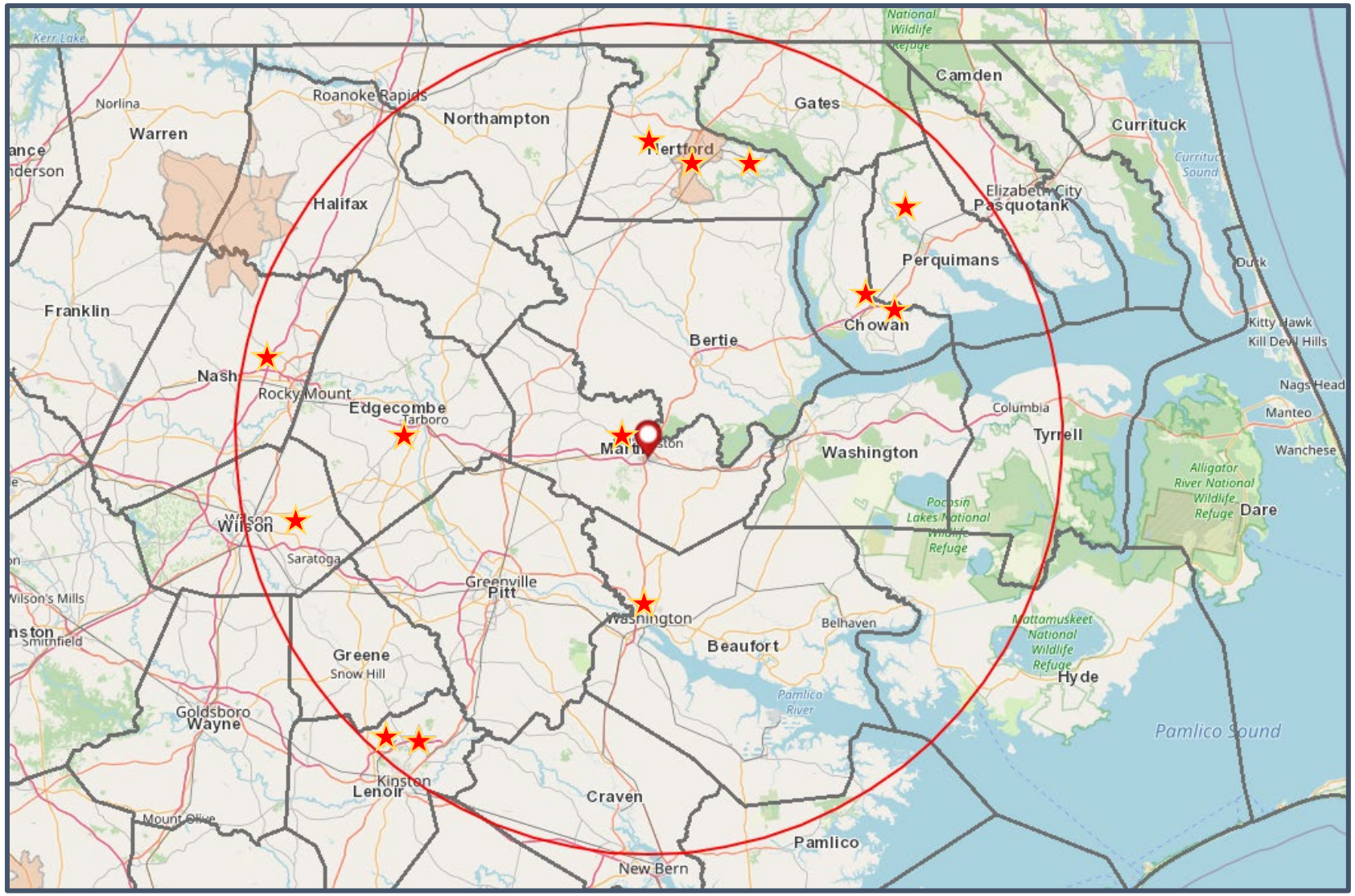
Martin Community College



- Accounting & Finance
- Applied Engineering Technology
- Business Administration
- Computer-Integrated Machining
- Electrical Systems Technology
- Industrial Systems Technology
- Information Technology
- Mechanical Engineering Technology
- Welding Technology

Within 50-miles of Martin County Seat…

- Offshore and marine trades
- Power systems and automation
- Power transformers
- Steel manufacturing, fabrication, and products
- Lubrication systems and parts
- Metal fabricators
- Welding
- 3-D molding
- Consulting, contractors
- Industrial maintenance



Offshore Wind
A Win-Win-Win for North Carolina

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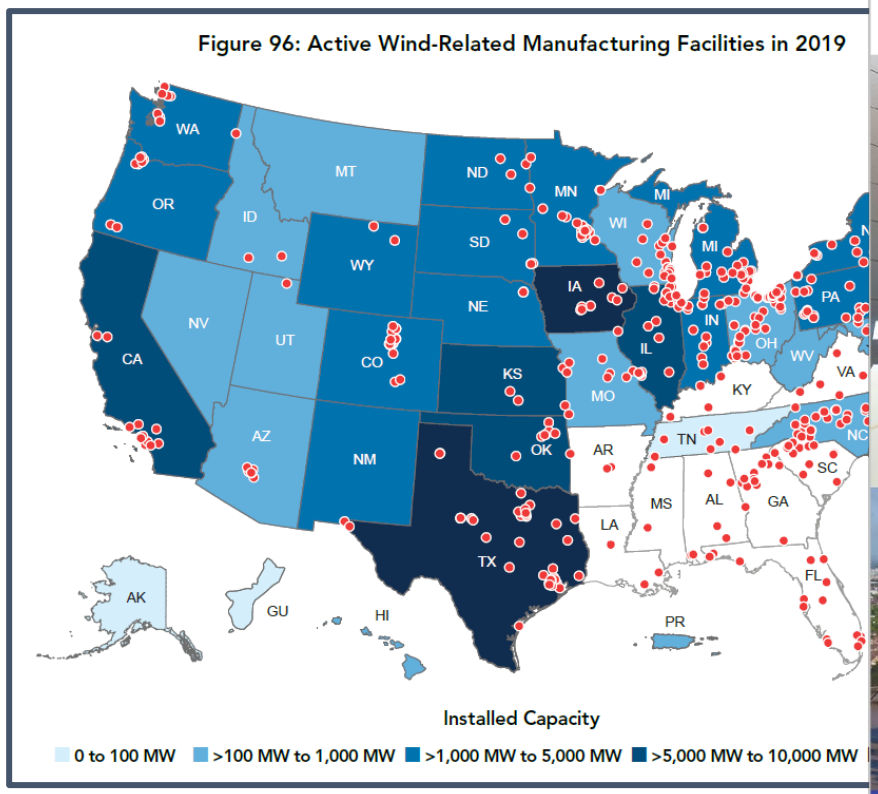
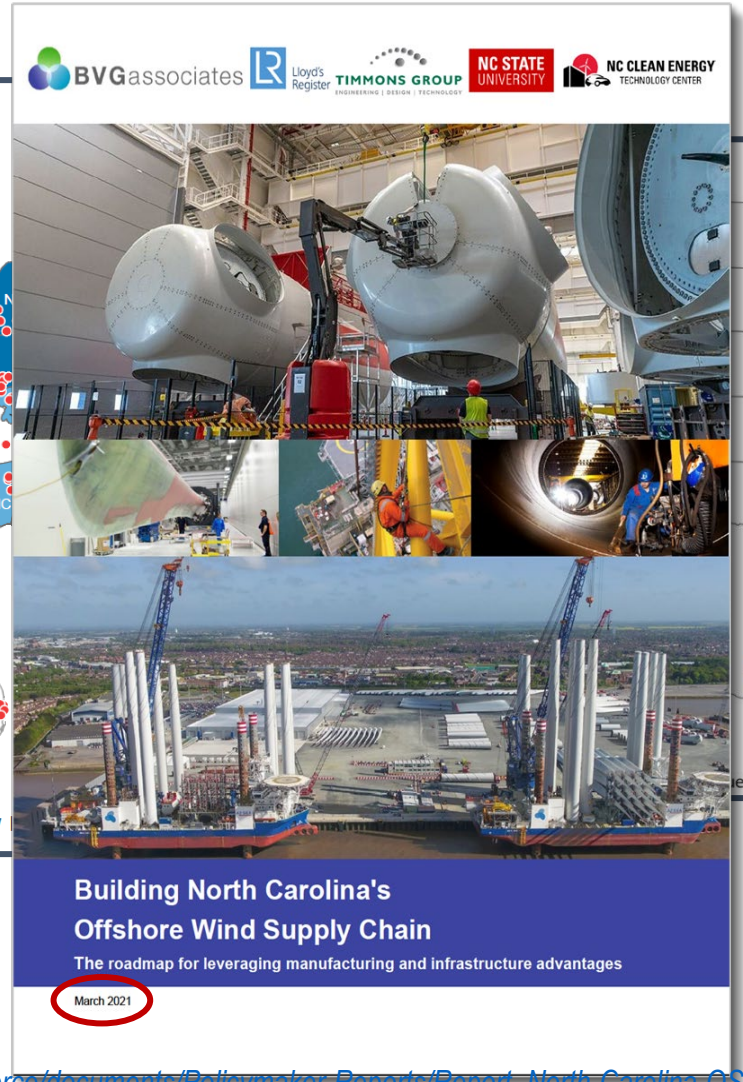
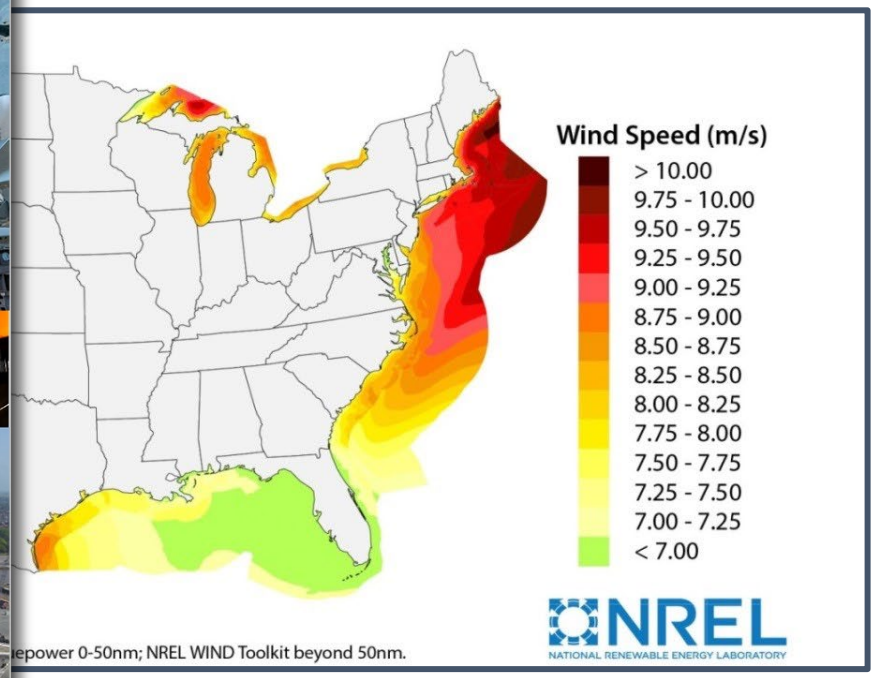
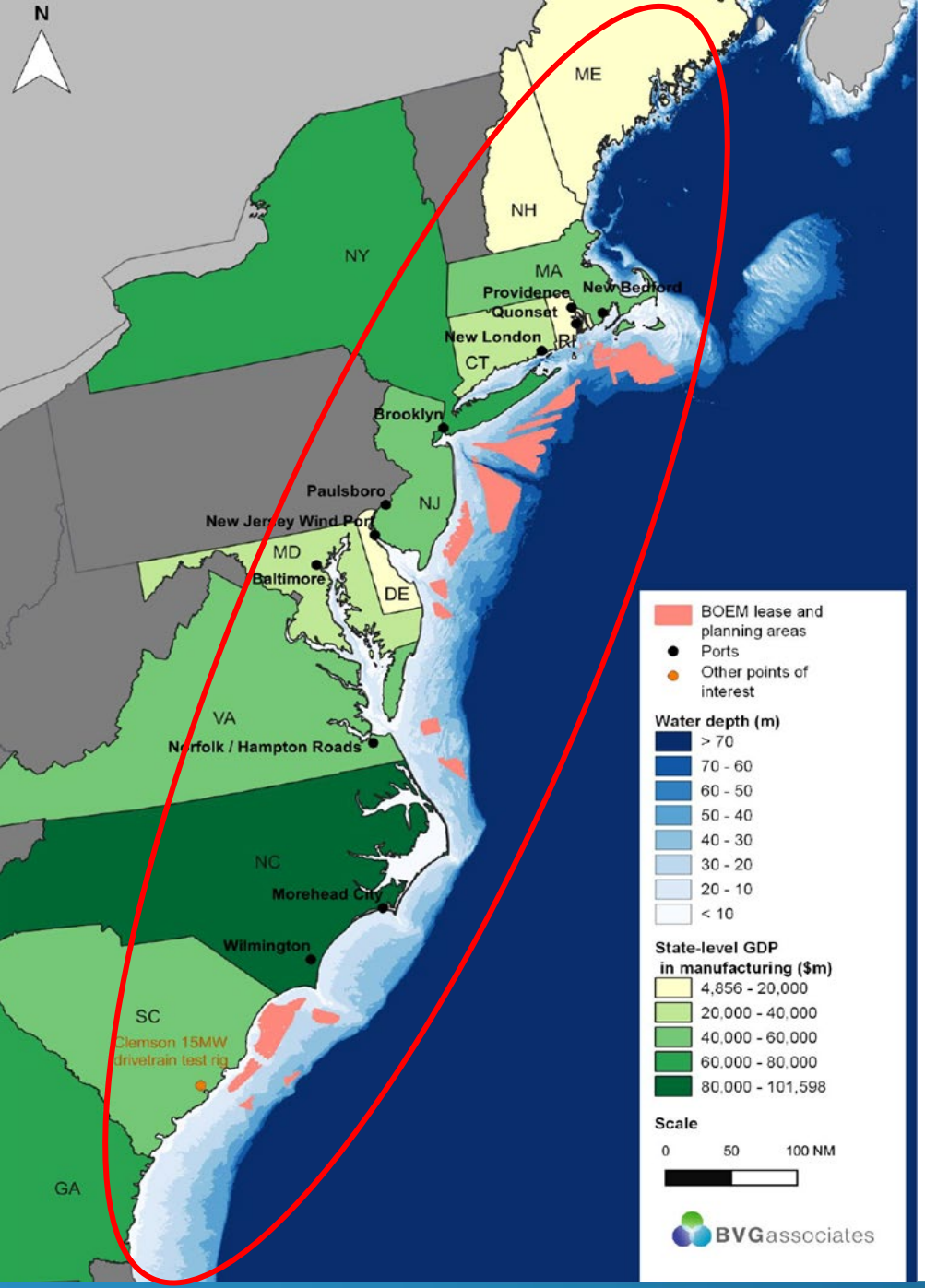
Offshore Wind
3. Potential $100B Investment Opportunity







https://files.nc.gov/nccommerce/documents/Policymaker-Reports/Report_North-Carolina-OSW-Supply-Chain-Assessment_BVGAssociates_asPublished-Mar3-2021.pdf



North Carolina

An OSW Manufacturing Powerhouse

1. Ranks 5th for manufacturing GDP in U.S. & 1st on East Coast
2. Employs > 470,000 workers at 10,250 companies (1st in Southeast)
3. Can supply major-, lower-level components, and materials for entire East Coast OSW market
4. Waterfront infrastructure assets

OSW is a HUGE Economic & Business Development Opportunity

A Supply Chain Road Map for Offshore Wind Energy in the United States

Matt Shields,[1] Jeremy Stefek,[1] Frank Oteri,[1] Matilda Kreider,[1] Elizabeth Gill,[1] Sabina Maniak,[1] Ross Gould,[2] Courtney Malvik,[2] Sam Tirone,[2] and Eric Hines[3]

1 National Renewable Energy Laboratory
2 Business Network for Offshore Wind
3 Tufts University

https://www.nrel.gov/wind/offshore-supply-chain-road-map.html

NREL is a national laboratory of the U.S. Department of Energy
Office of Energy Efficiency & Renewable Energy
Operated by the Alliance for Sustainable Energy, LLC

This report is available at no cost from the National Renewable Energy Laboratory (NREL) at www.nrel.gov/publications.

Contract No. DE-AC36-08GO28308

Technical Report
NREL/TP-5000-84710
January 2023

Required Resources To Deploy 30 GW of Offshore Wind Energy by 2030

- **2,100** Wind turbines
- **2,100** Foundations
- **6,800** Miles of cable
- **58** Crew transfer vessels
- **4–6** Wind turbine installation vessels
- **11** Service operation vessels
- **4** Cable lay vessels
- **2** Scour protection installation vessels
- **4–8** Transport vessels
- **4–6** Heavy lift vessels
- **12,300–49,000** Full-time equivalents average annual workforce

Investments in Manufacturing Facilities Needed To Establish a Supply Chain by 2030

- **$3.5 billion** Wind turbines
- **$1.3 billion** Substructures
- **$1.8 billion** Electrical components
- **$3.5 billion** Installation vessels
- **$8 billion** Ports
- **$3 billion** Steel plates
- **$1.3 billion** Other components

NC projected to be leading state for Tier 2 and Tier 3 OSW subassemblies and subcomponents

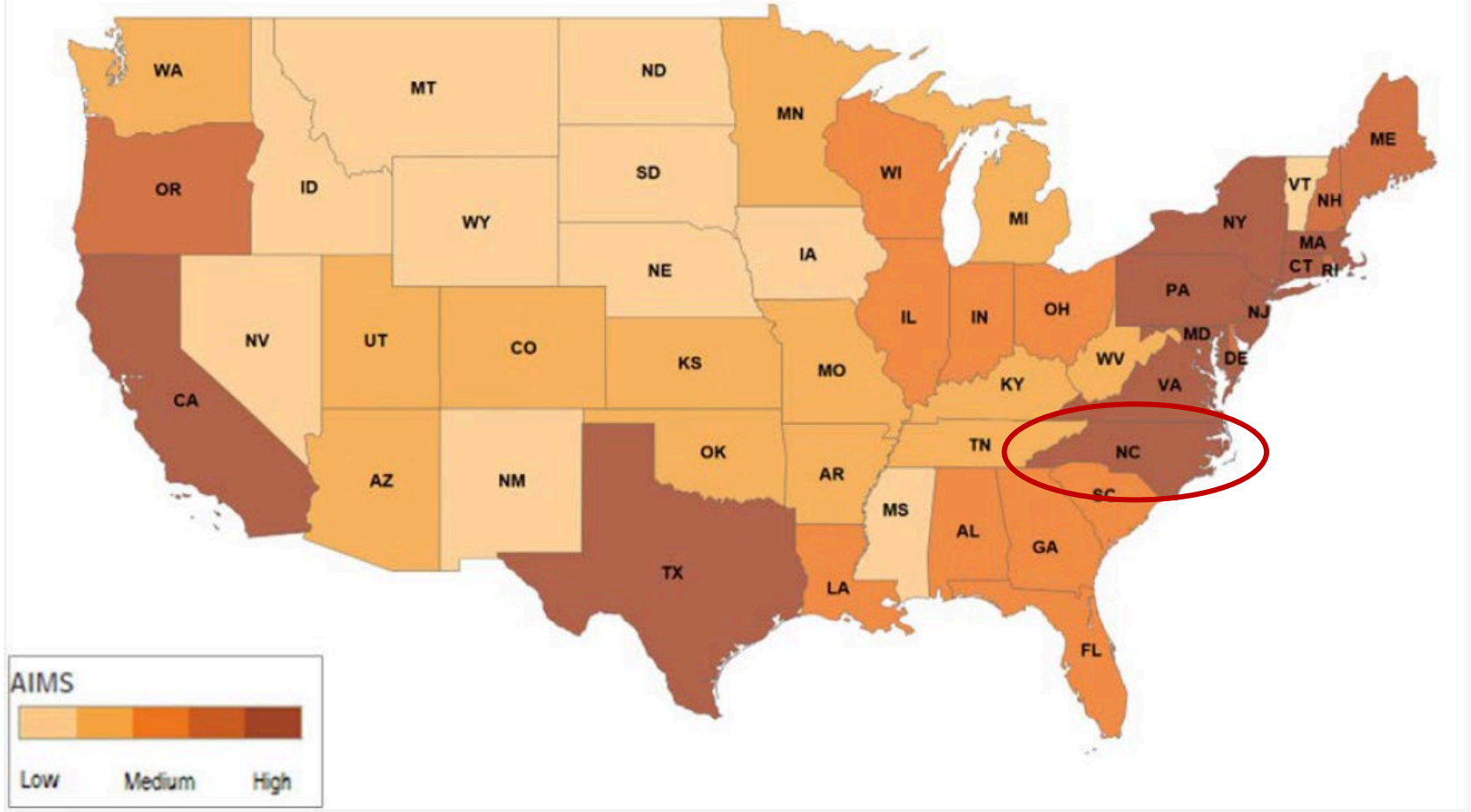


Figure 20. State adjacent industry manufacturing scale (AIMS) levels to produce Tier 2 and Tier 3 subassemblies and subcomponents for major offshore wind components for the domestic supply chain scenario

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5. Improved air quality/public health benefits
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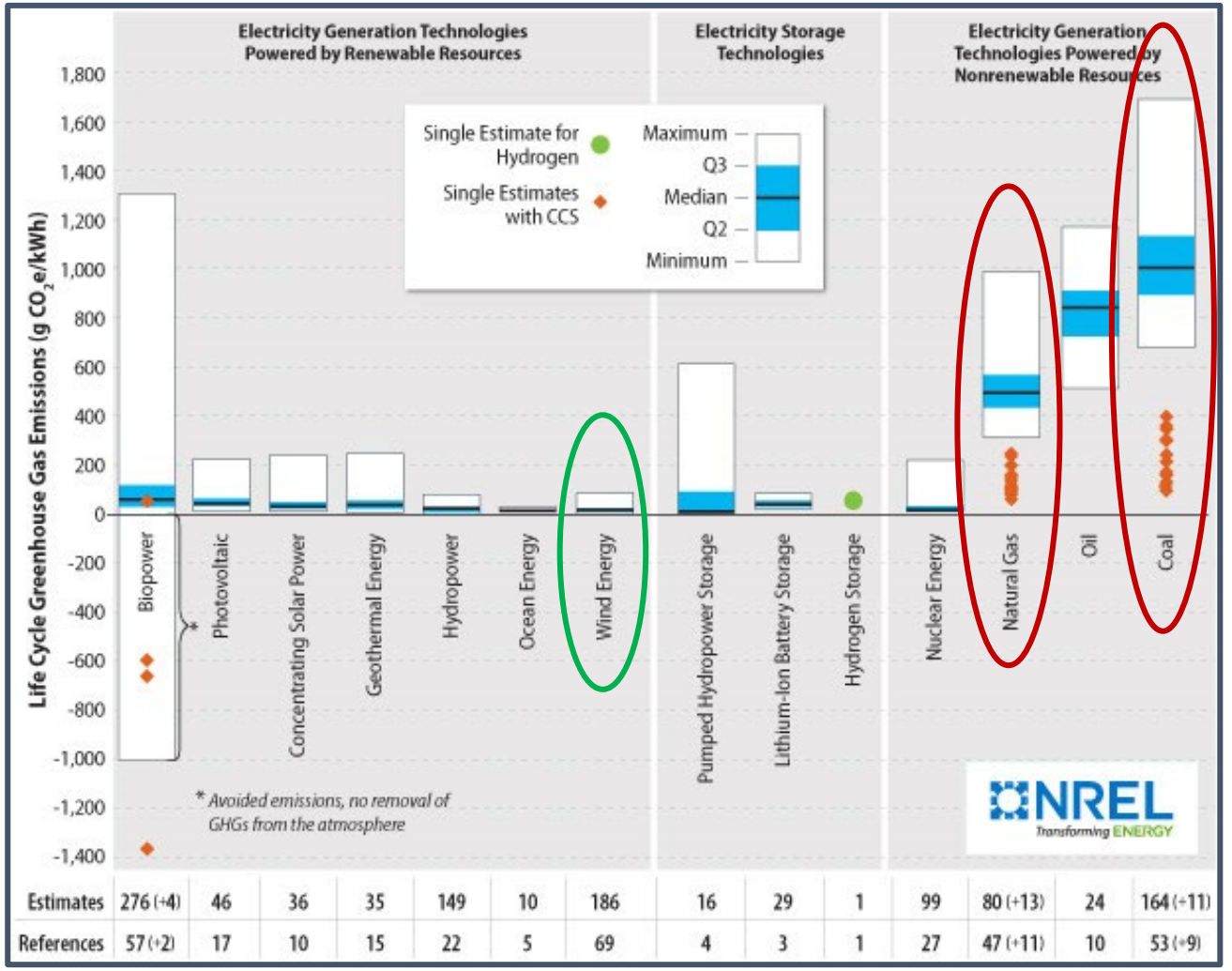
Offshore Wind
4. Renewable, Carbon-Free Energy Resource

Wind energy has a comparatively modest life-cycle greenhouse gas emissions footprint

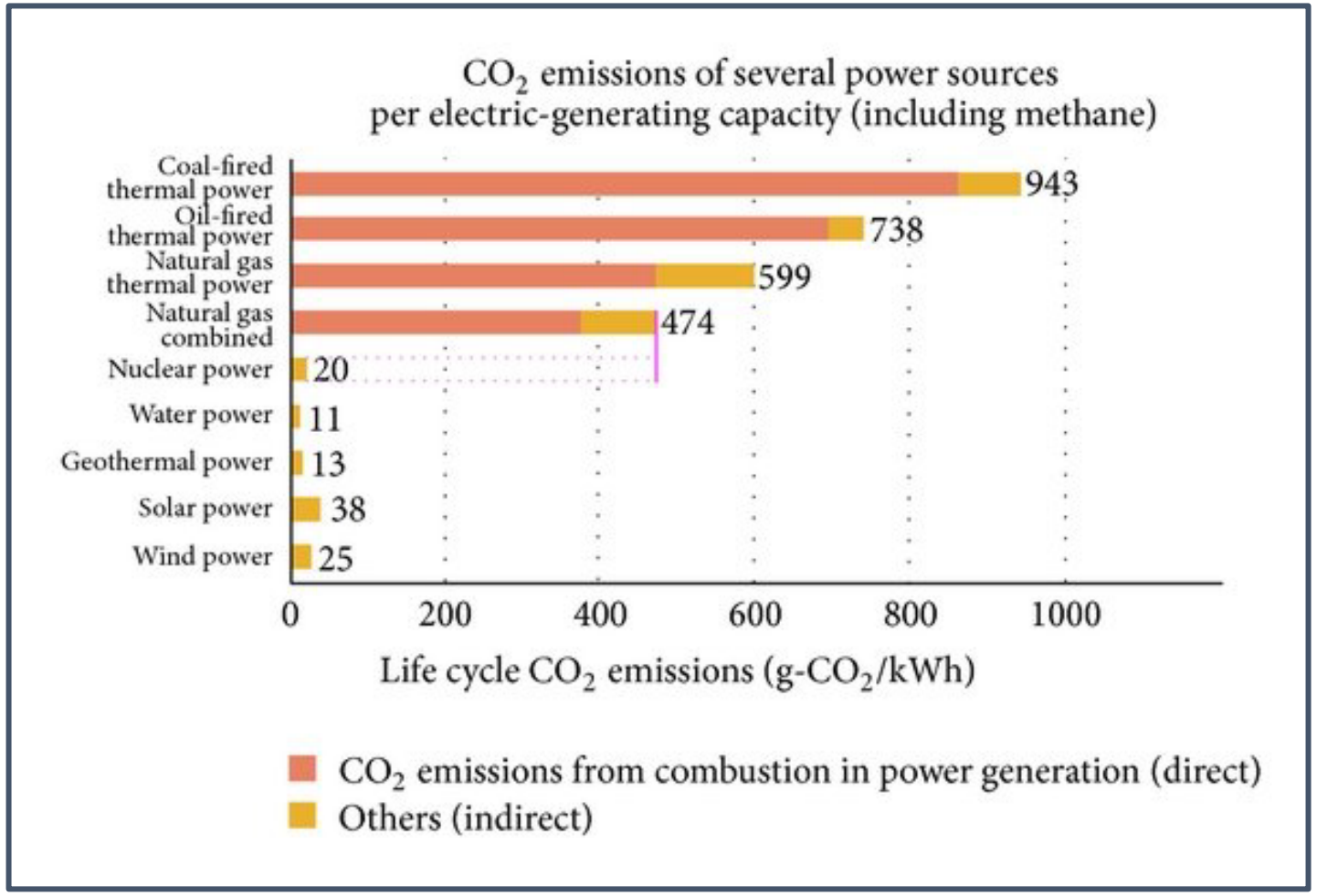


https://www.nrel.gov/analysis/life-cycle-assessment.html

Offshore Wind
Renewable, Carbon-Free Energy Resource (cont'd)

Wind turbines average just 25 grams of CO_2 emissions per kilowatt-hour (kWh) of electricity generated compared to:

- 38g/kWh for solar
- 474-599g/kWh for natural gas
- 943g/kWh for coal



https://www.researchgate.net/publication/258399637_Reducing_Carbon_Dioxide_Emissions_from_Electricity_Sector_Using_Smart_Electric_Grid_Applications#read

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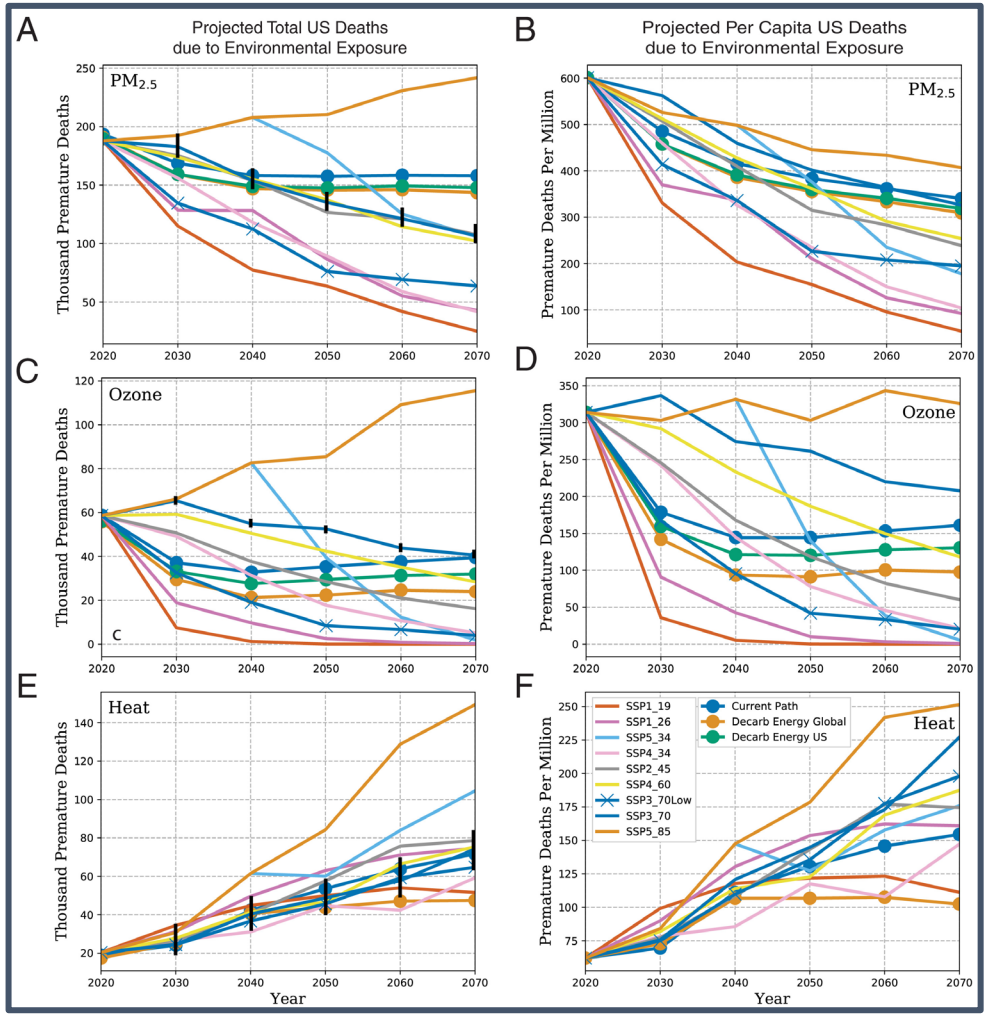
Offshore Wind

5. Improved Air Quality = Public Health Benefits

- **Reducing GHG emissions to mitigate climate change can result in health co-benefits**
- **Over the next 50 years, meeting the goals of the Paris Agreement could prevent (in the U.S.):**
  - ➢ 4.5M premature deaths
  - ➢ 1.4M hospitalizations/ER visits
  - ➢ 300M lost workdays
  - ➢ 1.7M incidences of dementia
  - ➢ 440M tons of crop losses nationwide



https://www.nasa.gov/feature/esnt/2021/reducing-emissions-to-mitigate-climate-change-could-yield-dramatic-health-benefits-by-2030

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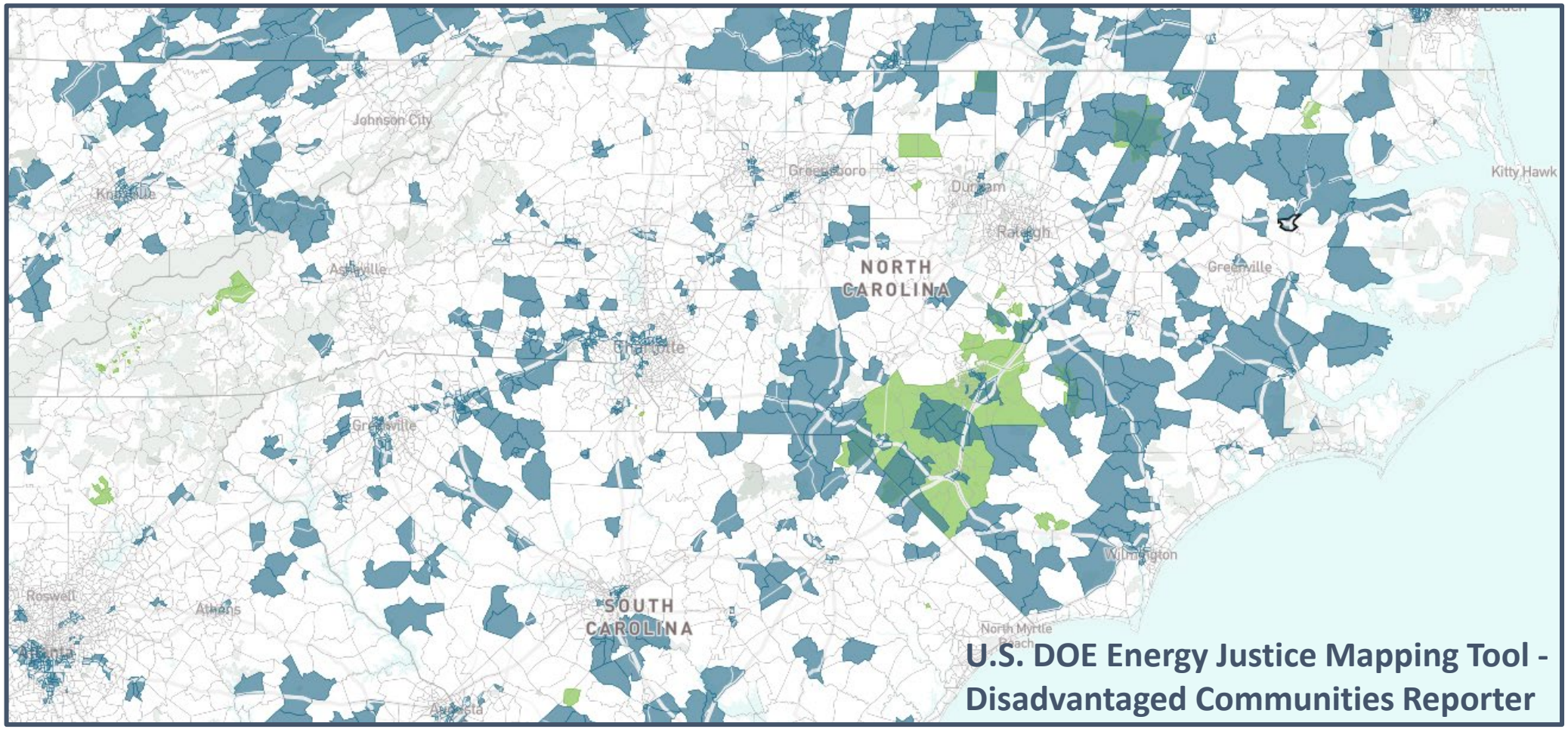
Offshore Wind
6. Investments in Under-served/-resourced Communities

- **Presidential EO 14008: *Executive Order on Tackling the Climate Crisis at Home and Abroad***
- **Gubernatorial EO 246: *NC's Transformation to a Clean, Equitable Economy***
  - Economy-wide GHG reductions
  - Increase # of registered ZEVs
  - **Justice and equity embedded throughout executive agencies**

https://www.usnews.com/news/politics/articles/2022-04-12/wh-environmental-justice-advisors-press-for-justice40; https://www.commerce.nc.gov/guidelines-north-carolina-offshore-wind-development-facts-and-fundamental-values/open

Offshore Wind
Investments in Underserved/Under-resourced Communities



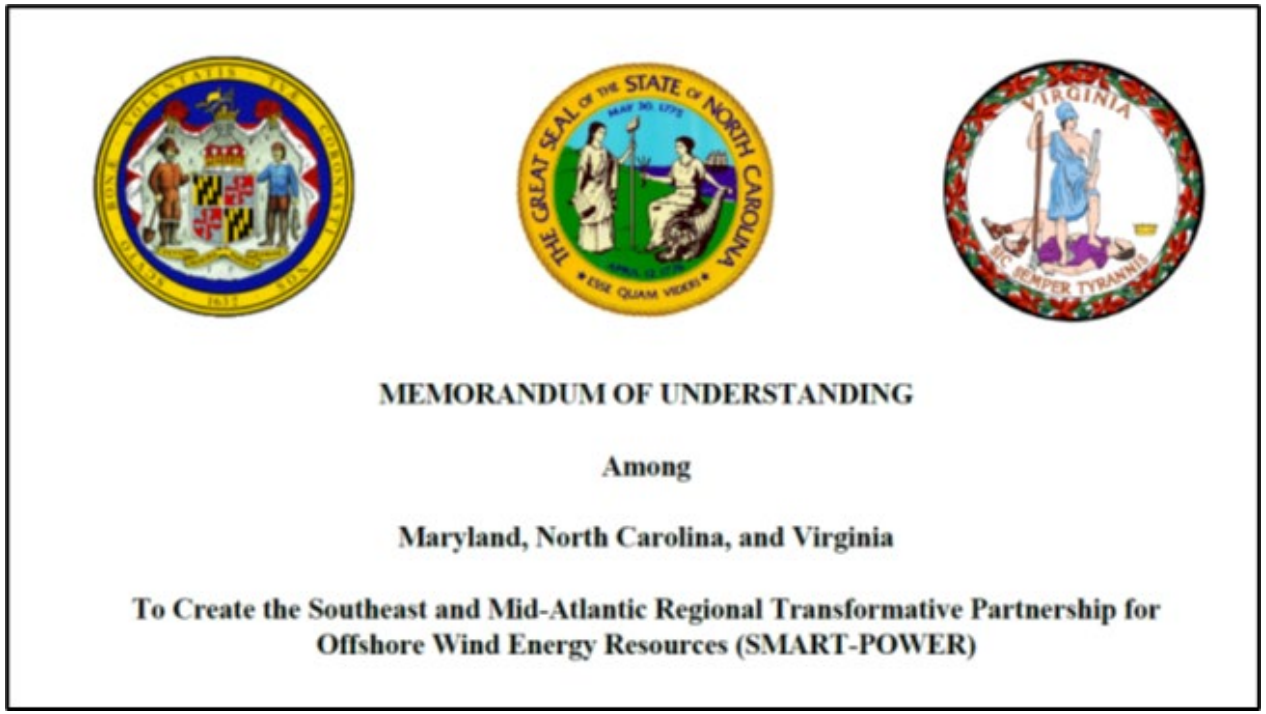
https://www.commerce.nc.gov/grants-incentives/county-distress-rankings-tiers; https://www.energy.gov/diversity/justice40-initiative; https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad

Seizing NC's Offshore Wind Opportunity
NC TOWERS, SMART-POWER, and other acronyms

North Carolina Taskforce for Offshore Wind Economic Resource Strategies

NC TOWERS

- **EO 218 created NC TOWERS**
  - Focus on economic opportunity and workforce development
  - Four subcommittees working to accomplish directives
- **SMART-POWER regional partnership**
- **MOUs signed with the UK and Denmark**



MEMORANDUM OF UNDERSTANDING

Among

Maryland, North Carolina, and Virginia

To Create the Southeast and Mid-Atlantic Regional Transformative Partnership for Offshore Wind Energy Resources (SMART-POWER)

Offshore Wind is a Win-Win-Win-Win-Win-Win for North Carolina

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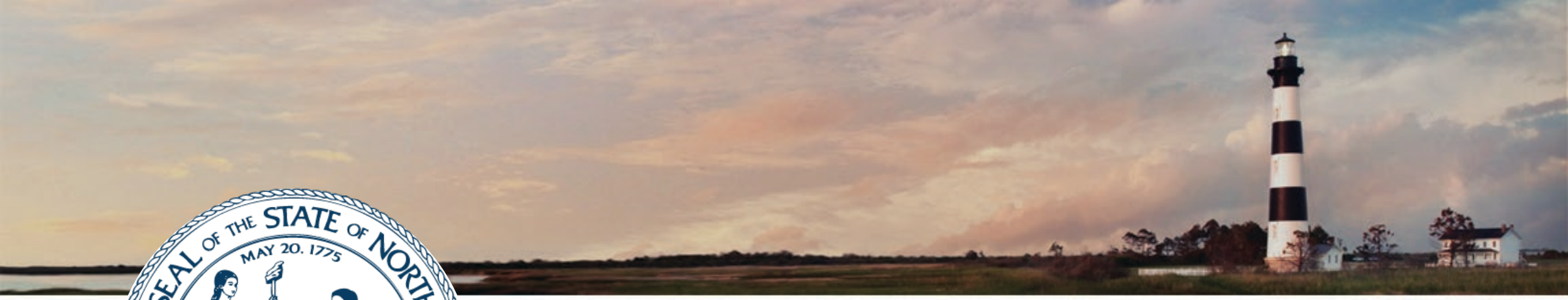
Call to action/Question for you

What are you willing to do to bring these opportunities to your communities?



commerce.nc.gov

Additional Resources

1. *Visit the NC TOWERS website, meetings and subcommittees*
2. *Subscribe to our monthly newsletter / OSW industry list*
3. *Learn more about NC OSW efforts*
4. *Contact me directly!*

JENNIFER MUNDT
Jennifer.Mundt@commerce.nc.gov
(919) 441-7430

North Carolina and the Offshore Wind Industry
Links to References and Primary Sources

- Executive Order 80: https://governor.nc.gov/documents/files/executive-order-no-80-north-carolinas-commitment-address-climate-change-and-transition-clean-energy/open
- NC Clean Energy Plan: https://files.nc.gov/ncdeq/climate-change/clean-energy-plan/NC_Clean_Energy_Plan_OCT_2019_.pdf
- SMART-POWER MOU: https://files.nc.gov/governor/documents/files/SMART-POWER-MOU_FINAL.pdf
- OSW Supply Chain Report: https://www.commerce.nc.gov/report-building-north-carolinas-offshore-wind-supply-chain/open
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- Energy Solutions for NC *(HB 951):* https://www.ncleg.gov/BillLookUp/2021/h951
- Carbon Plan Order: https://starw1.ncuc.gov/NCUC/ViewFile.aspx?Id=7b947adf-b340-4c20-9368-9780dd88107a
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- How Green Is Wind Power, Really: https://www.forbes.com/sites/christopherhelman/2021/04/28/how-green-is-wind-power-really-a-new-report-tallies-up-the-carbon-cost-of-renewables/?sh=5e2c4d0a73cd
- Bernstein Research
- Proceedings of the National Academies of Science: https://www.nasa.gov/feature/esnt/2021/reducing-emissions-to-mitigate-climate-change-could-yield-dramatic-health-benefits-by-2030