

# Costs and Impacts of Offshore Wind Development on North Carolina

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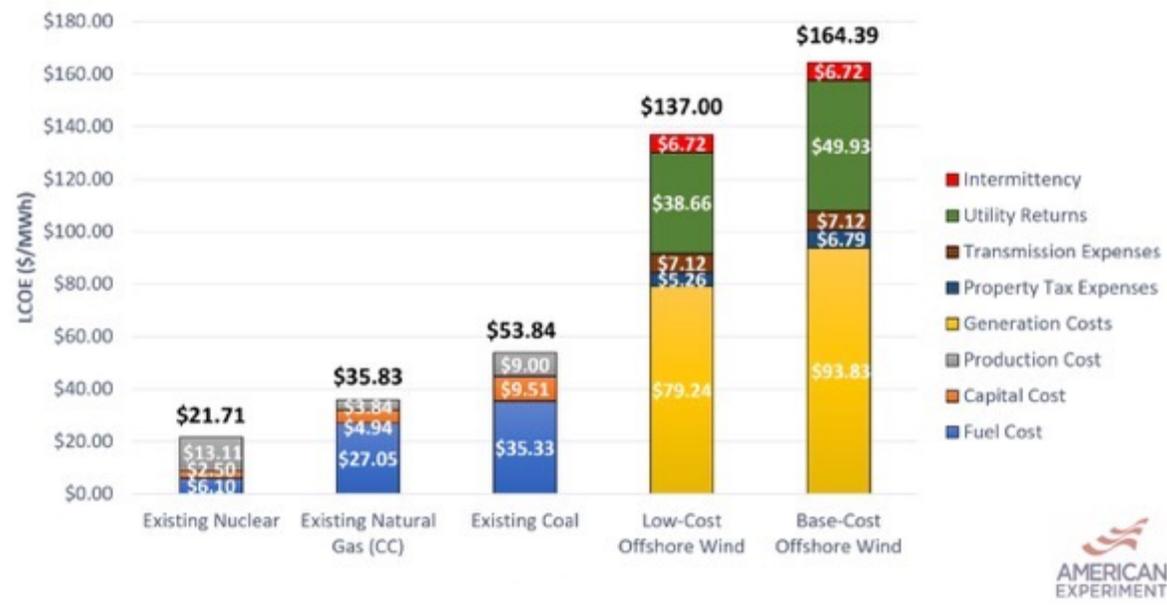
# 8 GW of Offshore Wind: Cost and Impacts to Electricity Consumers

- Estimated cost would be \$55.7 billion to \$71.5 billion
- Electricity rates would increase 28%–36% over 2020 levels
- Average cost increase per consumer: \$330–\$425 per year, reaching as high as \$641–\$823 in 2040
- Residential customers will pay around \$400 to \$500 extra per year
- New offshore wind energy facilities would cost \$137.00–\$164.39 per megawatt-hour (MWh) to build
- NC's nuclear plants generate electricity at \$21.71/MWh; our natural gas plants, \$35.83/MWh

Annual additional cost of adding 8 GW of offshore wind by 2040, scenario range



Levelized cost of existing power plants vs. new offshore wind, low-cost scenario

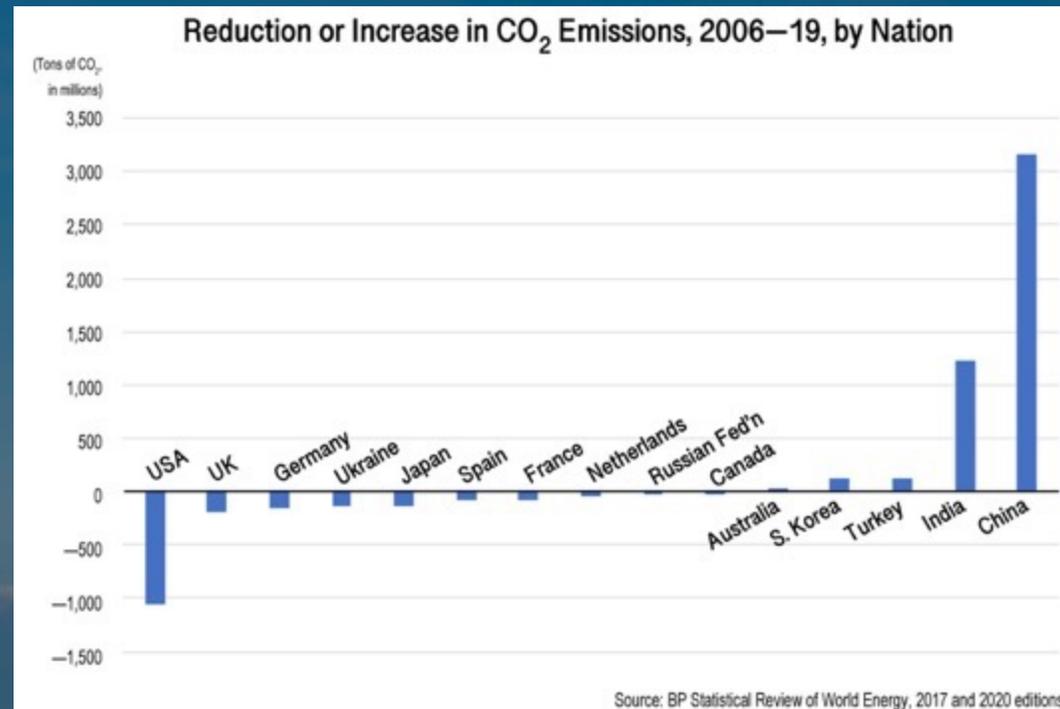




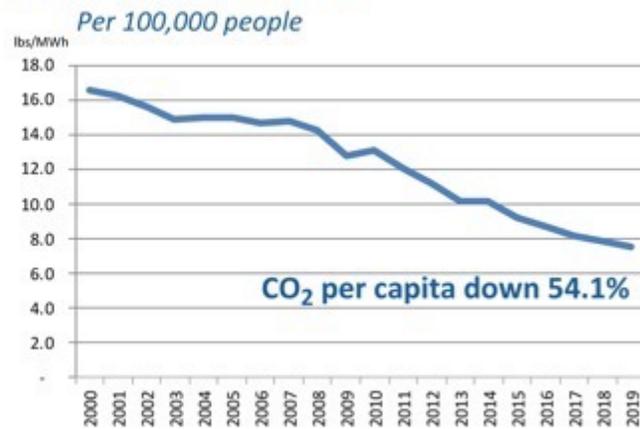
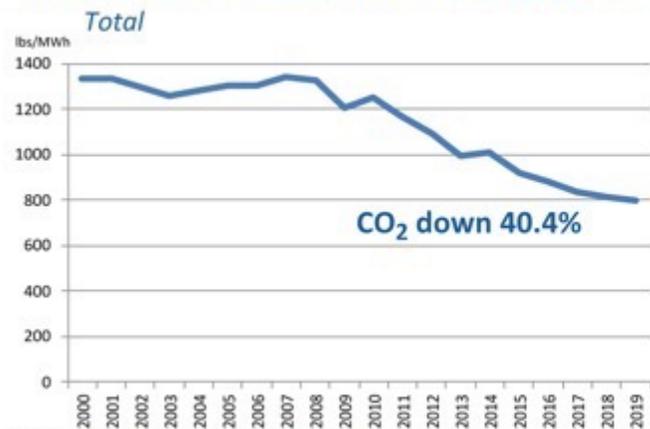
# NC's CO<sub>2</sub> Emissions and Climate Impact

- BOEM in 2021: "there would be no collective impact on global warming as a result of offshore wind projects"
- NC occupies only 0.00027 of the surface of the Earth — even if we stopped producing everything it could make no measurable impact on the climate
- Throughout the 21<sup>st</sup> century NC's energy-based CO<sub>2</sub> emissions have been falling dramatically
- Even with the estimated CO<sub>2</sub> emissions reductions from 8 GW offshore wind, it would take *nearly 27 years* to offset the additional CO<sub>2</sub> added by China just in 2019
- A focus on zero-emissions energy that favored lower costs, higher capacity factors, reliability, and dispatchability would invariably favor more nuclear generation
- Focusing on low emissions, low costs, reliability, and dispatchability would favor more natural gas generation

# How China and Other Nations Obliterate NC's Falling CO<sub>2</sub> Emissions



### Carbon dioxide emissions from electricity generation in North Carolina, 2000–19



Source: U.S. Energy Information Administration

# NC's Job Creation and Economic Growth

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- NC regularly ranks at or near the top in economic and business climate rankings
- Helped by years of policymakers choosing to cut taxes, cut regulations, keep the budget in line with inflation and population growth, and add to savings
- Resulting state revenue growth has seen large budget surpluses *annually* since 2014-15
- New analysis estimates building and operating 8 GW of wind energy off the NC coast could *cost* 45,000–67,000 jobs from rate hikes and their effects
- NC is not at such a lack of job creation and economic growth to make this rushed government intervention seem worth the risks



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# Impacts from Large Electricity Price Hikes — Especially on the Poor

- Electricity price increases behave like regressive tax hikes
- Home energy prices are not considered affordable past 6% of household income
- But a significant number of NC residents pay 6-9% already
- In 2021 the poorest NC families spent as much as 29% on energy — money they couldn't spend on other family needs





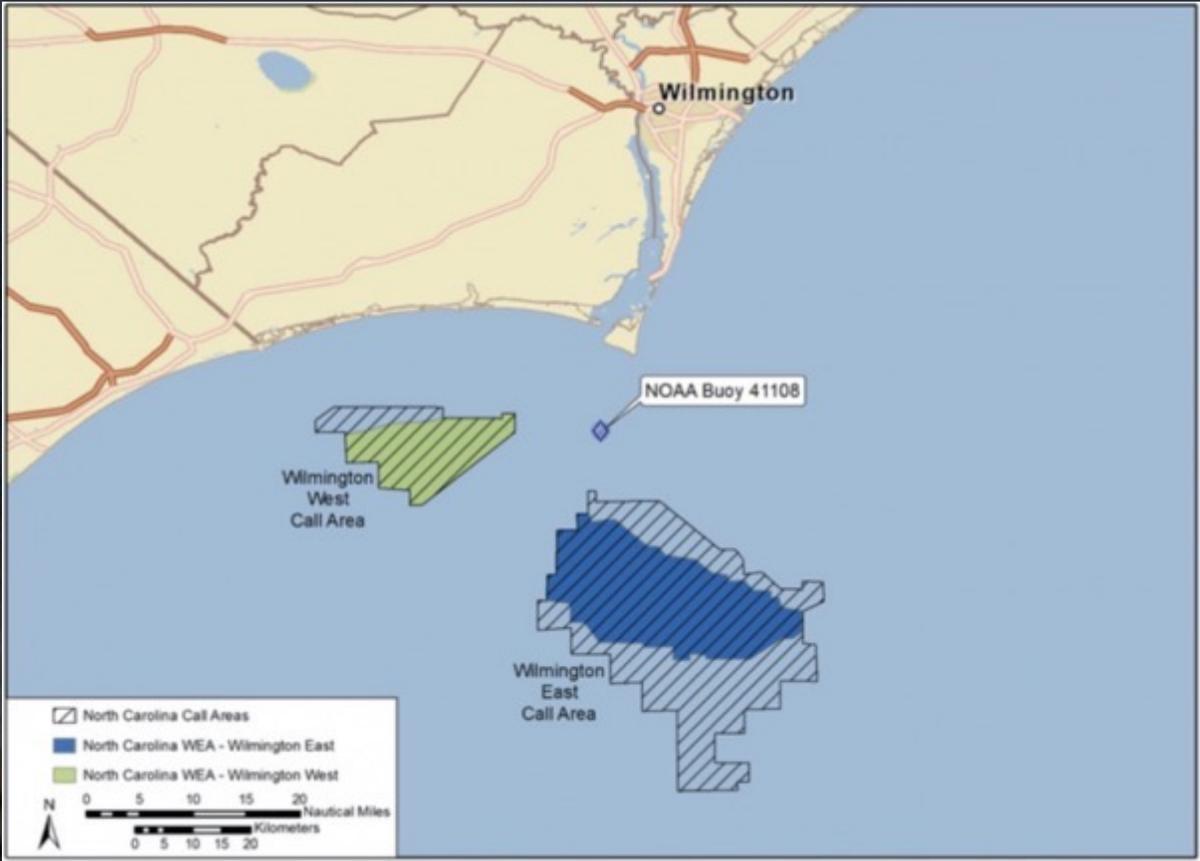
# Impacts on Coastal Tourism

- 2016 NC State survey: NC beach tourists are *highly sensitive to viewshed disruption by wind turbines*
- 54% would not rent a vacation home if turbines were visible *at all*; the rest wanted discounts
- Spoiled views of mountain ridges and fear of damaging NC local tourism and property values led to the Mountain Ridge Protection Act in 1983



# Impacts on Coastal Tourism, continued

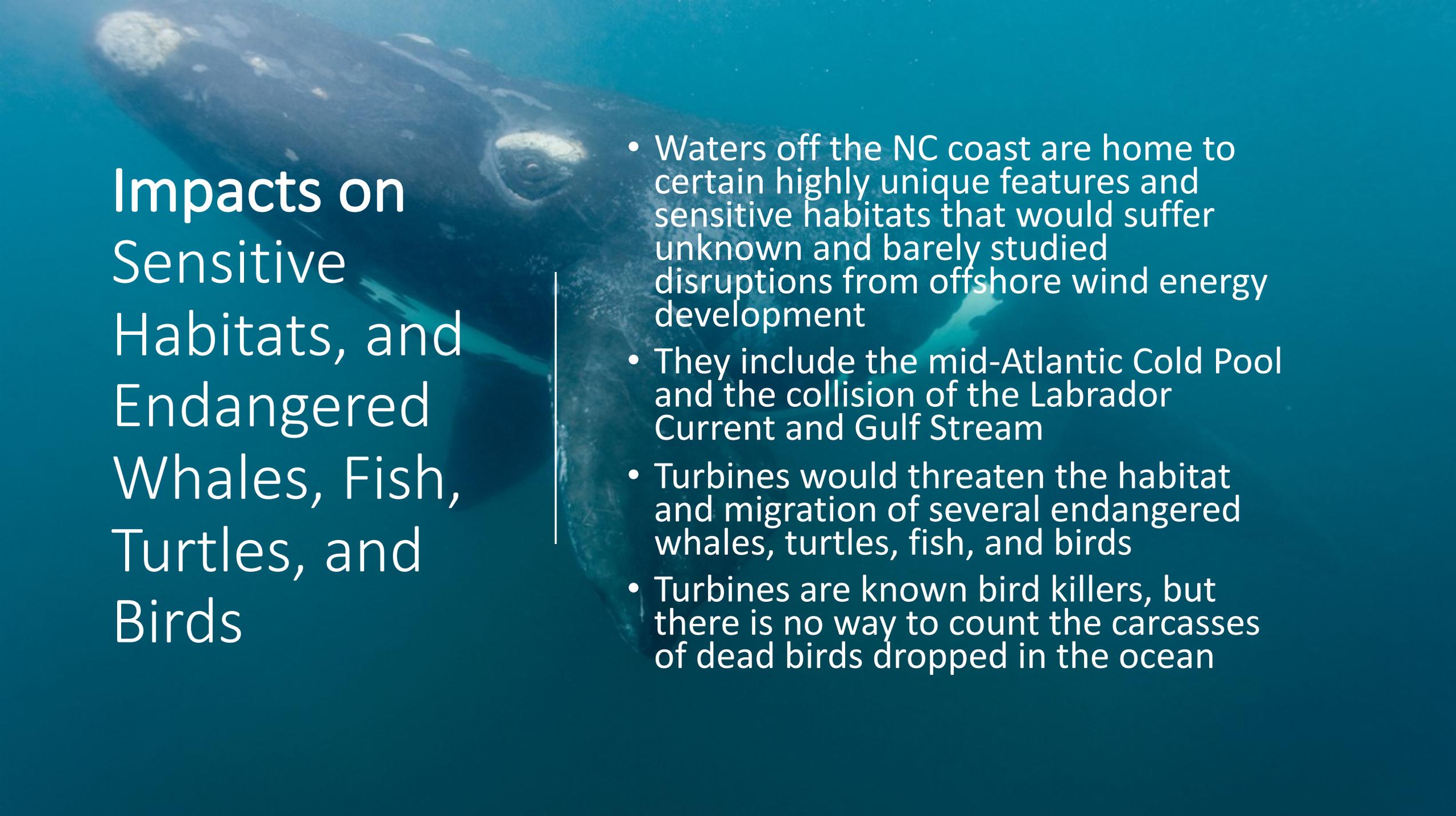
- 2015 BOEM study: wind turbines of 577 feet tall would "dominate" the horizon within 15 nautical miles from shore
- Turbines under consideration for offshore NC are up to 1,042 feet tall — *80 percent taller*
- The tallest building in N.C. is the Bank of America Corporate Center in Charlotte at 871 feet
- Wilmington East wind area is 15 nautical miles off the coast of Bald Head Island and would be *more than three times the size of the City of Wilmington*





## Impacts on Commercial Fishing and Fisheries

- 1,665 members of US fishing communities warned BOEM about offshore wind energy's threat to their industry and marine habitats, biodiversity, and oceanography
- BOEM's decision for the Vineyard Wind project anticipated commercial fishing would abandon those sites and lose income
- Negative effects on many different fish and mammal populations from offshore wind facilities include population impacts and habitat disruption from site selection, construction, and operational noise
- These effects could go *unobserved*
- Turbines interfere with the ability to estimate commercial seafood populations for determining sustainable harvest levels

A large whale, likely a humpback whale, is seen swimming underwater in clear blue water. The whale's head and eye are visible in the upper left, and its body extends towards the right. The background is a deep blue, suggesting an underwater environment.

# Impacts on Sensitive Habitats, and Endangered Whales, Fish, Turtles, and Birds

- Waters off the NC coast are home to certain highly unique features and sensitive habitats that would suffer unknown and barely studied disruptions from offshore wind energy development
- They include the mid-Atlantic Cold Pool and the collision of the Labrador Current and Gulf Stream
- Turbines would threaten the habitat and migration of several endangered whales, turtles, fish, and birds
- Turbines are known bird killers, but there is no way to count the carcasses of dead birds dropped in the ocean

# Marine Vessel Radar Disruption and Military Radar Interference

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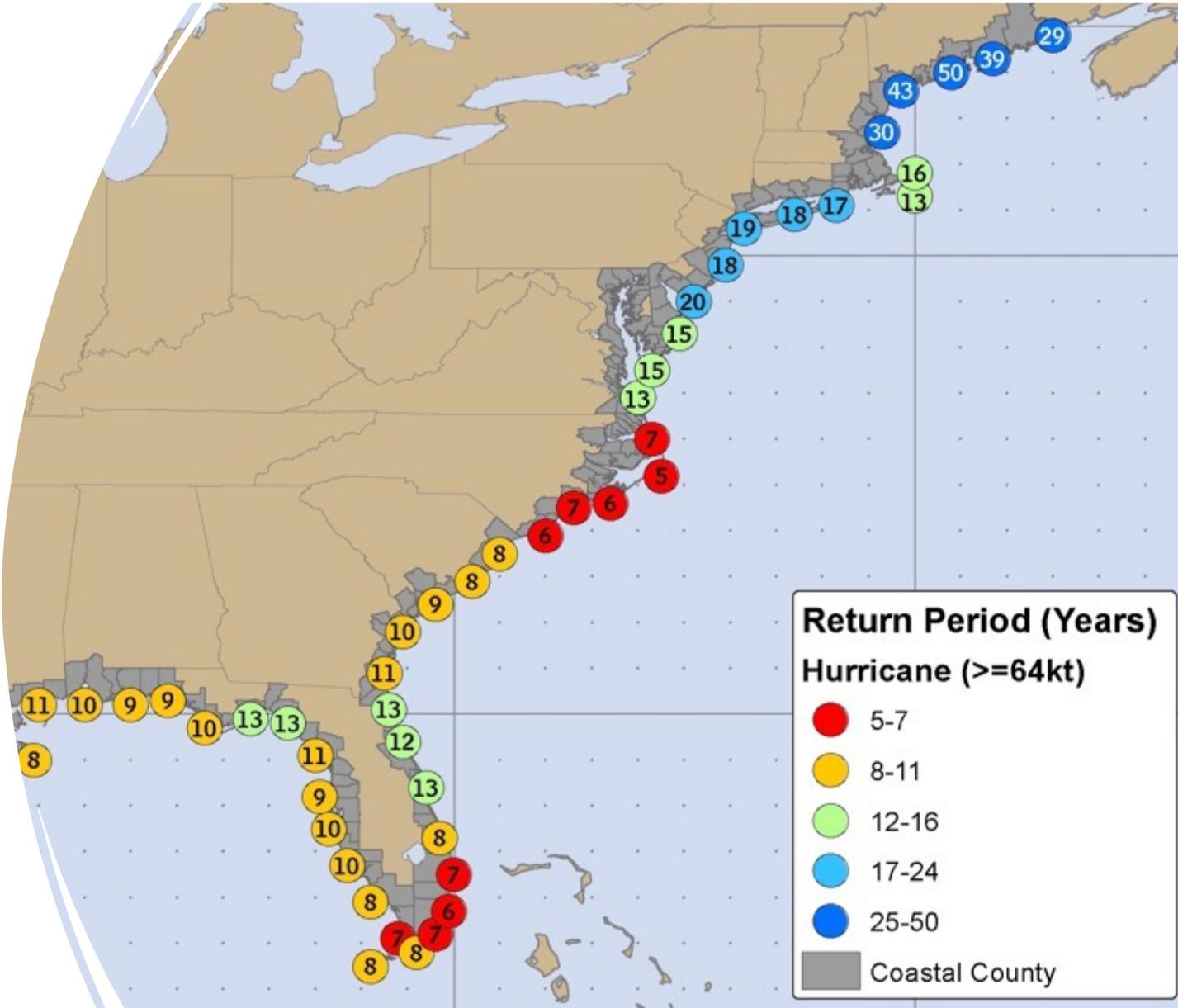
- Wind turbines pose a significant danger of disrupting marine vessel radar, which all ships use for navigation
- Electromagnetic reflectivity of the large metallic structures can interfere with radar systems, cluttering displays, creating the potential for deadly open-seas collisions
- They can also interfere with search and rescue operations near offshore wind facilities
- Turbine heights and radar interference could disrupt military Air Traffic Control and Fire Control radars, limit local air combat training and supersonic flights, and create a significant vulnerability around the Port of Wilmington

# The Unique Problem of Hurricanes

- Research estimated that nearly half the turbines in a wind farm placed in the most vulnerable areas would face destruction from hurricanes within a 20-year period
- The waters off North Carolina are frequently revisited by hurricanes, the greatest frequencies along the Atlantic Coast, rivaled only by the southern tip of Florida



# How Often Hurricanes Pass Within 50 Nautical Miles of the Coast





## “Forever Waste” from Retired and Damaged Turbine Blades

- Retired or damaged turbine blades are already a significant and growing environmental waste problem
- The blades are unrecyclable and unrepurposable "forever waste" that require either hauling away to landfills or burning in kilns
- Current landfill space is fast running out
- The bulk of blade retirements has not yet occurred even before NC adds 8 GW of offshore wind production

# Lessons and Questions from Other Offshore Wind Operations

- At the nation's first offshore wind farm, the Block Island Wind Farm off Rhode Island, stress lines in four of five turbines have already caused lengthy shutdowns
- Damages to rotors and turbine blades can lead to "no-sail zones" forbidding all maritime traffic around not only the affected facilities but also similar facilities elsewhere
- Block Island has also had an ongoing problem of undersea cables being exposed owing to the current, possibly endangering nearby underwater species while also costing electricity consumers via passthrough surcharges to pay for reconstruction



# Lessons and Questions from Other Offshore Wind Operations, continued

- Offshore wind projects can attract lawsuits from affected communities, ratepayers, interest groups, conservationists, even environmental advocates
- Vineyard Wind project currently faces five lawsuits, and affected NC communities have already signaled willingness to seek redress from courts
- Dominion Energy's Coastal Virginia Offshore Wind pilot project, completed in Sept. 2020, is a research project for gathering information about US offshore wind projects — turbine installation and operation, power output, hurricane resilience, operating and maintenance costs, supply chain issues, effects of turbine placement, and environmental effects
- *Over time* it could yield important info for NC



A man in a light blue t-shirt and dark shorts is walking on a sandy beach, holding the hand of a small child in a pink shirt and patterned shorts. They are walking away from the camera towards the ocean. The sky is blue with scattered white clouds. The text "Summary and Recommendations" is overlaid in white on the right side of the image, with a vertical white line to its left.

# Summary and Recommendations

# Study, Watch, and Wait

- The General Assembly and governor should call for a study to give full consideration of the issues raised here
- Collect information and data on the experiences with Block Island and the CVOW pilot project
- Listen to coastal communities' concerns
- Give researchers time to study potentially affected marine ecologies, habitats, and creatures more comprehensively
- Make careful study of the potential impact of hurricanes.



A photograph of a sandy beach with various seashells and a starfish. The shells are scattered on the left side, including a large scallop with red and white stripes, a white scallop, and several smaller shells. A large, light-colored starfish is positioned on the right side of the image. The background is a soft-focus view of the ocean waves breaking on the shore.

# Fully Consider the Tradeoffs Involved

- Give careful consideration to the tradeoffs between energy-based emissions and energy costs
- Also carefully consider the tradeoffs between energy costs and people's quality of life
- See if there are more optimal ways to balance those considerations

# Vigorously Protect Electricity Consumers

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- The legislature, the NCUC Public Staff, and the courts should also vigorously defend consumer protections built into state law



# Otherwise: The Proposition Before NC Policymakers



All to put the *most expensive form* of electricity generation with *enormous towers and unrecyclable wind blades* into the nation's *most hurricane-prone waters* — and say it's to reduce NC's climate emissions, create jobs, and grow the economy, which are *ongoing achievements in NC already*.

- Jack up electricity rates on everyone
- Create subsequent price increases on everything because of pervasive effect of electricity prices
- Cause people to spend an exorbitant amount of money throughout the coming decades paying for these facilities
- Inflict some unknown amount of harm to coastal communities' fishing and tourism
- Disrupt sensitive underwater habitats and threaten endangered marine animals
- Kill an uncountable number of birds
- Disrupt vessel navigation and search & rescue operations
- Introduce more intermittency and unreliability on the grid



For more information and for citations, see the John Locke Foundation Policy Report [“Big Blow: Offshore Wind Power’s Devastating Costs and Impacts on North Carolina”](#) by Jon Sanders, with analysis from Mitch Rolling and Isaac Orr of the Center of the American Experiment.