

A photograph of an offshore wind turbine in the ocean. The turbine is white with a red nacelle. The background shows a vast blue ocean under a clear blue sky. Another wind turbine is visible in the distance.

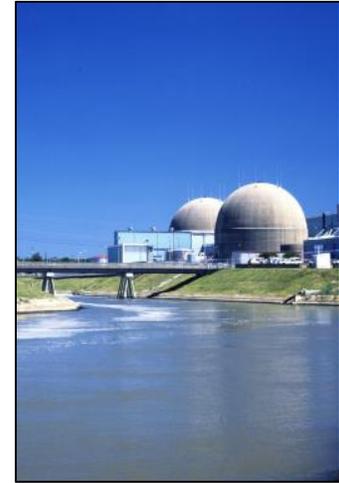
# **Coastal Virginia Offshore Wind**

**Virginia Beach Sail and Power Squadron**

**May 11, 2022**

## Dominion Energy, Inc.

- Headquartered in Richmond, VA, we employ over 17,000 people in 13 states and provide electricity and/or natural gas to more than 7 million customers
- Our vision is to become the most sustainable energy company in the country
- We are committed to achieving net zero greenhouse gas emissions – both carbon dioxide and methane – for all our electric and natural gas operations by 2050
- Achieving net zero emissions requires a shift of generation from carbon-based energy sources to low- and no-carbon sources



## Pilot Project

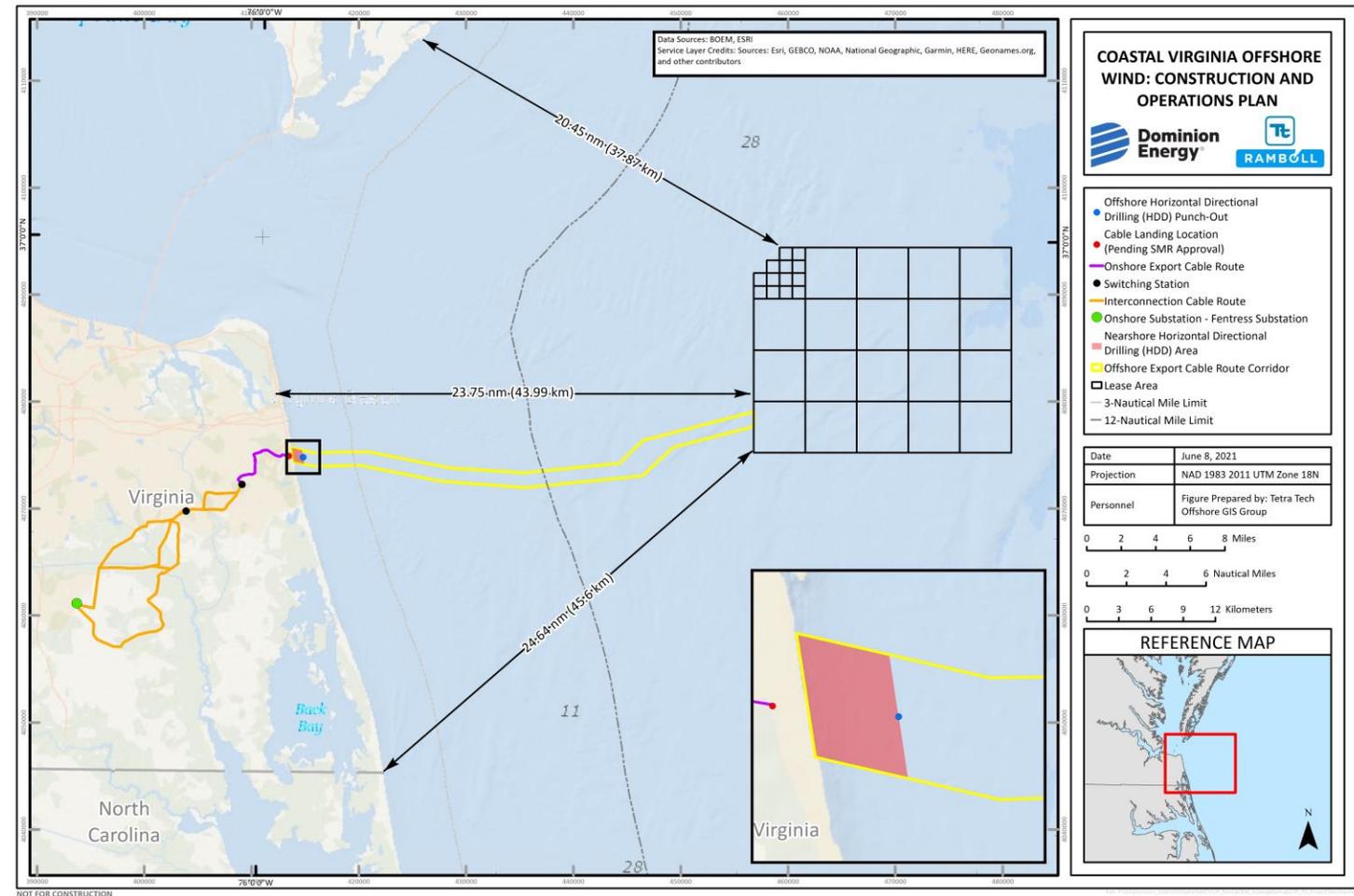
- First offshore wind project installed in federal waters and first owned by an electric utility
- Located within a 2,135-acre research lease area, 27 miles off the coast of Virginia Beach
- Two wind turbines
- 12 MW total capacity
- Enough to power up to 3,000 homes
- Began producing power in October 2020
- 47% capacity factor CY 2021



# Largest U.S. Project Under Development

## Commercial Project

- Builds on success of the two-test turbine pilot project
- Largest offshore wind project under development in the United States
- 2.6 GW total capacity (176 turbines)
- Power up to 660,000 homes
- Lease area approximately 113,000 acres (85,000 football fields)
- Located 27 to 42 miles offshore



# How Offshore Wind Works

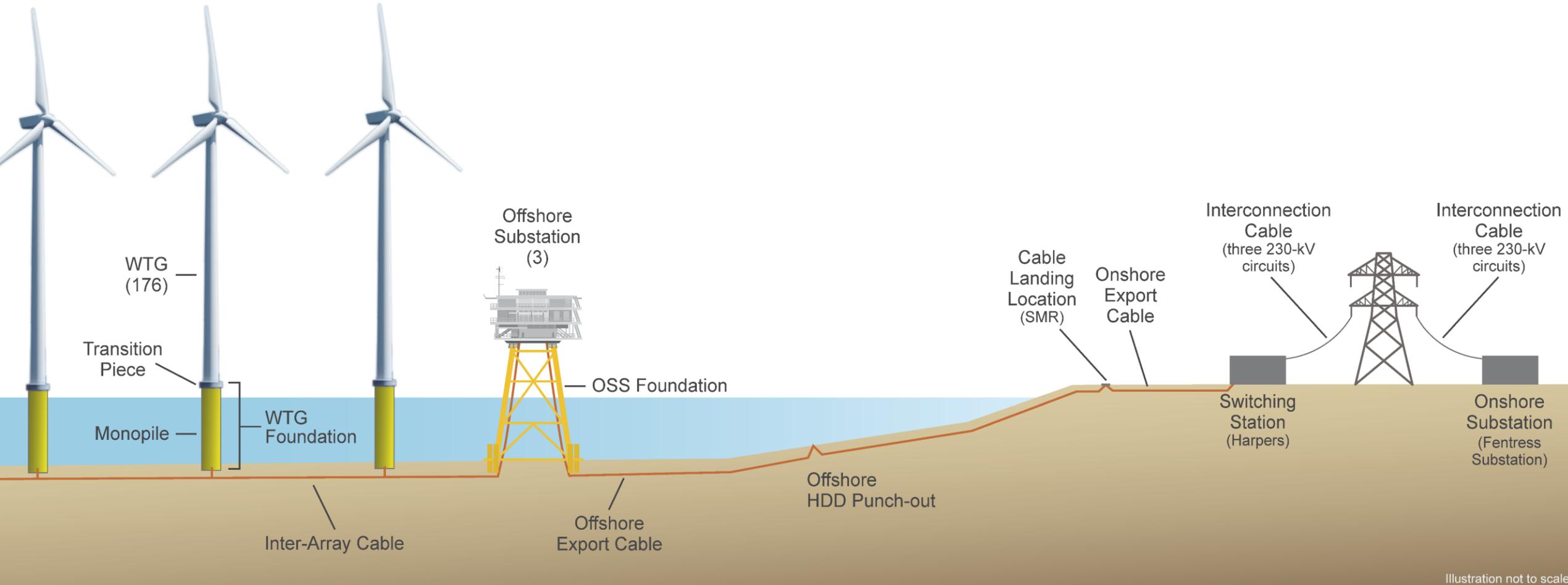
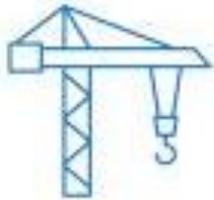


Illustration not to scale



## Wind Turbines

- 176 positions
- 14MW SGRE wind turbine
- Up to 869 feet tall



## Foundations

- Monopiles for Wind Turbines
- Open Jackets for Offshore substations



## Offshore Substations

- Up to three offshore substations
- Up to 1,000 MW
- 66kV to 230kV step up



## Inter Array Cable

- Total length up to 300 miles
- Up to 7.9 inches in diameter
- Buried up to 9.8 feet beneath the seabed



## Export Cable

- Nine 230 kV Circuits
- Total length up to 417 miles
- Up to 11.4 inches in diameter
- Buried up to 16.4 feet beneath the seabed

# What CVOW Means for the Environment

CVOW will generate 8.8 million megawatt hours annually, the equivalent of:



Taking more than one million non-EV cars off the road



Growing more than one hundred million trees for 10 years



Switching more than two hundred million incandescent light bulbs to LEDs



Charging almost eight hundred billion smartphones



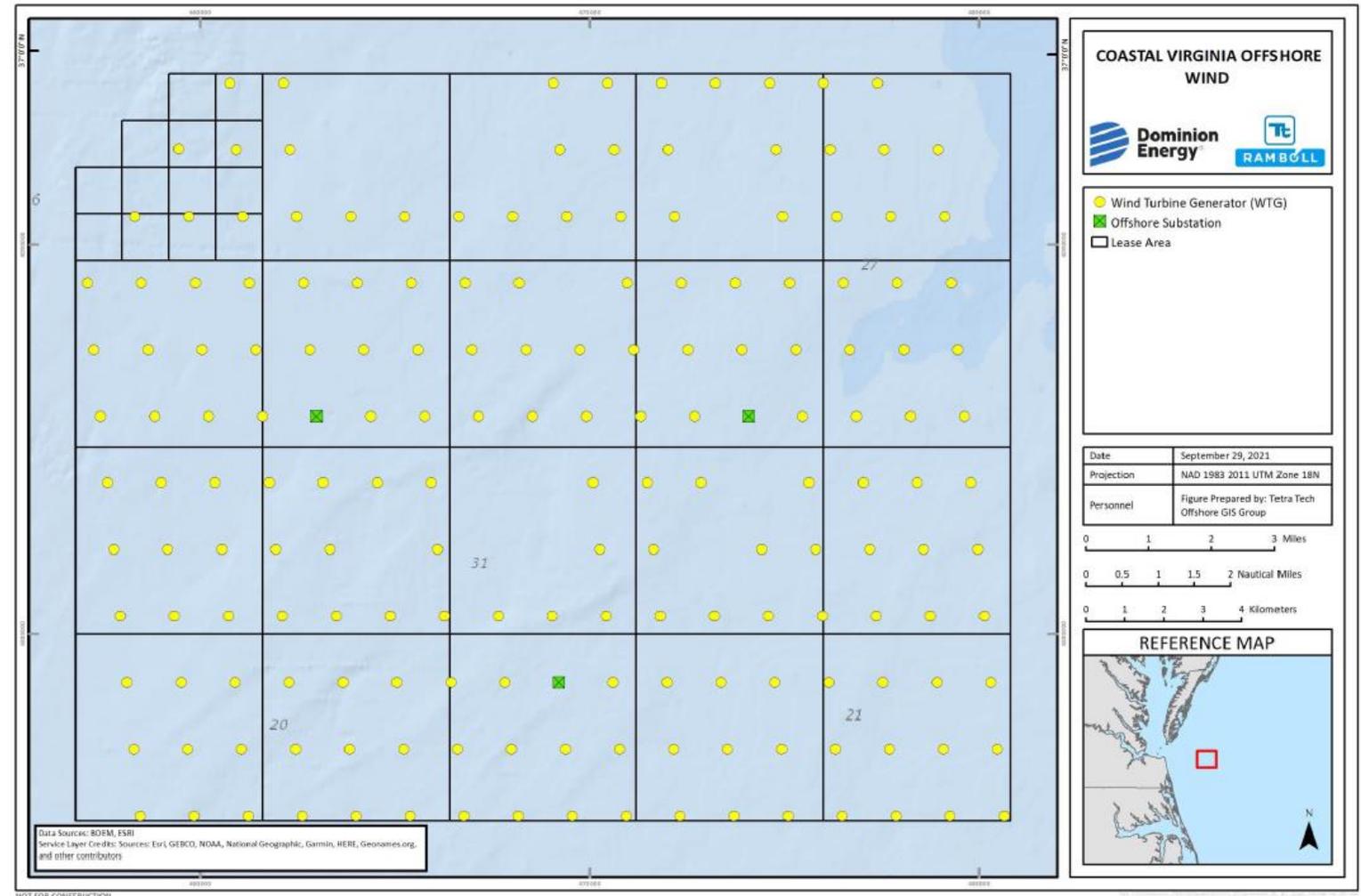
Source: Environmental Protection Agency, *Greenhouse Gas Equivalencies Calculator*.

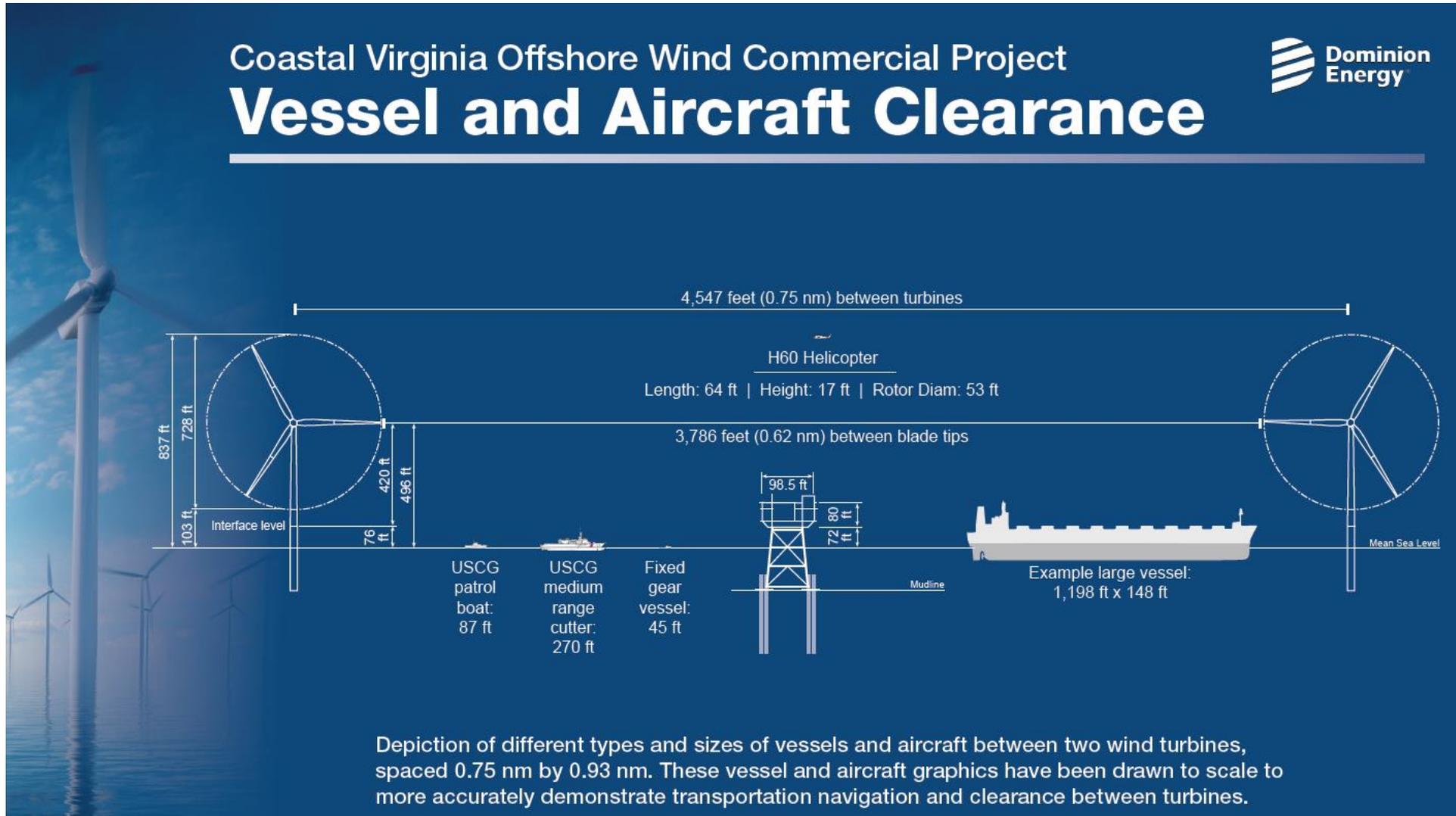
# How Big Are They?



# How Will They Be Spaced?

- 176 turbines and 3 offshore substations
- Two primary lines of orientation: 090°/270° and 174°/354°
- Distance between turbines is 1.1 miles (0.93 NM) in the N-S direction, and 0.9 miles (0.75 NM) in the E-W direction
- Multiple spare locations identified





Depiction of different types and sizes of vessels and aircraft between two wind turbines, spaced 0.75 nm by 0.93 nm. These vessel and aircraft graphics have been drawn to scale to more accurately demonstrate transportation navigation and clearance between turbines.

# Constructing CVOW With Experienced Partners

Wind Turbine Generators

Monopiles

Transition Pieces

Offshore Substations

Transport & install

**SIEMENS Gamesa**  
RENEWABLE ENERGY



**Prysmian Group**



# Installation of Monopiles and Transition Pieces



## Orion

- Delivered April 30, 2022
- 710 feet in length
- Dynamically positioned
- Motion Compensated Pile Gripper (MCPG)
- 5,511 ton lifting capacity

# Installation of Towers, Nacelles and Blades



## Charybdis

- Based in Hampton Roads
- 1<sup>st</sup> Jones Act compliant WTIV
- Delivery expected late 2023
- 472 feet in length
- 119 crew
- 2,200 ton lifting capacity
- Jack-up vessel



# Atlantic Wind **TRANSFERS**

## Atlantic Endeavor

- Based in Hampton Roads
- 2<sup>nd</sup> Jones Act compliant CTV
- 68 feet in length
- 2-4 crew and 24 wind techs
- 22 to 26 kt service speed, 29 kt sprint
- 11-ton cargo capacity
- IMO HSC Code compliant

# Service Operations Vessel



**SIEMENS** Gamesa  
RENEWABLE ENERGY

## Long Term Service Agreement

- SOV based in Hampton Roads
- Walk to work concept
- Crew of approximately 80



## Lamberts Docks

Fairwinds Landing, a new partnership made up of The Miller Group of VA Beach and other local developers, signed an agreement with Norfolk Southern to redevelop the 111-acre property adjacent to the Lamberts Point Coal Terminal.

Fairwinds will invest more than \$100M in buildings and infrastructure starting in late 2022 to “transform the property into a world-class maritime operations and logistics center that supports the offshore wind, defense, and transportation industries.”

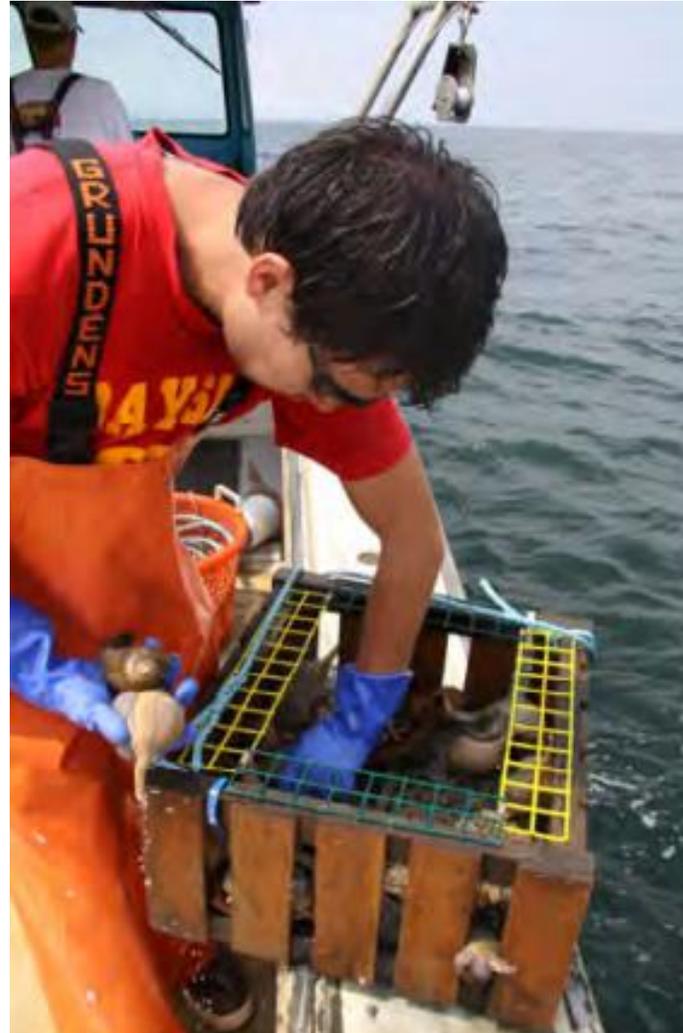
# Recreational Fisheries

- Recreational fishing community supportive
- Abundant marine life present at the Pilot turbines
- Recreational boats at the Pilot turbines frequently



# Commercial Fisheries

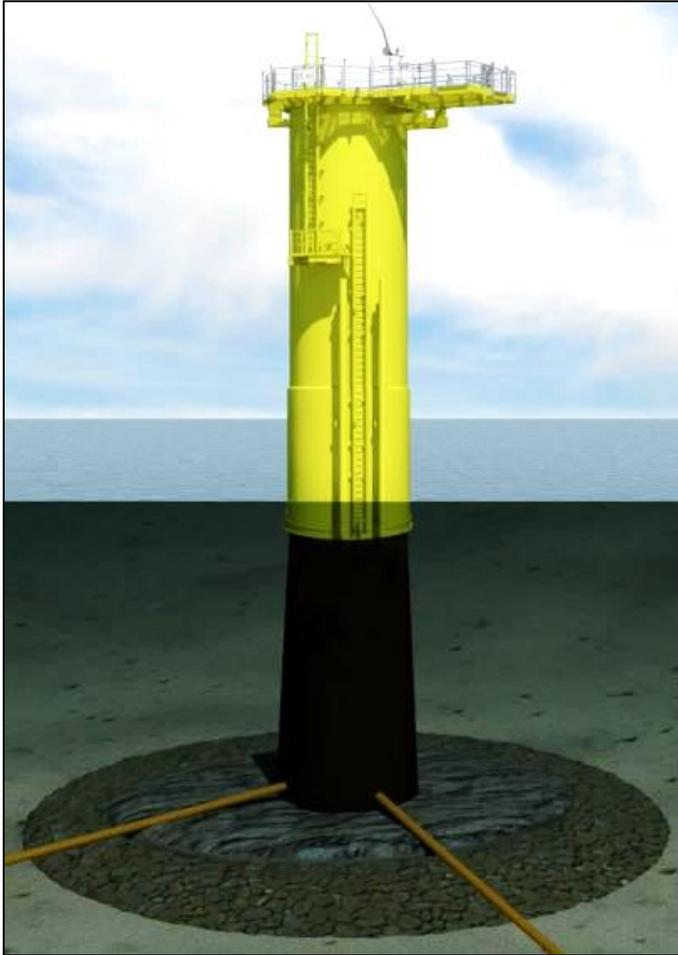
- Active Black Sea Bass and Conch commercial fisheries
- Baseline surveys through VIMS
- Active discussions with DEQ and VMRC on Coastal Zone Management
- Ongoing engagement through roundtable discussions and one-on-one meetings



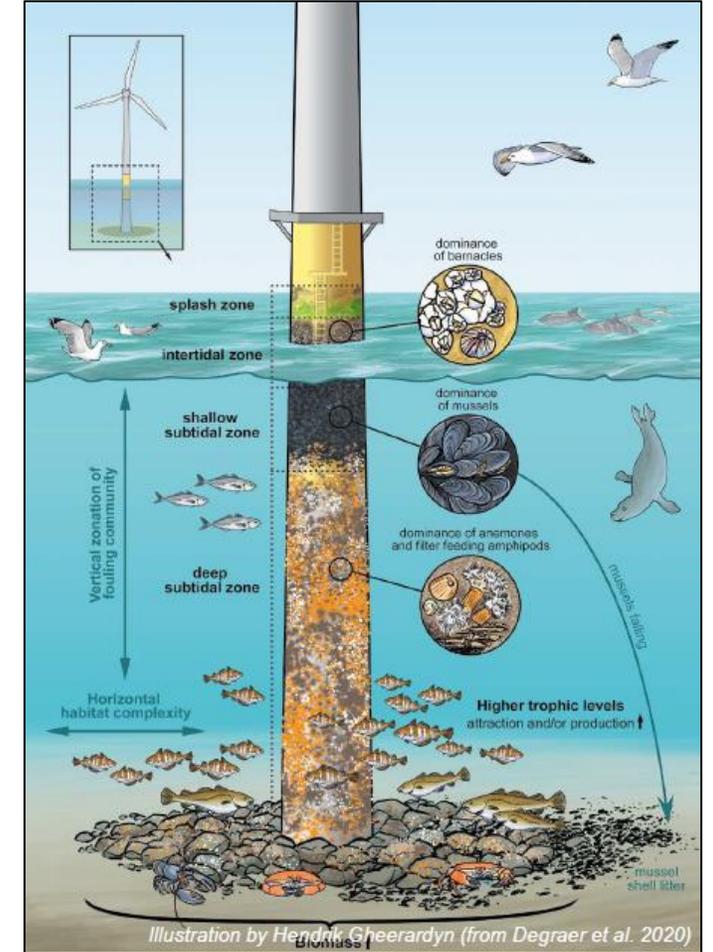
**VIMS** | **WILLIAM & MARY**  
VIRGINIA INSTITUTE OF MARINE SCIENCE  
MARINE ADVISORY SERVICES



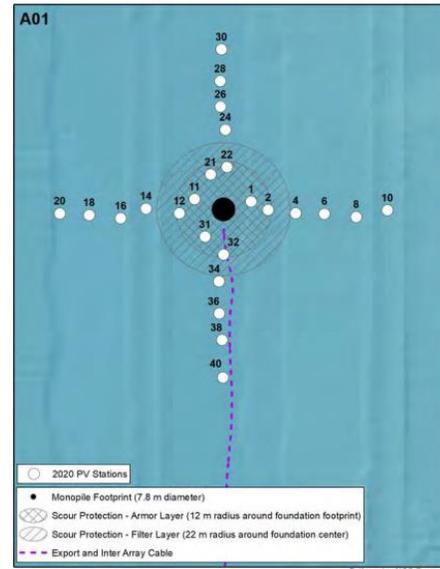
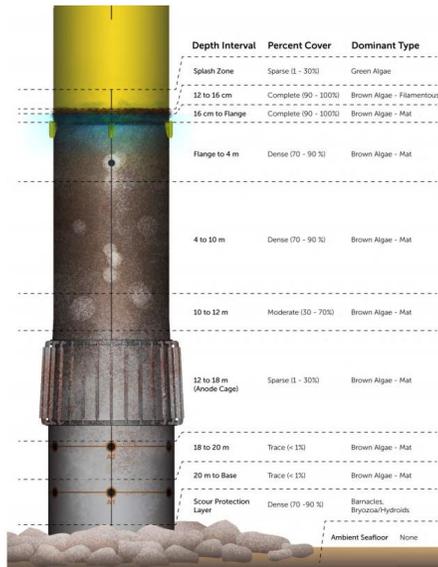
# Do They Attract Fish?



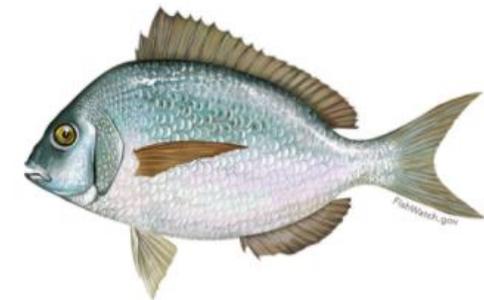
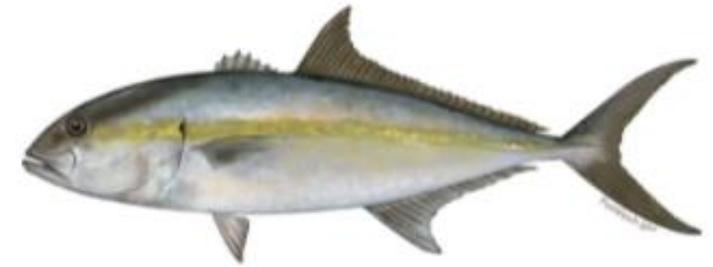
CVOW project has established new reef habitat and function as fish aggregators!



# Initial Foundation Survey Results



Common Name
Atlantic Spadefish
Chub Sp.
Black Sea Bass
Cunner
Greater Amberjack
Grey Triggerfish
Pilotfish
Scup
Spotfin Butterflyfish
Rainbow Runner
Summer Flounder (Fluke)
Unidentified Squid Sp.



[Fishing Dominion Energy's CVOW project turbines - YouTube](#)

## During construction:

- Short-term increase in project-related vessel traffic
- Temporary displacement of existing regional and military traffic during construction
- Vessel allision risk with partially installed structures during construction

## During operations:

- Long-term displacement of large vessel traditional navigation routes
- Long-term vessel allision risk with WTGs and OSSs
- Temporary diversion of smaller vessel traffic within project area during O&M activities



*Image source: Siemens Gamesa Renewable Energy*

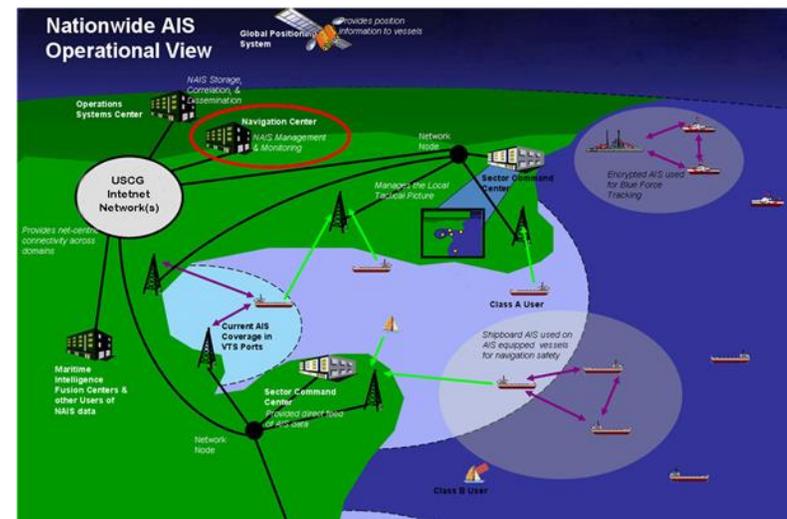
# Impacts to Navigation and Communication Systems

## Negative impacts to:

- Marine vessel radar
- HF radar (used to measure offshore sea surface current and direction)
- Air surveillance radar

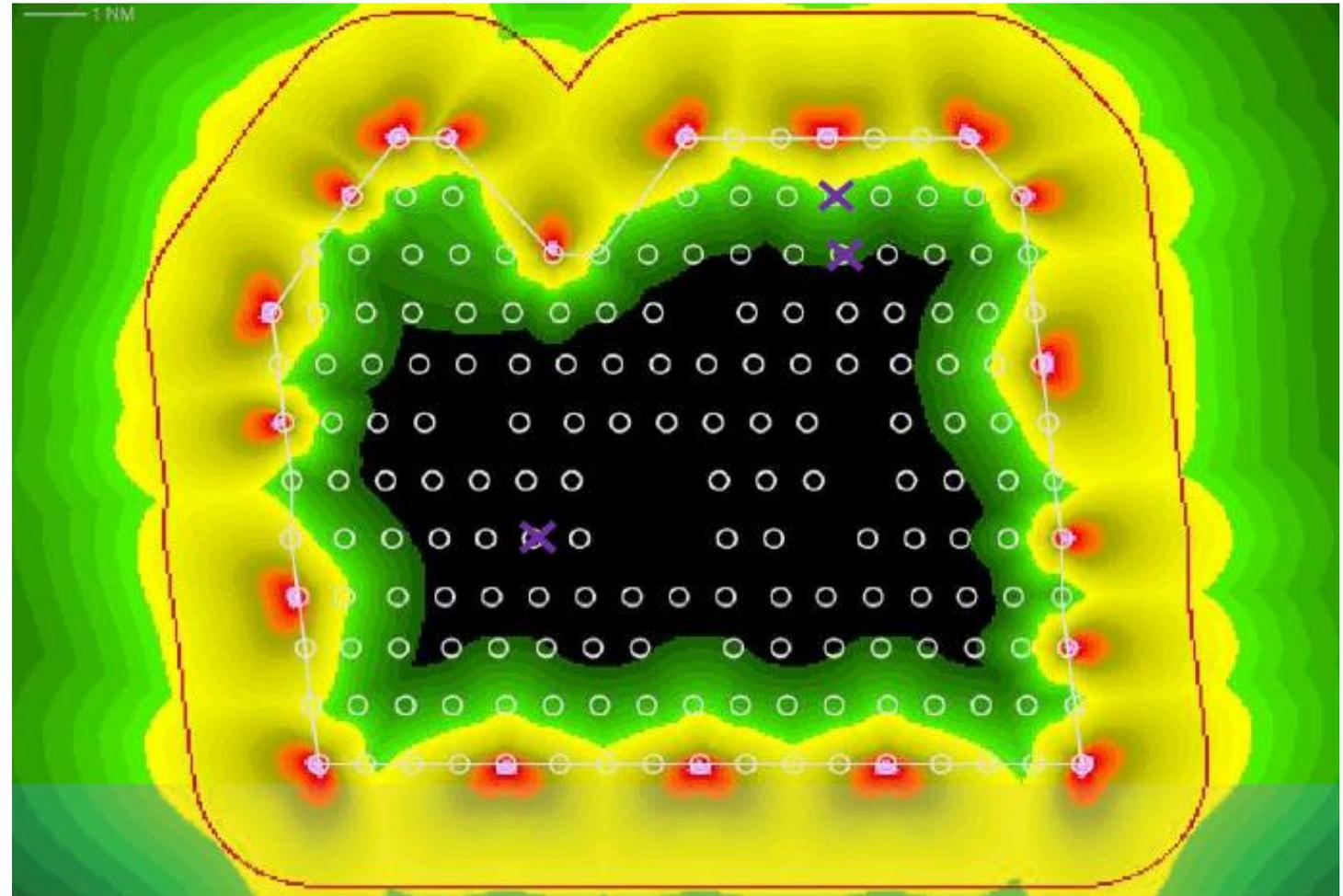
## No anticipated impacts to:

- VHF/UHF marine radios
- Digital selective calling
- USCG Rescue 21
- Global positioning system (GPS)
- Automatic identification system (AIS)
- AIS search and rescue transmitter (SART)
- Emergency Position Radio Indicating Beacon (EPIRB)
- Navigational Telex (NAVTEX)



# Marine Markings, Lighting and Signals

- Large alpha numeric identifier on each structure provides position within the wind farm by row and column
- Marine navigation lighting is synchronized across the wind farm by structure type, and range and flash sequence changes as you go further within the wind farm
- Mariner Radio Activated Sound Signal (MRASS)
- Automatic Identification System (AIS)

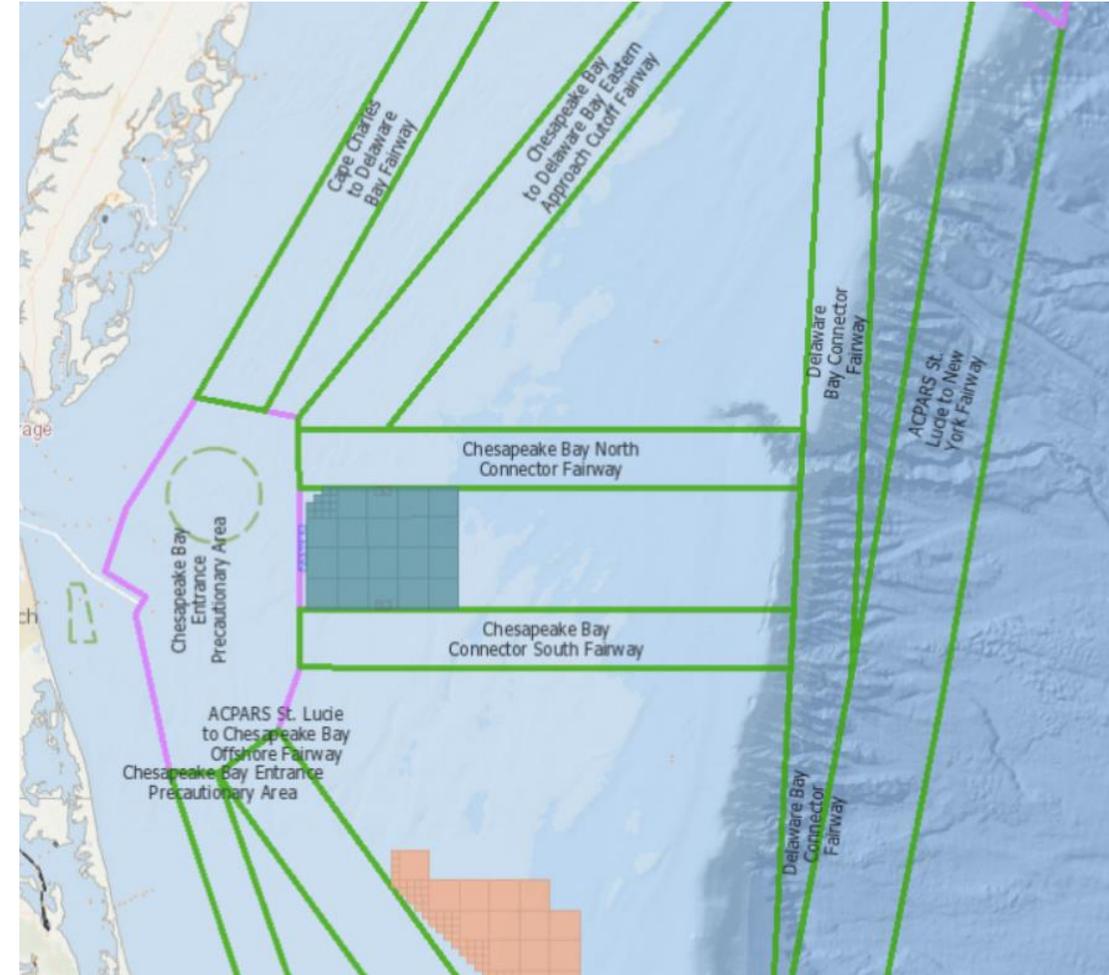
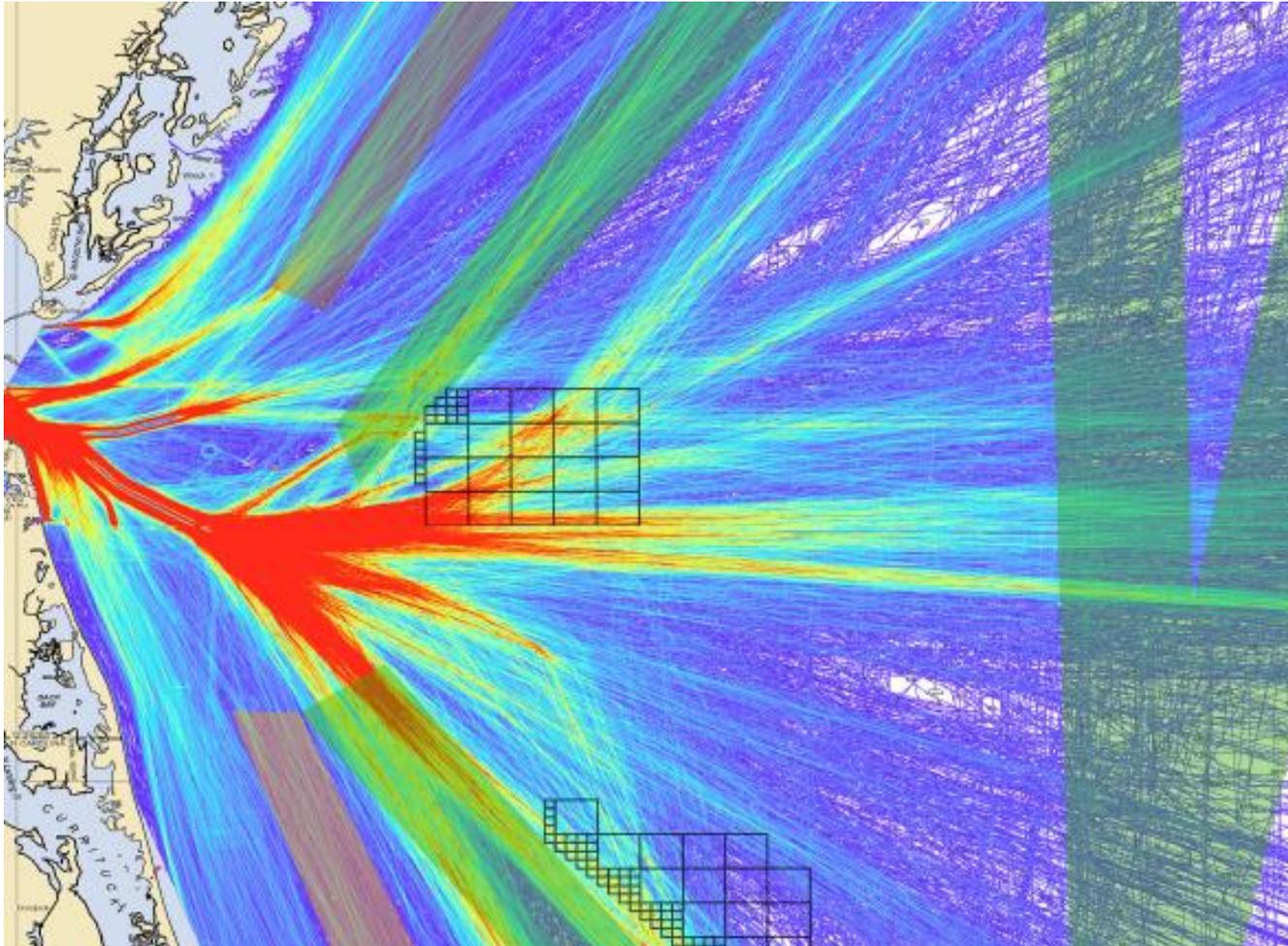


# Aviation Markings and Lighting

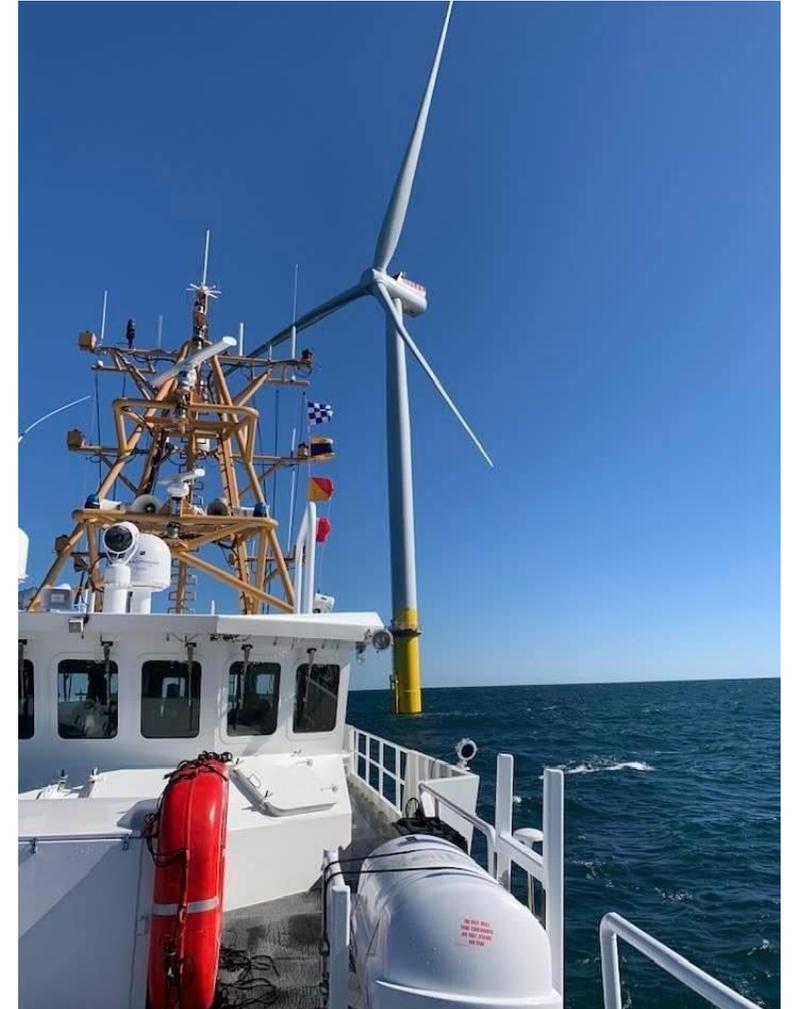
- Alpha numeric identifier on each structure visible from above provides position within the wind farm by row and column
- Aviation lighting that is NVG compatible and synchronized across the wind farm
- Helicopter hoist areas and hoisting lights on wind turbines
- Helicopter landing platform and lights on offshore substations
- Ability to remotely and quickly secure turbines and orient nacelle and blades



# Shipping Safety Fairways



- Marine Coordination procedures will be established and implemented prior to the commencement of construction to ensure project vessel movements are managed
- A Marine Coordinator will be responsible for:
  - General monitoring of the wind farm and surrounding area
  - Monitoring of third-party vessel traffic within the wind farm
  - Monitoring and coordinating project vessel traffic within the wind farm
  - Monitoring weather conditions and advise on changing weather patterns
  - Monitoring and controlling project personnel accessing WTGs
  - Conducting personnel offshore certification checks
- Maritime domain awareness information may be provided to the USCG upon request or as necessary



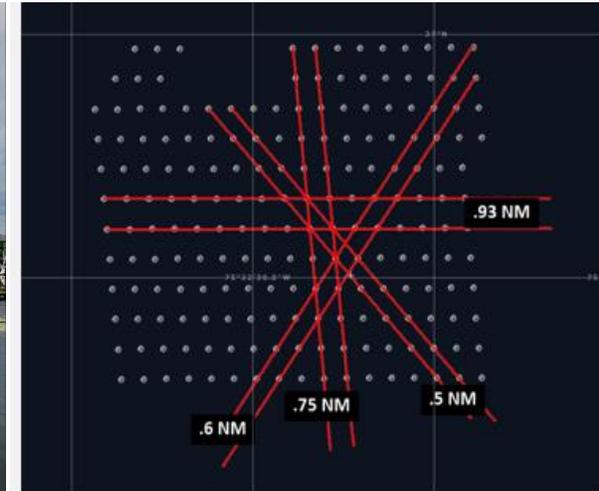
# WTG Control Systems and Emergency Shutdowns

- Each WTG has its own control system to carry out functions like yaw control and ramp down in high wind speeds
- Each WTG contains a Supervisory Control and Data Acquisition (SCADA) system to monitor performance and to control operations remotely
- Operation of the WTGs will be continuously monitored by the SCADA system, which has the capability of being both locally and remotely operated over a local area network to ensure the WTGs are operating within their specified design limits
- Communication systems include public address, general alarm, closed circuit television, and local area network



# Search and Rescue

- Near continuous on-scene presence during construction and operations
- Operations Center will monitor wind farm and surrounding area, including third-party and project vessel traffic
- During SAR operations to reduce visual distraction, physical collision, and turbulence risk to helicopters, Operations Center personnel can shut down WTGs individually, or in a string, or across the complete array
- Once shut down, Ops Center personnel can fix and maintain the position of the WTG blades, nacelles, and other appropriate moving parts
- SAR procedures will be discussed and agreed with the USCG in advance of construction and will be updated as necessary in liaison with the USCG
- SAR procedures will include project vessels assisting with non-project related SAR in the vicinity of the wind farm



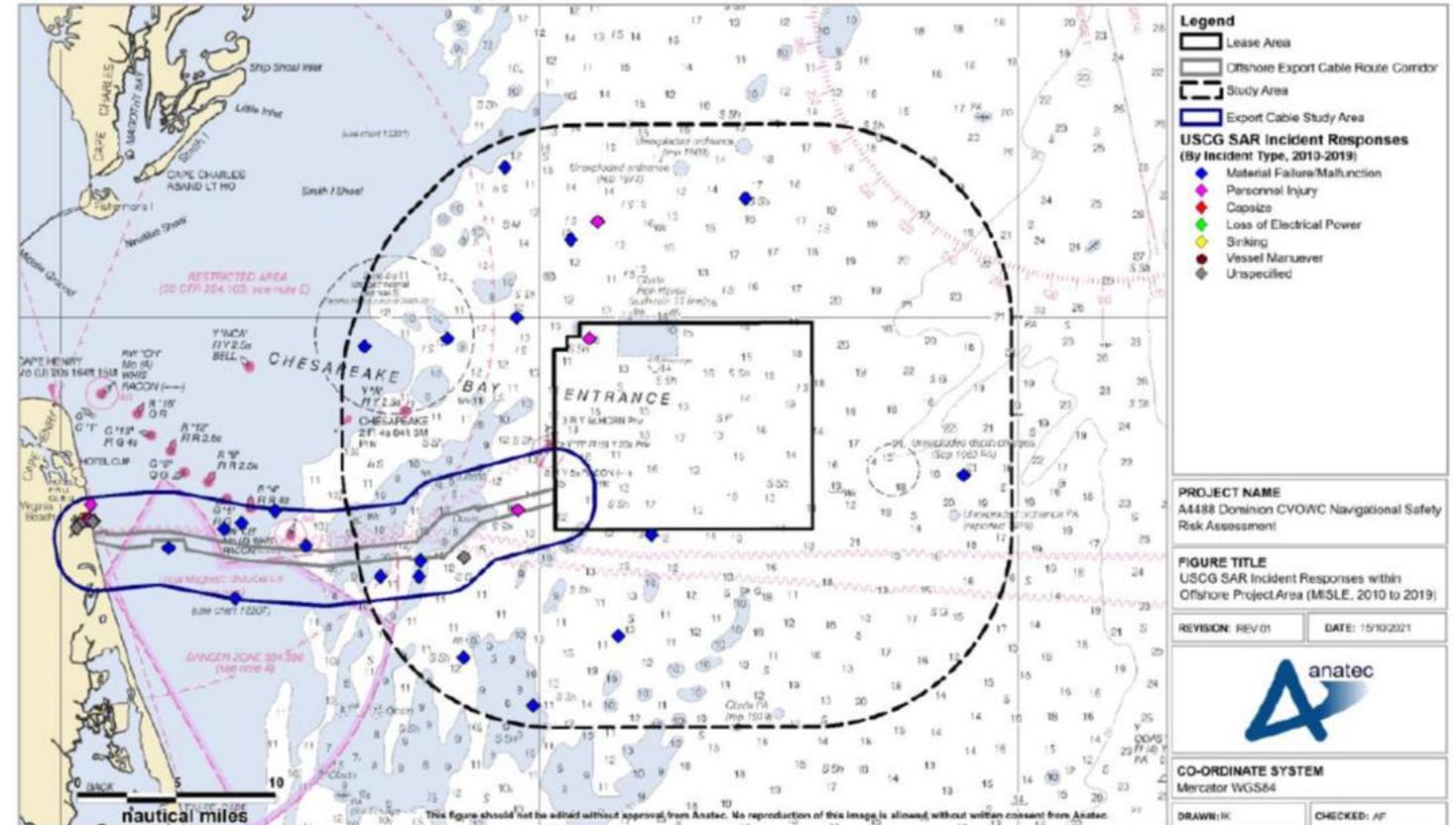
# Wind Farm Access - Are There Any Restrictions?

- Give way to vessels approaching turbines to conduct operational/maintenance activities
- Maintain a safe distance from turbine foundations to avoid risk of collision from swell
- Observe safety zones that may be established around construction or servicing activities
- Follow instructions from safety vessels that may be monitoring a safety zone
- Do not attempt to touch, bump or access the wind turbines
- *Before heading out, please check the local notice to mariners to learn about important work activities that may be going on in the area and visit the project website at [www.coastalvawind.com](http://www.coastalvawind.com)*



# When You Visit - Always Practice Safe Boating!

- Take a boater safety course
- File a float plan
- Wear a life jacket
- Monitor the weather
- Maintain a proper lookout
- Maintain a safe speed
- Maintain a safe distance
- Carry a VHF-DSC marine radio



U.S. Coast Guard Search and Rescue Cases, 2010-2019

# Questions, Discussion and Shared Insights

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