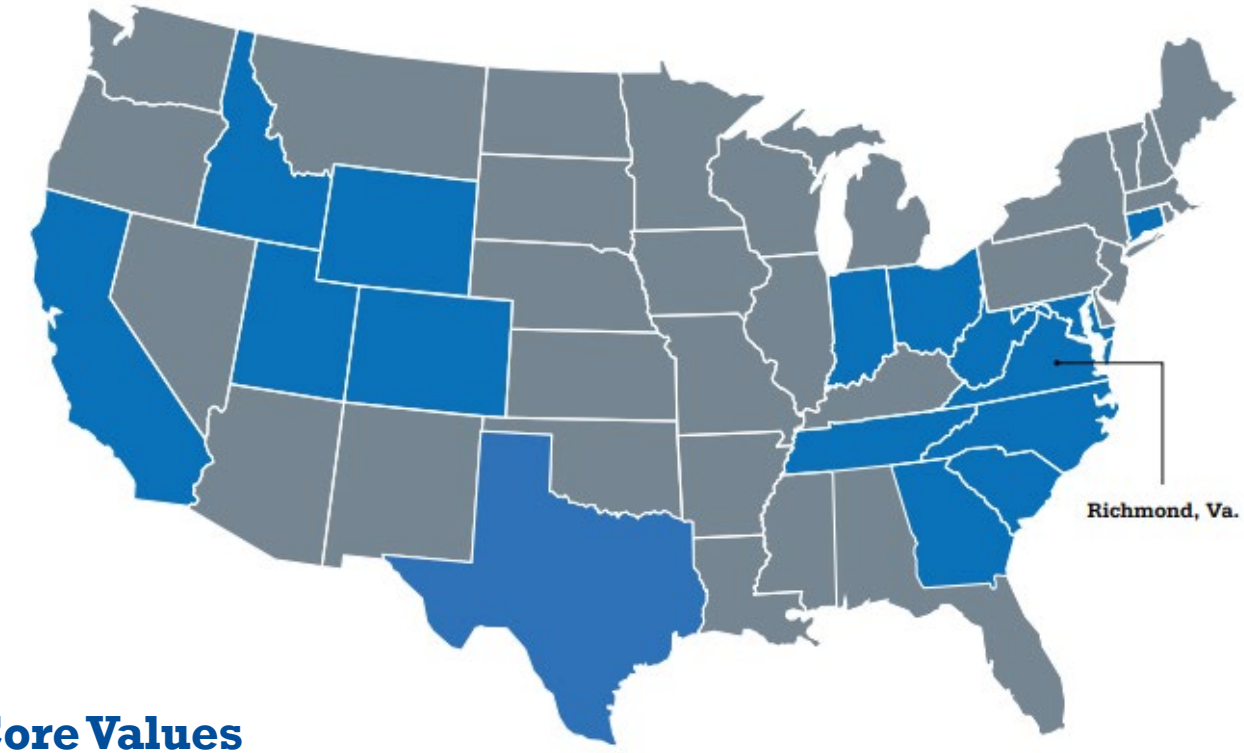
Coastal Virginia Offshore Wind

Regional Response Team III Meeting

December 8, 2022

About Dominion Energy



Core Values

- Safety
- Ethics
- Excellence
- Embrace Change
- One Dominion Energy

- Headquartered in Richmond, VA
- We operate in 15 states and serve nearly 7 million customers
- Net zero carbon dioxide and methane emissions from power generation and gas infrastructure by 2050
- More than 85% of our energy generation comes from clean energy sources or natural gas
- 2nd largest solar fleet in the U.S.

Pilot Project - Coastal Virginia Offshore Wind

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- 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

Commercial Project

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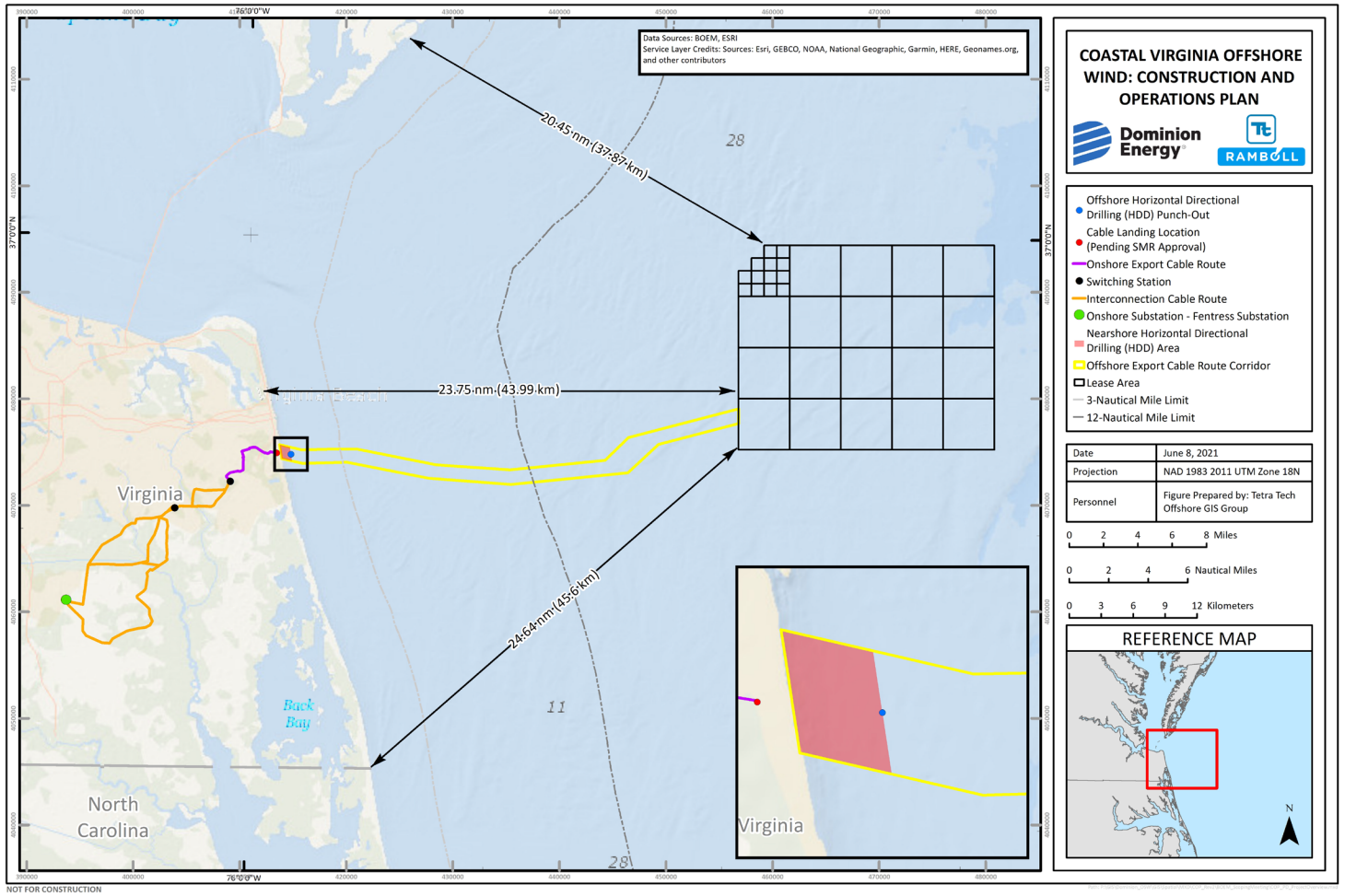
- Builds on success of the two-test turbine pilot project
- Largest offshore wind project under development in the United States
- 2.6 GW total capacity
- Power up to 660,000 homes
- Lease is ~ 15 x 12 miles or 176 sq miles
- Located 27 to 42 miles offshore



Economic and Environmental Benefits

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CVOW will provide an estimated:

- 2,000 construction & permanent clean energy jobs in VA
- $300M in economic output & pay/benefits per year
- $11M in state and local tax revenue per year
- $3B in fuel savings over first 10-years

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

Commercial Project - Layout

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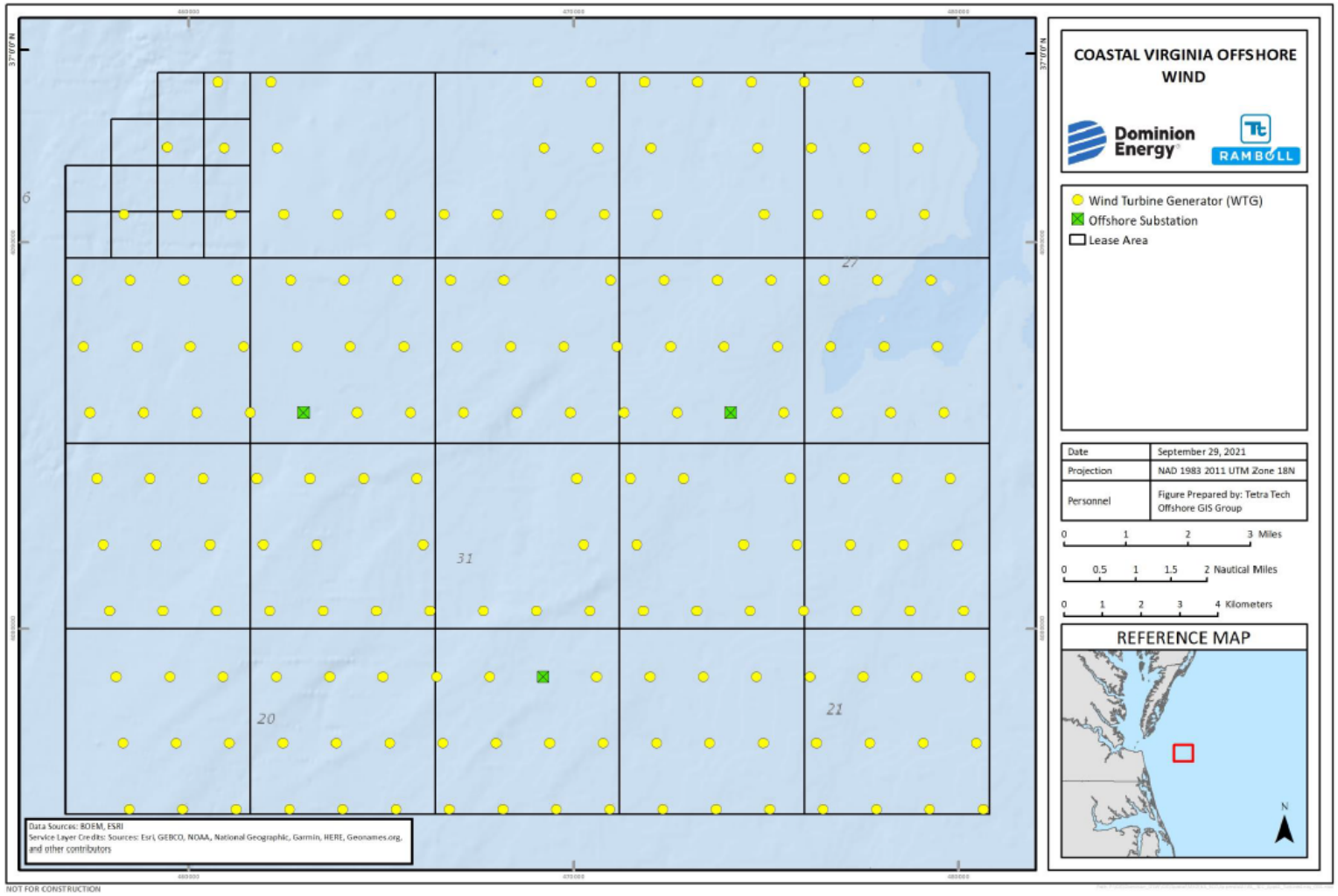
- 176 turbines and 3 offshore substations
- Two primary lines of orientation: 090°/270° and 174°/354°
- Distance between turbines is 1.1 miles (0.93 NM) in the N-S direction, and 0.9 miles (0.75 NM) in the E-W direction
- Multiple spare locations identified



Schedule Milestones

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Milestones	Target	
Construction & Operation Plan submitted	✓ Dec. 2020	Met target
Notice of Intent issued by BOEM	✓ July 2021	Met target
CPCN/Rider filing with VA SCC	✓ Fall 2021	Met target
Final order from VA SCC	✓ Q3 2022	Met target
Record of Decision published by BOEM	2H 2023	
Commence onshore construction	2H 2023	
Jones-Act compliant installation vessel COD	2H 2023	
Commence offshore construction	Q2 2024	
Construction completion	Late 2026	
Project Life (baseline)	30 years	

BOEM = Bureau of Ocean Energy Management

VA SCC = Virginia State Corporation Commission

Commercial Project - Port Facilities

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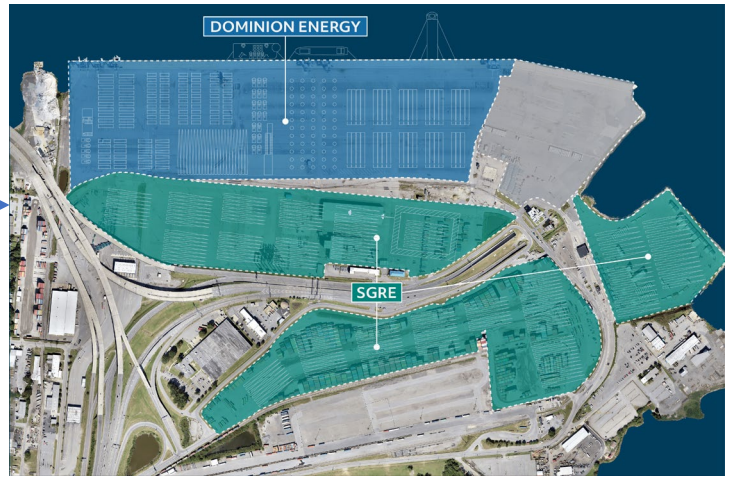

Hampton Roads Based Staging Area

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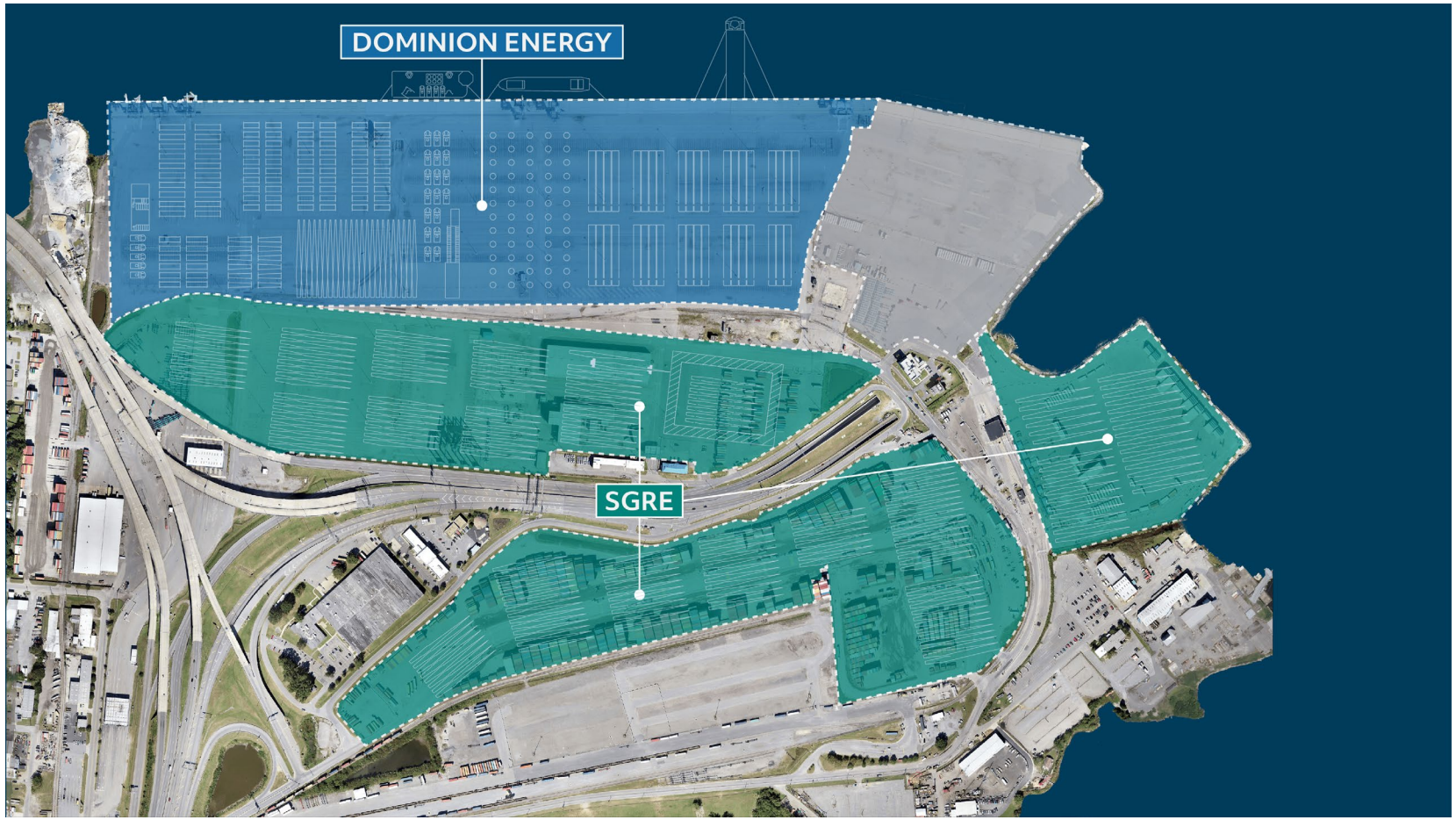

- Dominion Energy leased 72 acres of the Portsmouth Marine Terminal
- Siemens Gamesa Renewable Energy blade finishing facility
- PMT improvements are being completed by the Port of Virginia
- Site development discussions between tenants and Port of Virginia continue

Marine Coordination Center - Operations Base

Lamberts Docks

- Fairwinds Landing, LLC, signed an agreement with Norfolk Southern to redevelop the 111-acre property
- Fairwinds will invest more than $100M in buildings and infrastructure starting in late 2022
- Dominion is in discussions with Fairwinds to site CVOW operations based on property inclusive of 26,000 sq ft office building, 17,000 sq ft warehouse and berths to accommodate SOV and 2 CTVs
- Sublease under negotiation and site demolition to commence in coming weeks

Construction Schedule, 2024-2026

(in process of being refined)

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Activity	2023		2024				2025				2026				2027	
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Scour Protection Pre-Installation		Scour Protection														
Monopile and transition piece transport and onshore staging		Staging														
Monopile Installation (piling between May 1 and October 31)				Monopiles				Monopiles								
Scour Protection Post-Installation						Scour Protection										
Transition Piece Installation				Transition Pieces												
WTG pre-assembly and Installation								Towers, Generators & Blades								
Inter-Array Cable Installation								Inter-Array Cables								
Offshore Substation Installation (piling between May 1 and October 31)					Substations											
Offshore Export Cable Installation		Export Cables														
Onshore Export and Interconnection Cable Installation		Cables														
Switching Station Construction		Switching Station														
Onshore Substation Upgrade Construction		Substation														
Commissioning				Commissioning												

Constructing CVOW With Experienced Partners

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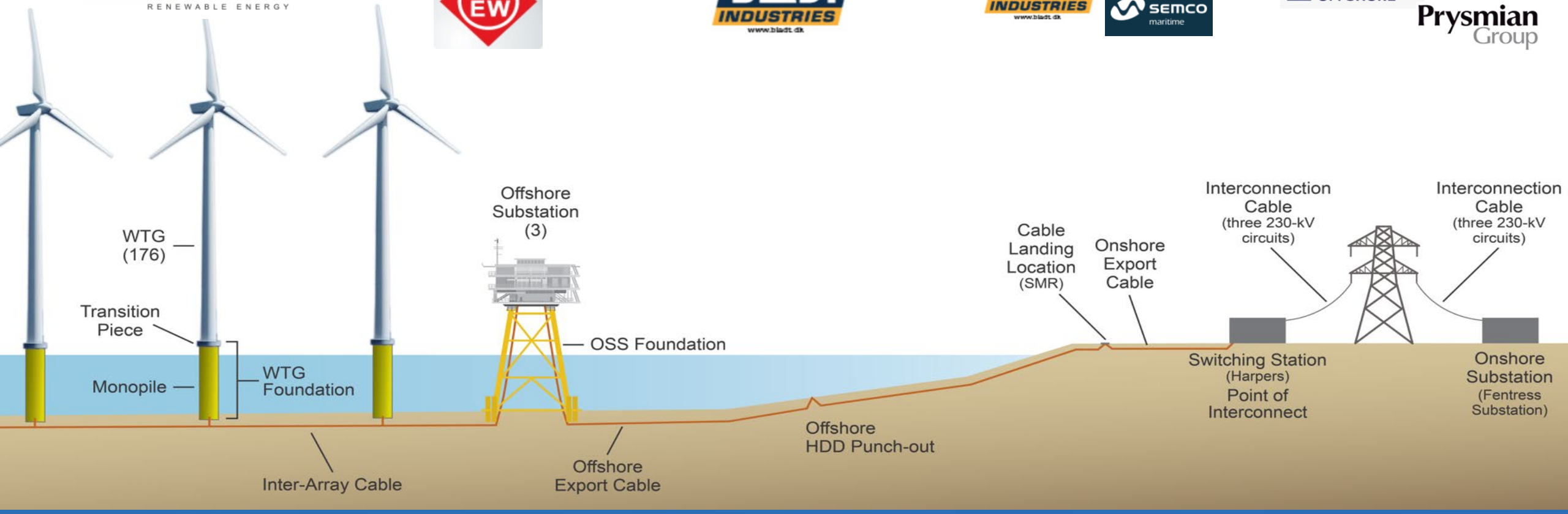
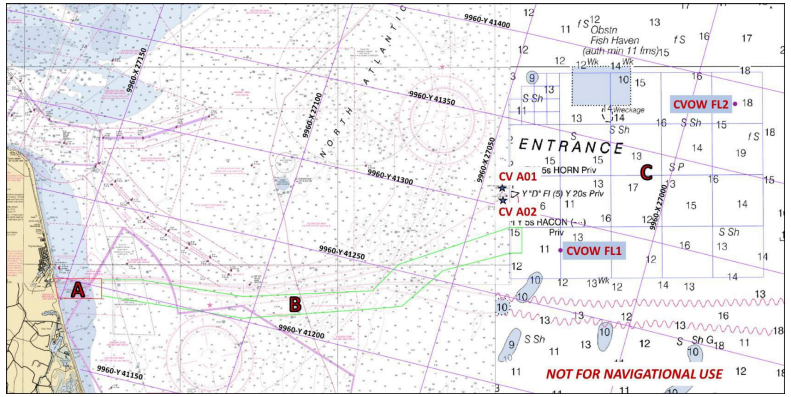
Wind Turbine Generators	Monopiles	Transition Pieces	Offshore Substations	Transport & install
SIEMENS Gamesa RENEWABLE ENERGY	EEW	BLADT INDUSTRIES www.bladt.dk	BLADT INDUSTRIES www.bladt.dk; semco maritime	DEME OFFSHORE; Prysmian Group



UXO Surveys of Cable Routes in Progress



Alpine

- UXO investigation surveys of export and inter array corridors are in progress through March 2023
- UXO identification surveys beginning ~March 2023
- UXO disposition ~January 2024

Export and Inter Array Cables

Prysmian Group

- Manufacturing of cables has started
- Cable crossings and protection measures
- Cable joining

Foundations, Transition Pieces & Offshore Substations

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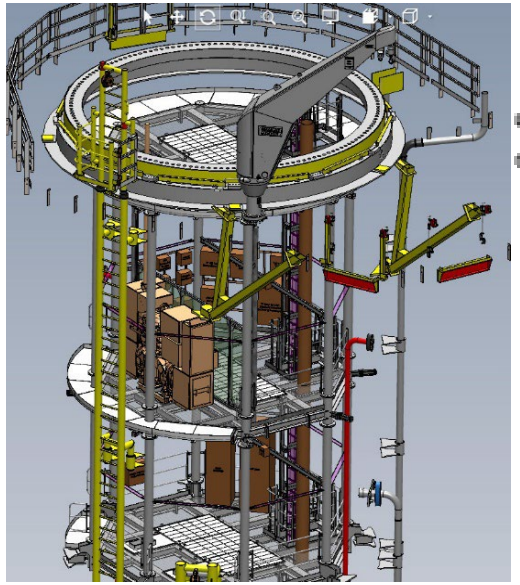
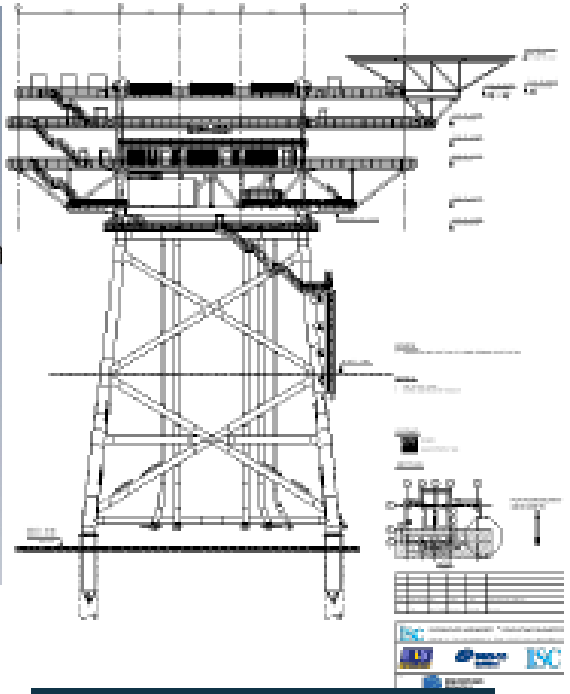


BLADT INDUSTRIES
www.bladt.dk



SEMCO maritime

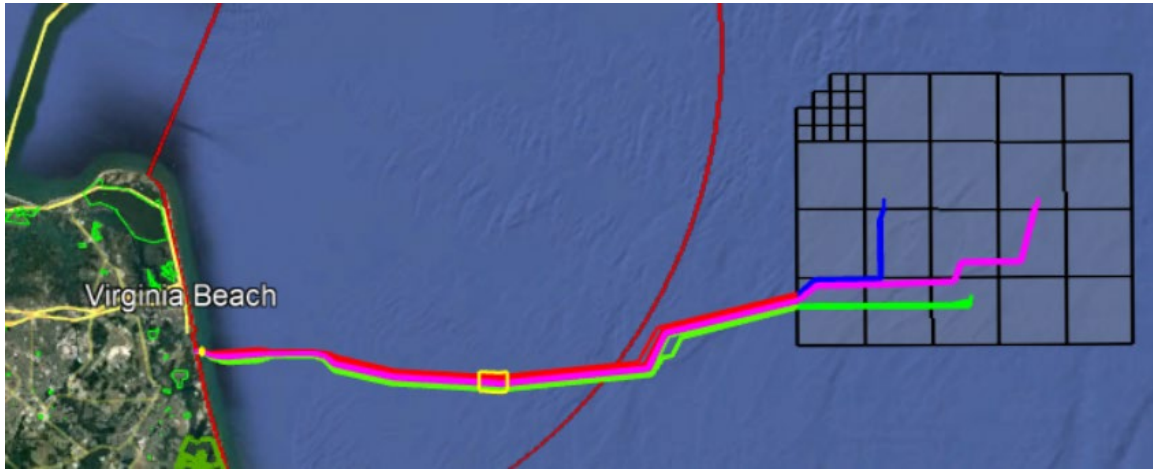
- Detail design efforts ongoing
- Fabrication has started

Installation of Scour Protection

DEME OFFSHORE

- Q1 2024 – installation begins
- Q4 2025 – installation ends
- 320 days of on-site work
- 140 days of transit to and from loading port

Installation of Export Cables



Schedule

- Q1 2024 - installation begins
- Q2 2025 - installation ends

Pre-lay grapnel run and HRG surveys

- 230 days on-site with 4 days transit to/from Portsmouth MT

Cable lay vessel

- 494 days on-site work with 25 days transit

Cable joining and pull-in

- 310 days on-site work with 9 days transit

Installation of Monopiles and Transition Pieces

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DEME OFFSHORE

Schedule

- Q2 2024 – Installation begins
- Q1 2026 – Installation ends
- Noise producing activities seasonally restricted

Orion

- 240 days on-site work
- Dynamically positioned
- Motion compensated pile gripper
- 5,511 ton lifting capacity

Feeder Barges

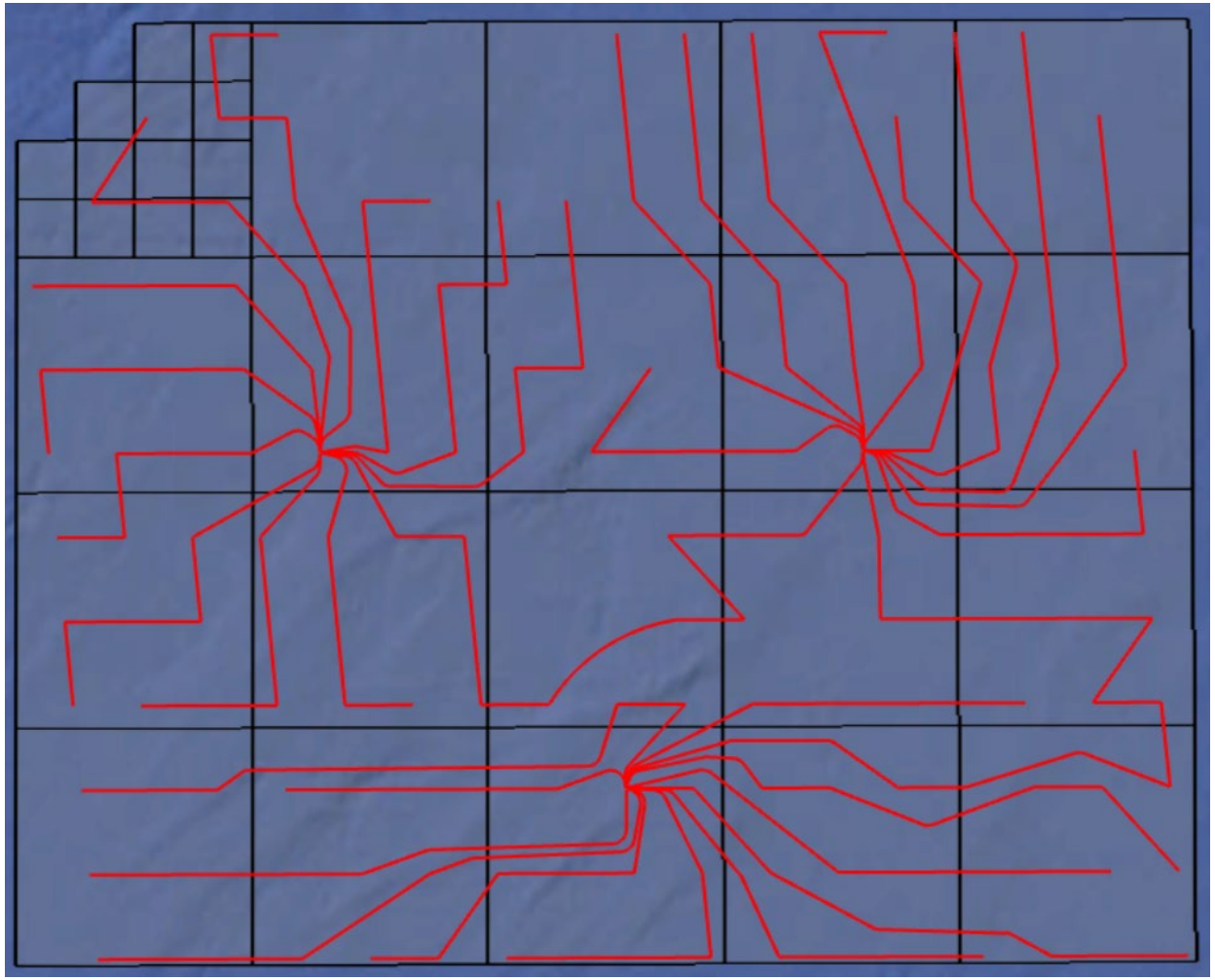
- 240 days on-site work
- 17 days transit to/from Portsmouth Marine Terminal

Installation of Substations

- Q3 2024 – installation begins
- Q2 2025 – installation ends
- Three 880 MW substations

Photo: Orion install of jacket and topside of the Fecamp Offshore Substation. Fecamp Windfarm is 500 MW farm off the coast of France.

Installation of Inter Array Cables



- Q2 2025 – installation begins
- Q3 2026 – installation ends

Pre-lay grapnel run and HRG surveys

- 132 days on-site with 2 days transit to/from Portsmouth Marine Terminal

Living Stone – Cable lay vessel

- 290 days on-site work with 5 days transit

Installation of Towers, Nacelles and Blades

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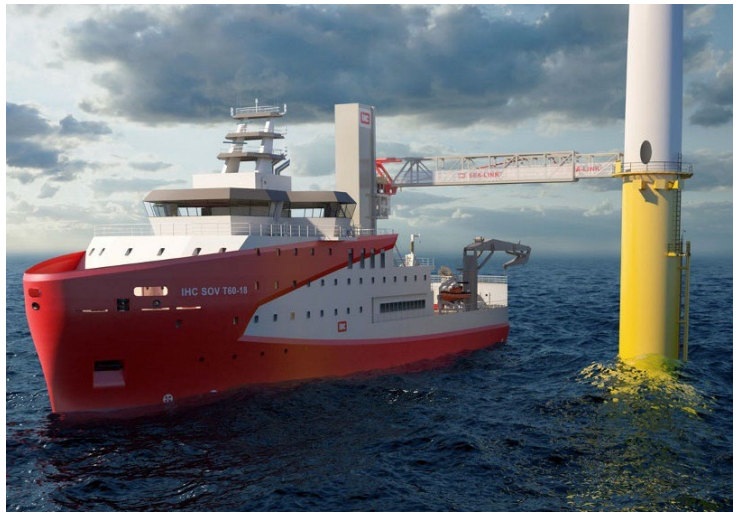
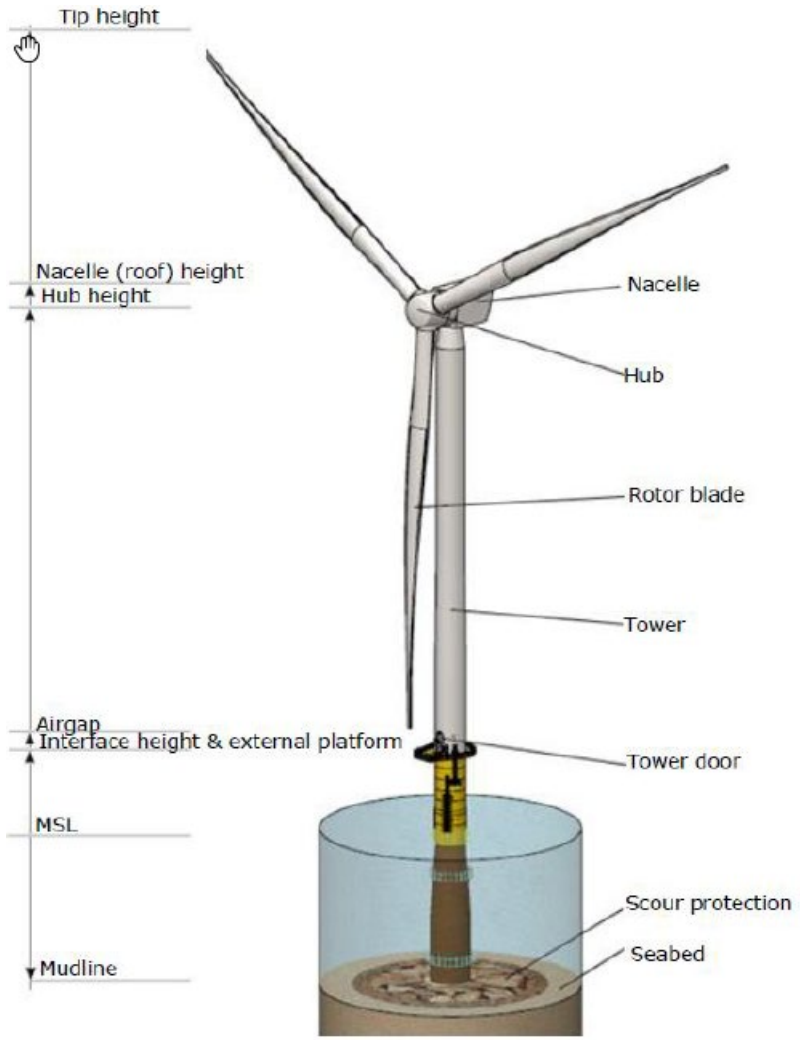


Schedule

- Q2 2025 – Installation begins
- Q4 2026 – Installation ends
- Charybdis – 400 days on-site and 60 days transit to/from Portsmouth MT
- SOV used during construction and commissioning

SG-DD 222 Wind Turbine Generator



- 14.7 MW with power boost
- 836 ft turbine tip height from MSL
- 728 ft rotor diameter
- 472 ft hub height from MSL
- 358 ft blade length
- 60 ton blade weight
- 108 ft air gap
- 6.7 mph cut in wind speed
- 62.6 mph cut out wind speed

WTG: Putting Into Perspective

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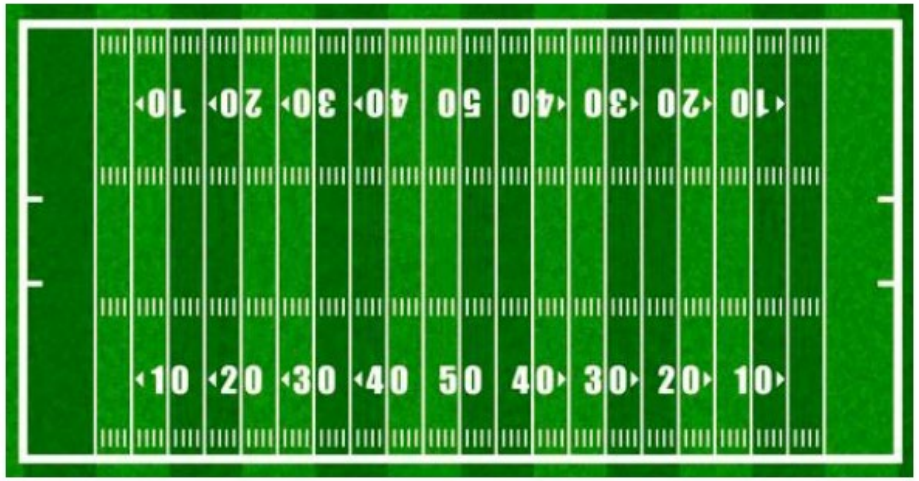

Federal Agency Roles

- Cooperating Agency to BOEM under NEPA.
- Provides BOEM evaluation of the potential impacts the wind farm may have on the marine transportation system, safety of navigation, traditional uses of the waterway, and the Coast Guard's ability to conduct its missions.

- Responsible for offshore renewable energy development in Federal waters.
- Program began in 2009, when the Department of the Interior announced the final regulations (33 CFR 585) for the Outer Continental Shelf Renewable Energy Program, which was authorized by the Energy Policy Act of 2005.

- Responsible for enforcing safety and environmental regulations.
- Provides BOEM technical reviews of project plans and facility designs.
- Developing regulations and compliance guidelines and refining methods to include offshore wind inspection capabilities into existing oil and gas inspection and compliance programs.

Impacts to Navigation Safety

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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

Deep Draft Vessels - Shipping Safety Fairways

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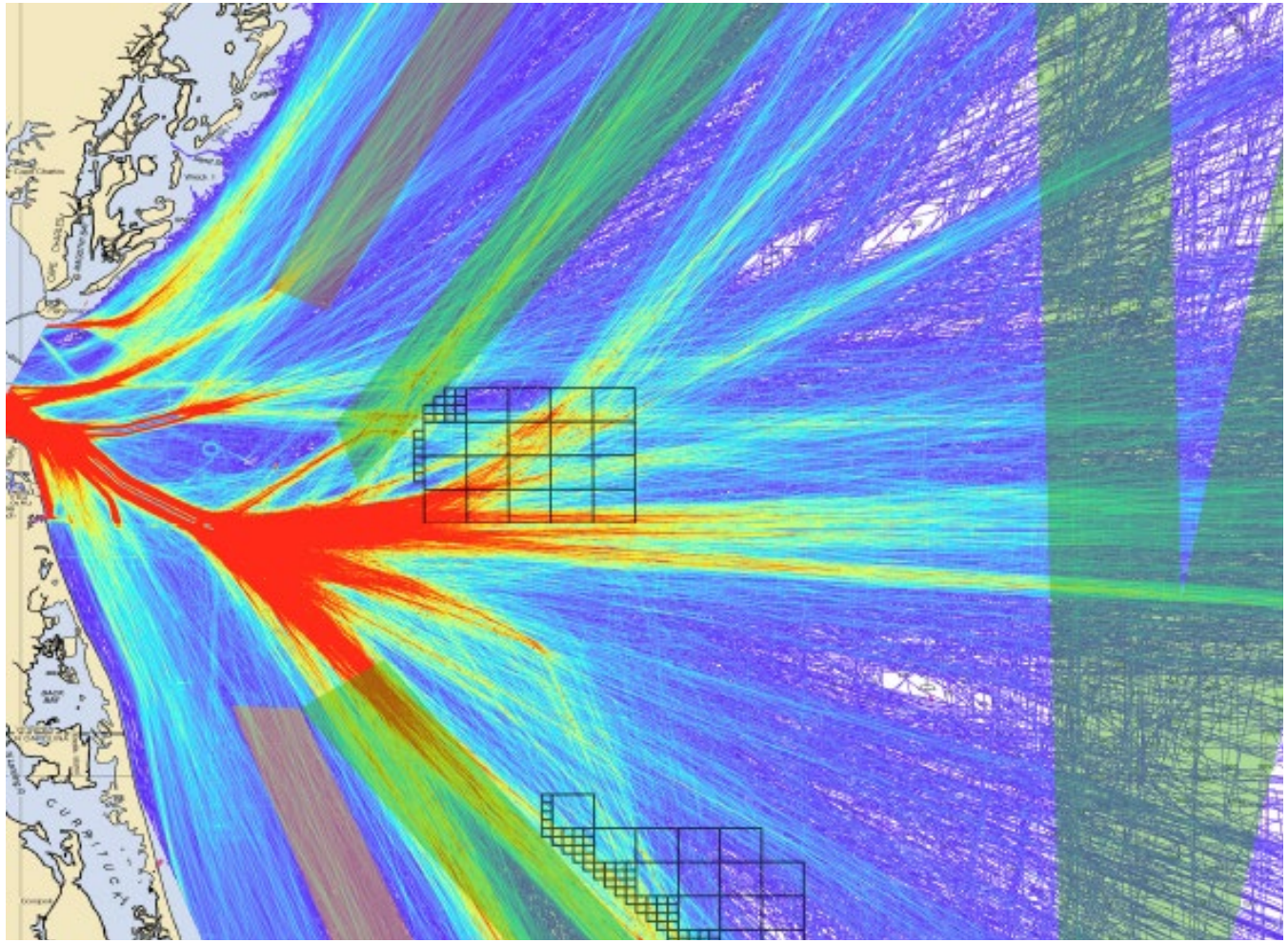

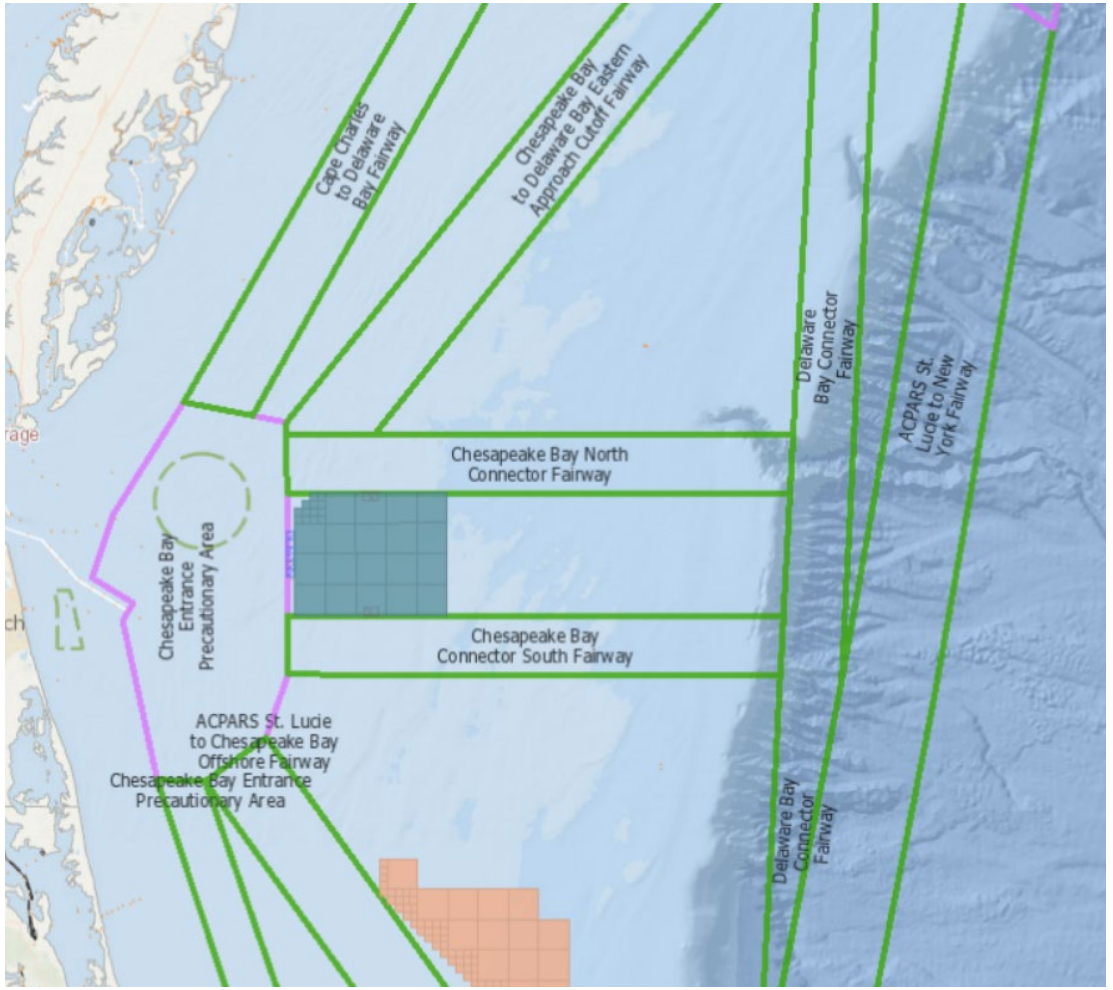

Impacts to Navigation and Communication Systems

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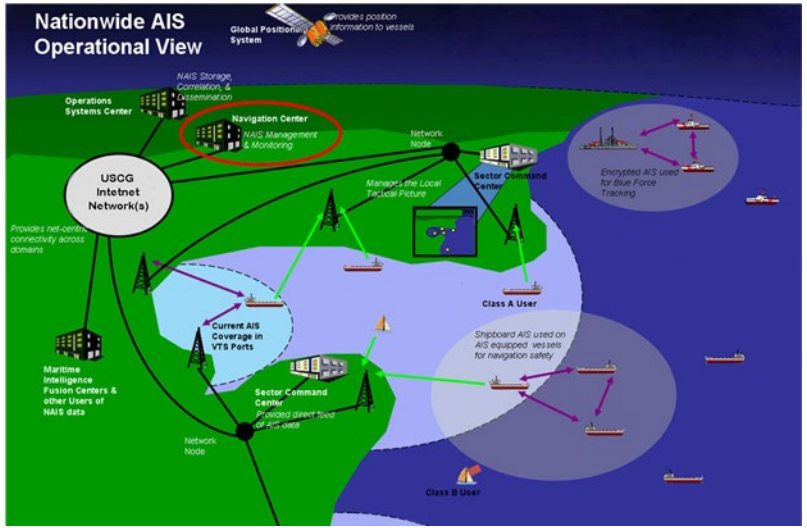
Negative impacts to:

- 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

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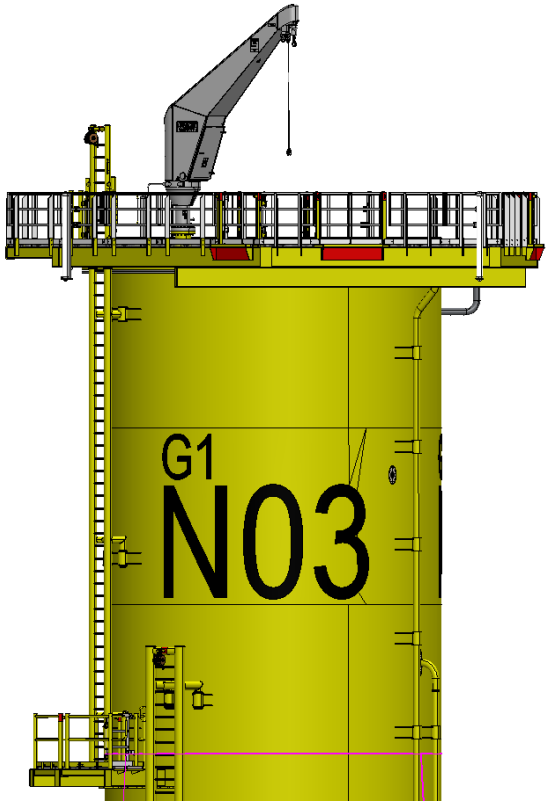
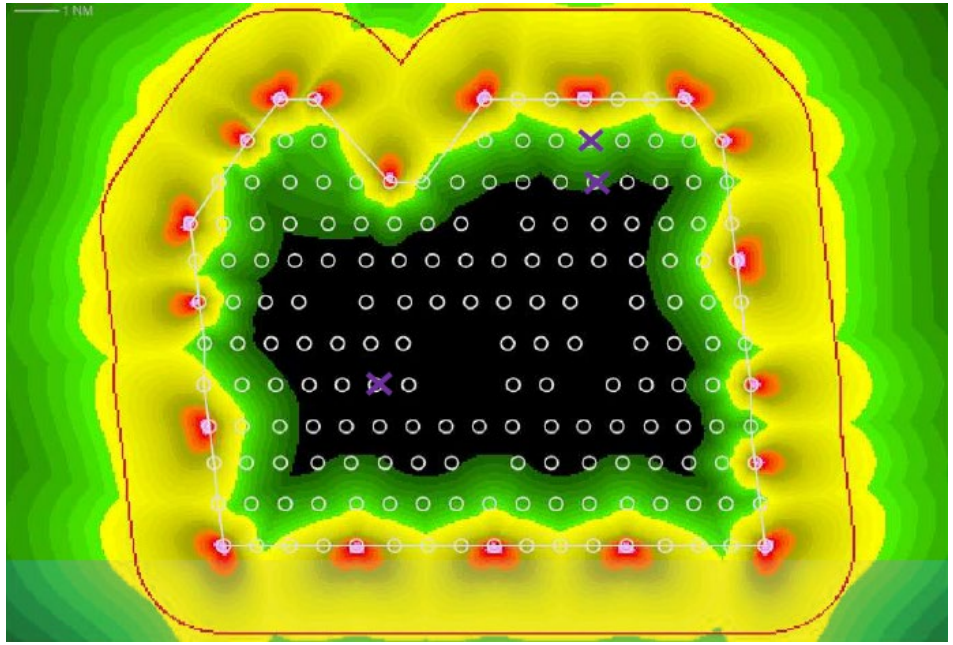
- Large alpha numeric identifier on each structure provides position within the wind farm by row and column
- Marine navigation lighting is synchronized across the wind farm by structure type, and range and flash sequence changes as you go further within the wind farm
- Mariner Radio Activated Sound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





Aviation Markings and Lighting

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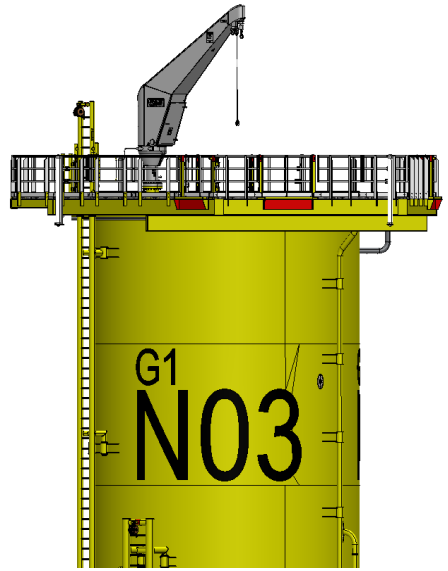
- Alpha numeric identifier on each structure visible from above provides position within the wind farm by row and column
- Aviation lighting that is NVG compatible and synchronized across the wind farm
- Helicopter hoist areas and hoisting lights on wind turbines
- Helicopter landing platform and lights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

Temporary Markings During Construction

- CVOW project will be constructed in phases and will result in partially constructed components without electrical power remaining in the water for many months
- All temporary base, tower and construction components preceding the final structure completion will be marked with a quick flashing (QY) marine light energized at 5 NMs
- During construction and until such time a platform cable of supporting the temporary obstruction lights is completed, the fixed lights on an attending vessel shall be used
- Charting of all structures will be completed shortly after initial installation of the foundation



Marine Coordination

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- 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

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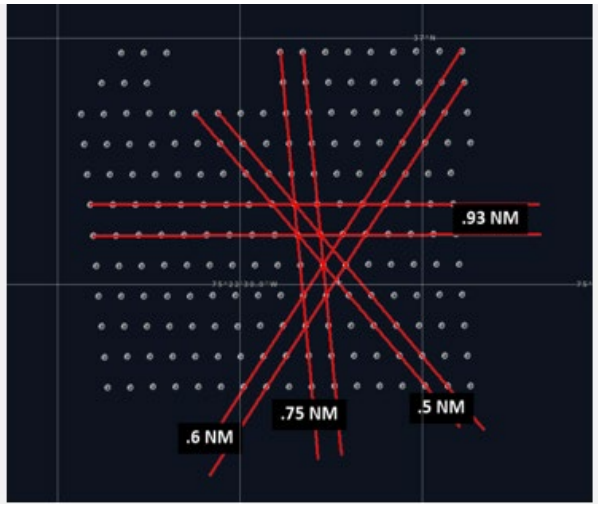
- Each WTG has its own control system to carry out functions like yaw control and ramp down in high wind speeds
- Each WTG contains a Supervisory Control and Data Acquisition (SCADA) system to monitor performance and to control operations remotely
- Operation of the WTGs will be continuously monitored 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



Emergency Response Plan Exercise

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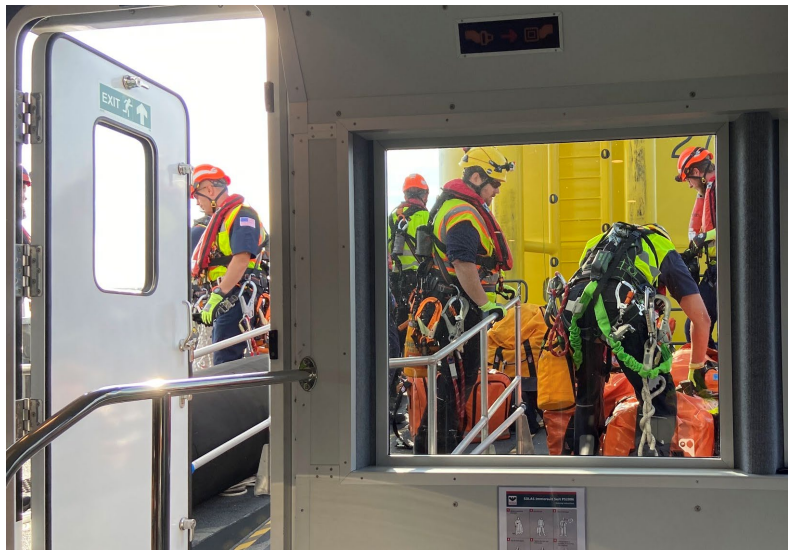

Proof of Concept - Nacelle to CTV Rescue

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CTV to Coast Guard Helo Rescue

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Oil Spill Prevention and Response

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- Oil Spill Response Plan (OSRP) encompasses our work activities performed by us and our contractors.
- Where applicable, each contractor's Vessel Response Plan (VRP) or Shipboard Oil Pollution Emergency Procedure (SOPEP) will be aligned our OSRP
- Each of the WTGs and OSSs require various oils, fuels, and lubricants to support operation
- Each are designed to minimize the potential for spills and leaks through the implementation of containment measures, and are remotely monitored
- Each OSS contains a collection and sump system including an oil water separator system
- During a spill, oil would flow tidally around the WTG or OSS due its location

Wind Turbine Generator Oil/Fuel/Lubricant Details

Oil/Fuel/Lubricant	Expected Amount
Hydraulic oil	30 gallons (gal, 115 liters [l])
Gear oil (yaw gears)	up to 5 gal(20 l)
Transformer	1,717 gal(6,500l)
Total	**1,752 gal**

Offshore Substation Oil/Fuel/Lubricant Details

Oil/Fuel/Lubricant	Minimum Amount	Maximum Amount
Hydraulic oil	264 gal(1,000 l)	396 gal(1,500 l)
Diesel	5,283 gal(20,000l)	7,925 gal(30,000l)
Mineral Oil	13,209 gal(50,000 l)	66,043 gal(250,000 l)
Generator lube oil	18 gal(70 l)	53 gal(200 l)
Total	**18,774 gal (oil only)**	**74,417 gal (oil only)**

Dominion Energy's OSRO is the Marine Spill Response Corporation (MSRC)

Worst-Case Discharge and Trajectory Analysis

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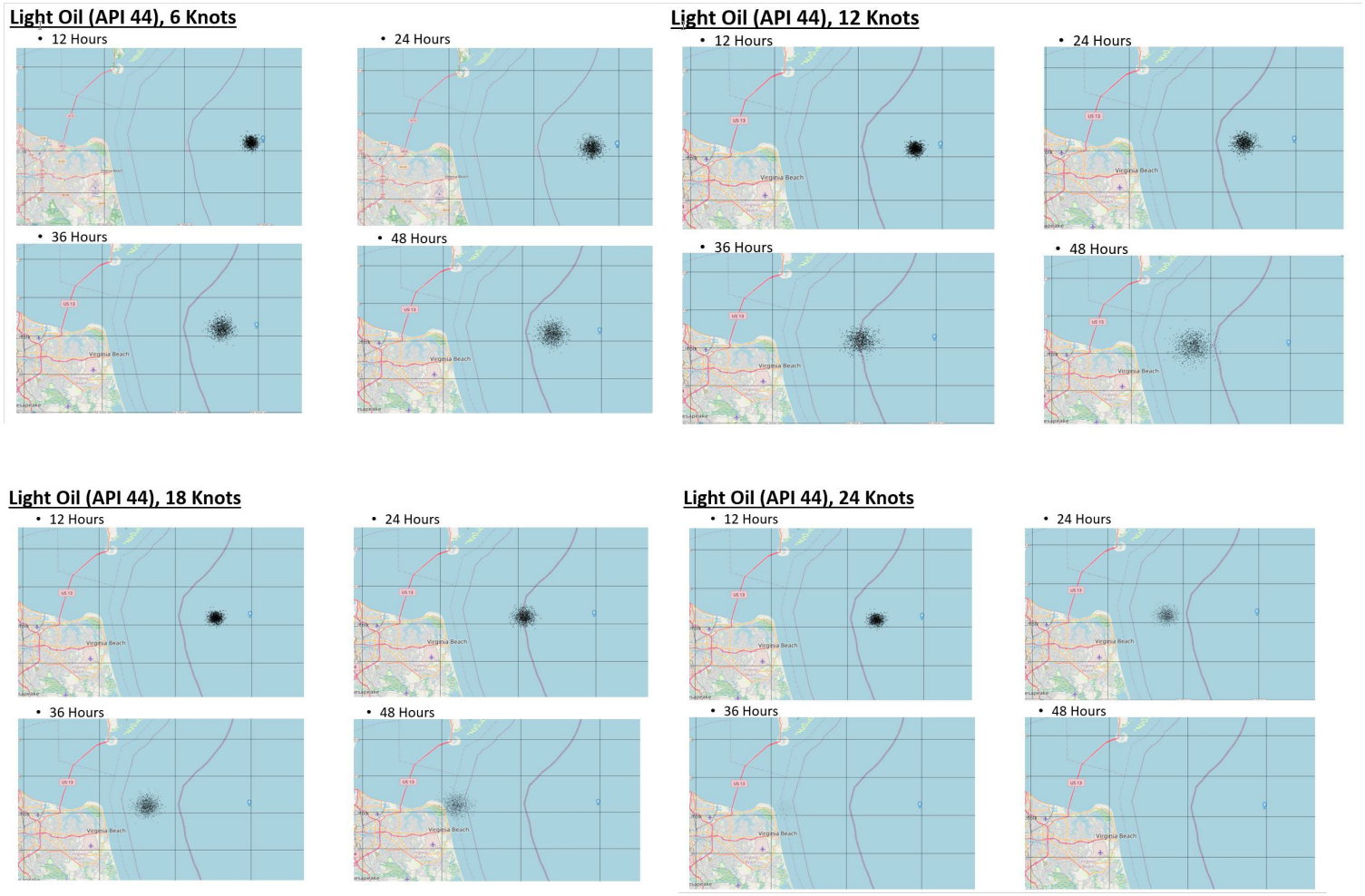
- Worst-case discharge would result if there was a catastrophic failure to a WTG or an OSS
- The volume of oil discharged would be 1,752 gals for the WTG and 74,417 gal for the OSS
- Modeling shows that at normal wind speeds, the oil will evaporate and dissipate before reaching the shoreline
- In the unlikely scenario of constant winds between 18 and 23 kts directly towards the shoreline, a very minimal amount may reach the shoreline
- Wind greater than 23 knots will cause faster evaporation and dissipation and the spill is not expected to reach the shoreline



Critical Infrastructure and Cyber Security

- As a regulated electrical utility, Dominion Energy and the CVOW Commercial Project must comply with strict cyber security standards, which are monitored and enforced by the **North American Electric Reliability Corporation (NERC).** These cover topics such as:

  Critical Cyber Asset Identification
  Security Management Controls
  Personnel and Training, Electronic Security Perimeters
  Physical Security, Systems Security Management
  Incident Reporting and Response Planning
  Recovery Plans for Critical Cyber Assets

- NERC is a not-for-profit international regulatory authority whose mission is to assure the effective and efficient reduction of risks to the reliability and security of the electrical grid

- NERC has jurisdiction of users, owners and operators of the bulk power system, which serves nearly 400 million people in the United States, Canada, and the northern portion of Baja California, Mexico

- NERC is subject to oversight by the **Federal Energy Regulatory Commission (FERC)**

Wind Farm Access - Are There Any Restrictions?

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- Give way to vessels approaching turbines to conduct operational/maintenance activities
- Maintain a safe distance from turbine foundations to avoid risk of allision 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*

Questions, Discussion and Shared Insights

Contact Us:

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