

Coastal Virginia Offshore Wind (CVOW) Project Update

2018 Virginia Coastal Partners Workshop

November 14, 2018



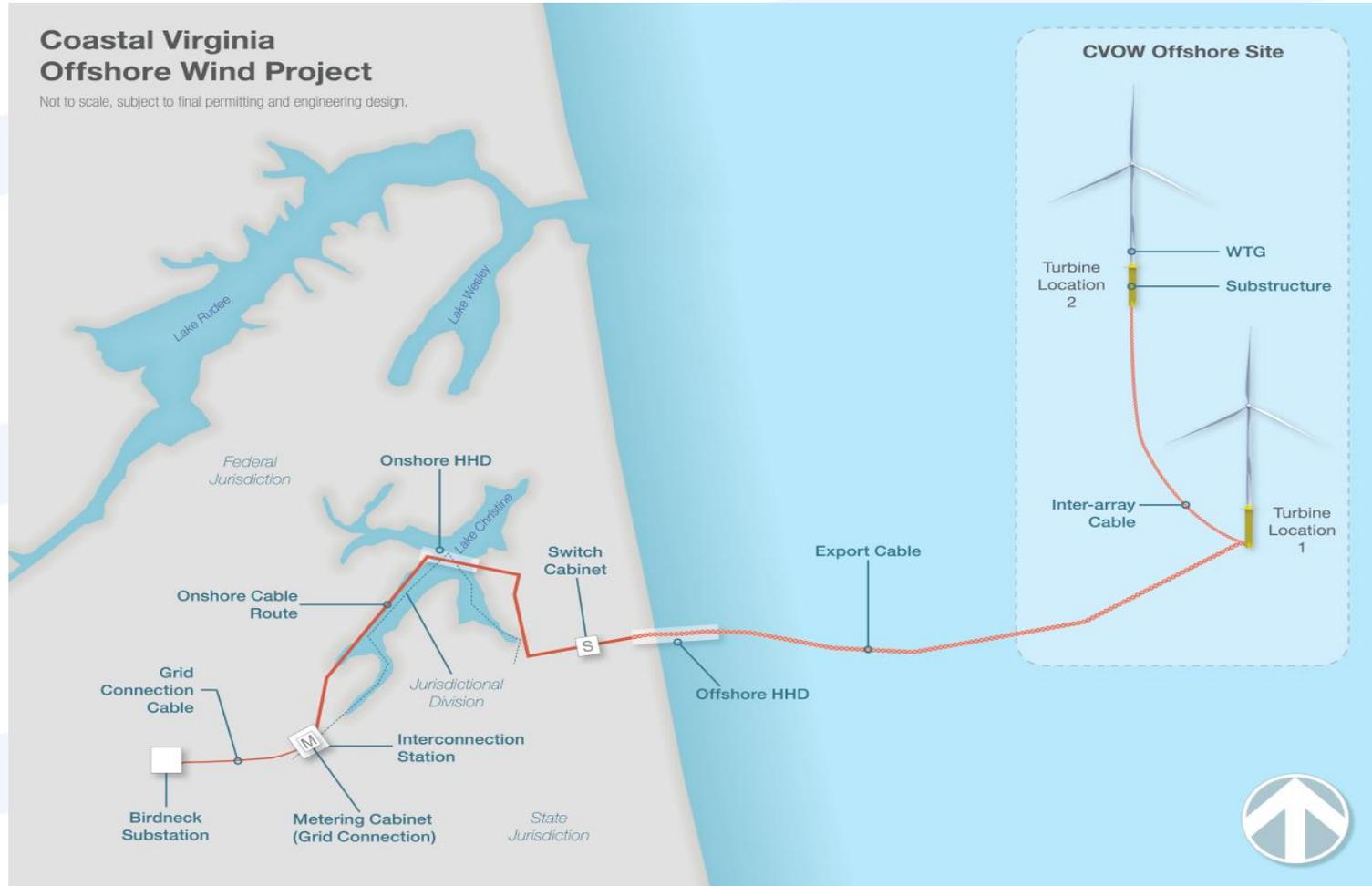
CVOW Project Team

In July 2017, Dominion announced a strategic partnership with Ørsted of Denmark for development and construction of the Coastal Virginia Offshore Wind Project (CVOW)

- ❑ Virginia Department of Mines Minerals and Energy (DMME) - Research Lease Holder
- ❑ Dominion Energy - Research Lease Designated Operator
- ❑ Ørsted Wind Power - Offshore Engineering, Procurement and Construction (EPC) Contractor
- ❑ LE Meyers and Mott MacDonald - Onshore Engineering, Procurement and Construction (EPC) Contractor



CVOW Project Overview



Project Details

- ❑ Two 6 MW Wind Turbine Generators (WTG)
- ❑ 27 mile export cable and 0.6 mile interconnect array cable
- ❑ Turbines will be located ~27 miles east of Virginia Beach, VA
- ❑ The 12 MWs from this project will provide renewable energy to power approximately 3,000 homes
- ❑ In 2016 received the first Research Activities Plan (RAP) issued by the Bureau of Ocean and Energy Management (BOEM)
- ❑ Dominion Energy filed an instant Petition under Code § 56-585.1:4 F, which was enacted during the 2018 Session of the General Assembly
- ❑ Dominion Energy received SCC approval on November 2, 2018
- ❑ In 2020 CVOW will be the first WTGs installed in U.S. Federal Waters

Benefits

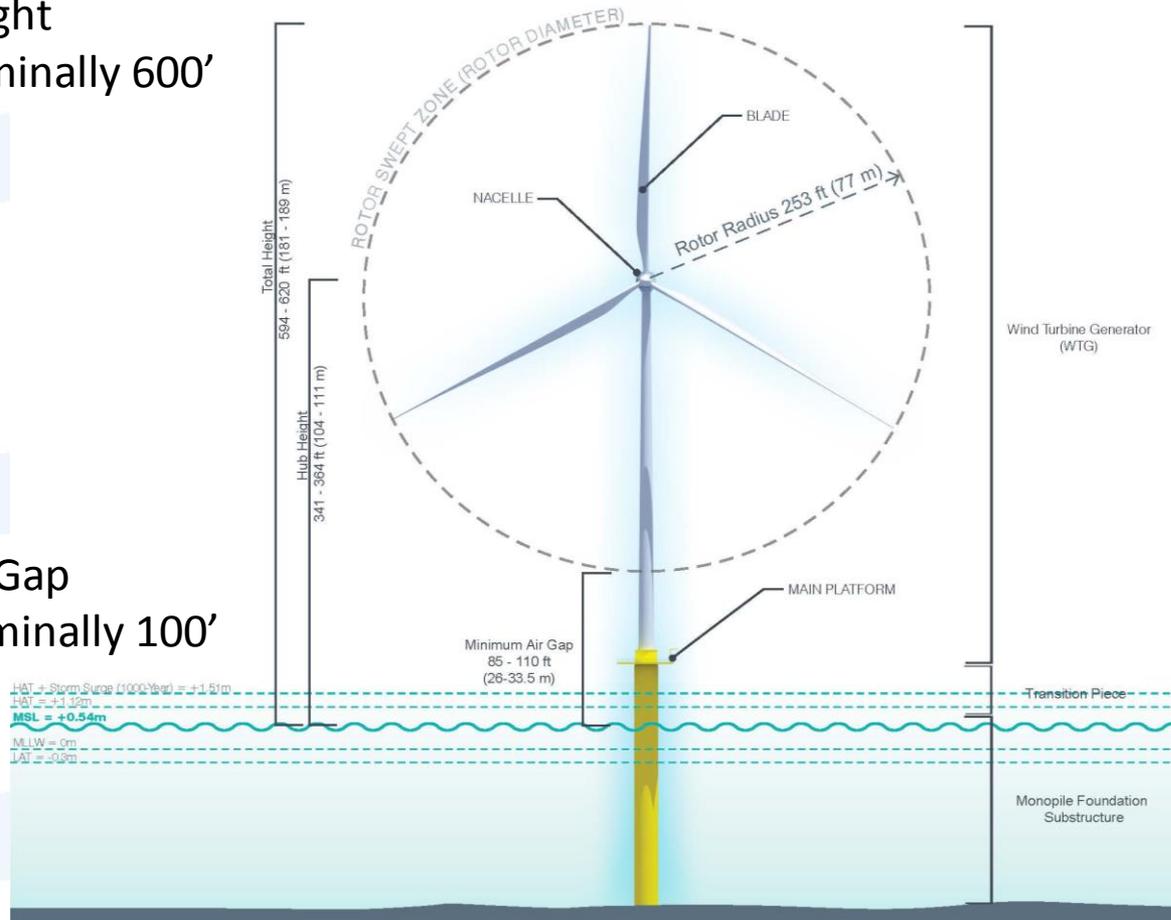
Installing the initial Two Wind Turbine Generators prepares us for a potential larger commercial scale project by:

- ❑ Validating the available wind resource and WTG performance
- ❑ Evaluates the equipment ability to withstand severe storms with rotating winds
- ❑ Determines design changes required to be compatible to US and International standards
- ❑ First project to move through the Federal processes for permitting and environmental compliance
- ❑ Provides valuable construction lessons learned with our EPC contractor
- ❑ Provides operational experience that can be extrapolated to a larger commercial installation
- ❑ Initiate and inform the supply chain process for US Off-shore wind industry
- ❑ Project is necessary, in part, to prove military and port operations can harmoniously coexist

Siemens 6 MW WTG

Height
Nominally 600'

Air Gap
Nominally 100'



Max Blade tip height - 614'
Washington Monument - 555'

Historical Project Schedule

2013

- Bureau of Ocean and Energy Management (BOEM) publishes Request for Public Notice of an Unsolicited Request for an OCS Research Lease, Request for Competitive Interest, and Request for Public Comment

2015

- BOEM issues first research lease to Virginia Department of Mines Minerals and Energy (DMME) and Dominion Energy is the Designated Operator for Virginia Offshore Wind Technology Advancement Project (VOWTAP)

2016

- BOEM issues the first Research Activities Plan (RAP) approval for VOWTAP

2017

- Dominion announced a strategic partnership with Ørsted of Denmark for development and construction of the Coastal Virginia Offshore Wind Project (CVOW), formerly VOWTAP

Project Schedule

2018

- Environmental permitting
- UXO Investigation survey completed on October 23, 2018
- **Received SCC approval on November 2, 2018**

2019

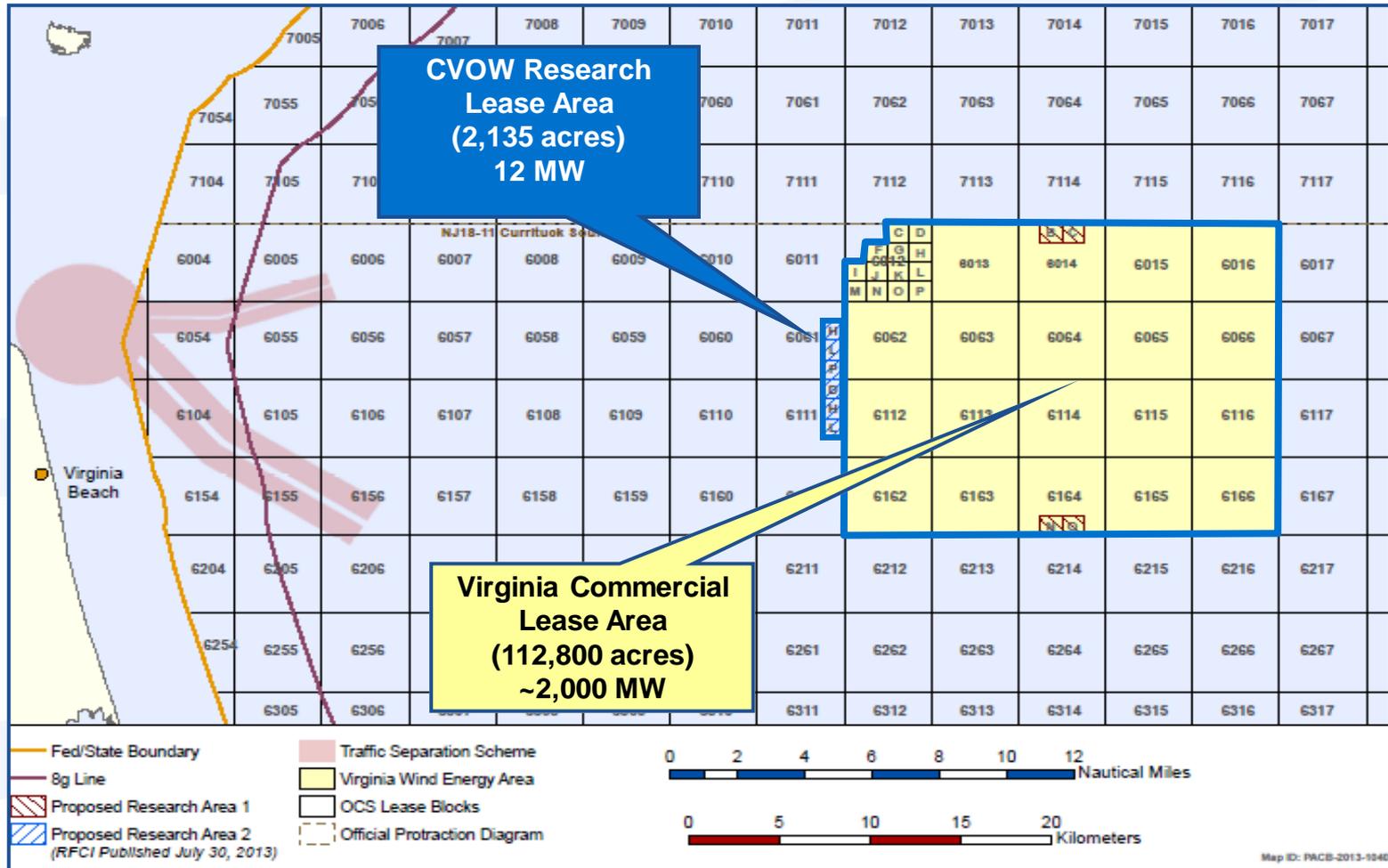
- Environmental permitting
- UXO Identification surveys (if needed)
- Fabrication of major pieces of equipment

2020

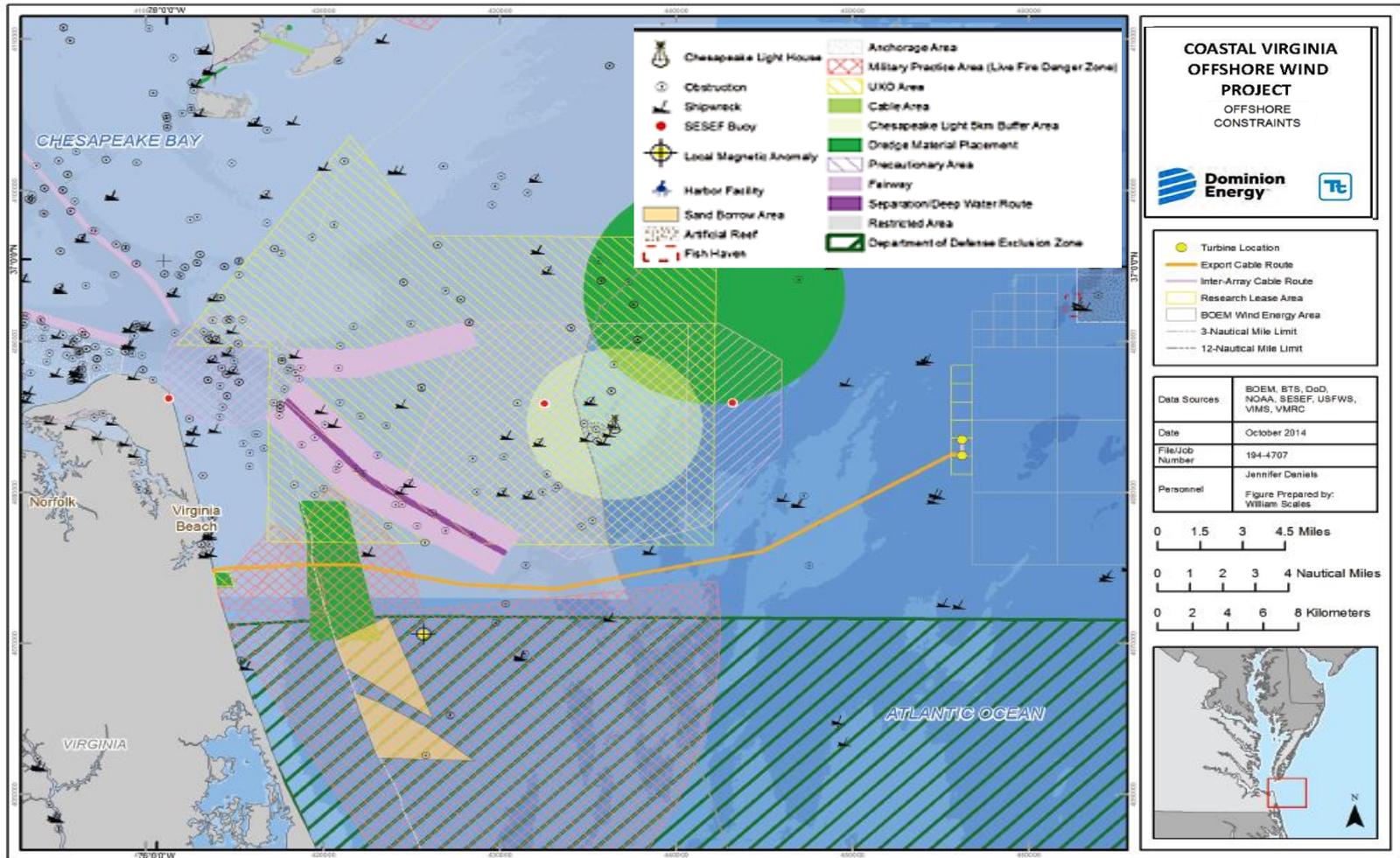
- Q1/Q2 On-shore construction
- Q2/Q3 Off-shore construction

CVOW will be the 1st offshore wind project in U.S. Federal Waters

Virginia Off-Shore Wind Leases

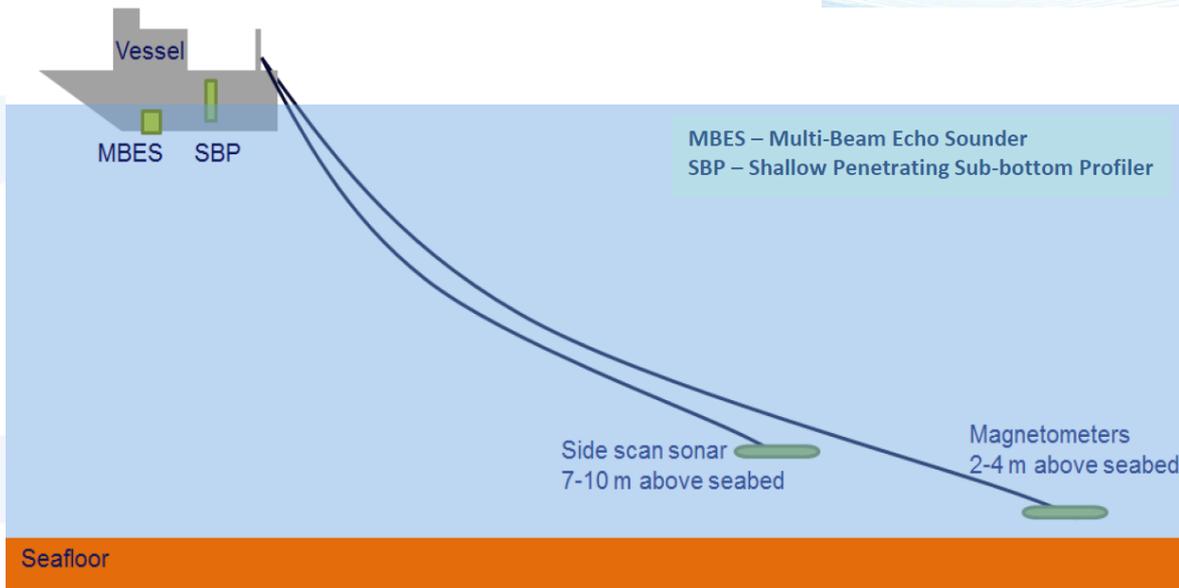


Off-Shore Constraints



2018 UXO Investigation Survey

- ❑ UXO/DMM surveys began in August and completed on October 23, 2018
- ❑ Survey equipment consisted of towed side scan sonar and magnetometers as indicated below



- ❑ Protected Species Observers (PSO) were on watch during all operations
- ❑ 188 mammal detection events occurred with 1,032 animals observed during survey
- ❑ No issues with local fisheries

Fisheries Outreach

- ❑ Strong, proactive fisheries outreach and consultation program to coordinate project operations and address fishery concerns
- ❑ Phased, ongoing commercial and recreational fisheries consultation conducted by Sea Risk in Maryland, Virginia and North Carolina starting July 2018
- ❑ Commercial fishing captains from Rudee Inlet contracted to run gear clearance and outreach in advance of each survey block
- ❑ UXO survey timing coincided with lowest fishery activity
- ❑ Abandoned fishing gear retrieved and returned to port
- ❑ Next phase of ongoing outreach to continue and develop best practices for fishery coordination during survey, clearance and installation operations



Offshore Construction

- ❑ Various purpose built vessels will be employed and will comply with the Jones Act requirements. Vessels include;
 - jack up vessels for installation
 - crew transfer vessels
 - cable laying vessel
 - bubble curtain vessel
 - etc.



Monopile Foundation

Monopile installation expected to occur in May 2020



- ❑ 26.2 foot diameter monopile for each new foundation will be installed by pile driving
- ❑ Transition piece
- ❑ ~80' diameter scour protection installed at base of each foundation
- ❑ Monopile design reduces installation from 1 week to less than 1 day per foundation which significantly reduces potential impacts to marine mammals

Monopile Installation

BKR02 MP/TP - Knowledge transfer - Installation trip – 9th - 16th May 2018

Pictures from trip (3/6)

Upending of MP



Piling of MP



Bubble curtain vessel

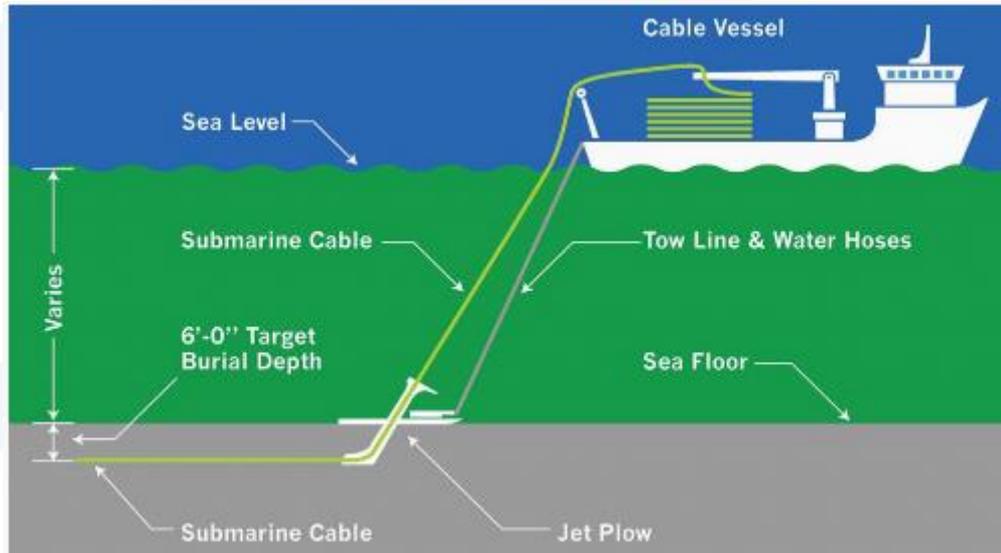


Double bubble curtain



Export Cable Installation

Cable installation expected to occur in May/June 2020



Typical Multi-conductor Subsea Cable

- CVOW cable will be similar
- Approximately 5" in diameter
- Contains all three electrical phases in one sheath
- Also contains fiber optic communications cable
- Shielding and armoring
- Synthetic Rope covering to aid handling and spool coiling



Credit: [EPR insulated cables for modern offshore systems](#)

Regulatory Involvement

Federal

- Bureau of Ocean and Energy Management (BOEM)
- NOAA Fisheries (NMFS)
- Marine Mammal Commission (MMC)
- US Fish and Wildlife Service (USFW)
- US Army Corp. of Engineers (USACE)
- US Coast Guard (USCG)
- US Fleet Forces (USFF)
- Magnuson-Stevens Fisheries Conservation & Management Act

State

- Virginia Department of Historic Resources (VDHR) / Tribes
- Virginia Department of Environmental Quality (VADEQ) - Stormwater permit
- Virginia Department of Environmental Quality (VADEQ) - OCS air permit
- Virginia Department of Environmental Quality (VADEQ) - Water permit
- Virginia Marine Resources Commission (VMRC)