



**Dominion  
Energy<sup>®</sup>**

**Application, Direct  
Testimony, Appendices,  
and Schedules of Virginia  
Electric and Power  
Company**

**Before the State Corporation  
Commission of Virginia**

**For approval and certification of  
the Coastal Virginia Offshore  
Wind Commercial Project and  
Rider Offshore Wind, pursuant to  
§ 56-585.1:11, § 56-46.1, § 56-265.1  
*et seq.*, and § 56-585.1 A 6 of the  
Code of Virginia**

**Volume 2 of 11  
PUBLIC VERSION**

**Case No. PUR-2021-00142**

**Filed: November 5, 2021**

**Application of Virginia Electric and Power Company  
For approval and certification of the Coastal Virginia Offshore Wind  
Commercial Project, and Rider Offshore Wind, pursuant to § 56-585.1:11, § 56-46.1,  
§ 56-265.1 *et seq.*, and § 56-585.1 A 6 of the Code of Virginia  
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COMMONWEALTH OF VIRGINIA  
BEFORE THE  
STATE CORPORATION COMMISSION

APPLICATION OF

VIRGINIA ELECTRIC AND POWER COMPANY

FOR APPROVAL AND CERTIFICATION OF THE COASTAL VIRGINIA  
OFFSHORE WIND COMMERCIAL PROJECT AND RIDER OFFSHORE  
WIND, PURSUANT TO § 56-585.1:11, § 56-46.1, § 56-265.1 *et seq.* AND  
§ 56-585.1 A 6 OF THE CODE OF VIRGINIA

Generation Appendix

Containing Information in Response to Statutory Requirements Pertaining to the  
Coastal Virginia Offshore Wind Commercial Project

Case No. PUR-2021-00142

Filed: November 5, 2021

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## EXECUTIVE SUMMARY

§ 56-585.1:11 and related provisions of § 56-585.1 A 6 of the Code of Virginia (“Va. Code” or “Code”) provide for and impose certain requirements on the construction and operation of offshore wind electric generation projects located off the Commonwealth’s Atlantic coastline. Virginia Electric and Power Company (“Dominion Energy Virginia” or the “Company”) proposes to construct, own, and operate an offshore wind electric generation facility governed by these statutory provisions. This Generation Appendix demonstrates the Company’s compliance with the relevant statutory provisions.

The Company seeks to construct, own, and operate offshore wind generation facilities consisting of 176 14.7 megawatt (“MW”) Wind Turbine Generators (“WTGs”) located in a federal lease area beginning approximately 27 statute miles (approximately 24 nautical miles) off the coast of Virginia Beach, Virginia (“Lease Area”) and its related power export facilities, which will transport the generated electricity to the Cable Landing Location at the State Military Reservation (“SMR”) in the City of Virginia Beach, Virginia. From there, the generated electricity will utilize onshore transmission infrastructure (the “Virginia Facilities”) to connect to the electric grid (collectively, the WTGs, related power export facilities, and the Virginia Facilities are the Coastal Virginia Offshore Wind Commercial Project, referred to as the “CVOW Commercial Project” or “Project”).

In addition to the 176 WTGs, the “Offshore Export Facilities” include associated foundations on which the WTGs will be installed (“WTG Foundations”) as well as a cable system (“Inter-Array Cables”) that connects the WTGs to each other and to three offshore substations (“Offshore Substations”). Generated electricity flowing from the Offshore Substations will be combined into nine transport cables (“Offshore Export Cables”) that will depart the Lease Area and transmit the energy through an underwater corridor (“Offshore Export Cable Route Corridor”) to the Cable Landing Location at SMR in the City of Virginia Beach, Virginia. The Virginia Facilities, which transport the generated electricity from the Offshore Export Cables to the Cable Landing Location at SMR to the Fentress Substation, are addressed in detail in the Transmission Appendix included in this filing beginning three miles from the coast of Virginia Beach and extending to the Fentress Substation. For U.S. income tax purposes, fabrication of certain Project components began in 2020. The Company expects the Project to be fully in service by the end of 2026.

The CVOW Commercial Project will provide clean, reliable offshore wind energy to Virginia customers, create the opportunity to displace electricity generated by fossil fuel-powered plants, and offer substantial economic and environmental benefits to the Commonwealth of Virginia. This Project represents a viable and needed opportunity for Virginia to obtain clean renewable energy and realize its economic and environmental goals, and for the Company to meet its statutory carbon reduction requirements.

The Project has gained critical operating experience and received valuable insights both from the CVOW Pilot Project, which represents the two 6 MW WTGs installed during 2020 in an area adjacent to the Lease Area, as well as from firms with significant experience in offshore windfarm design, construction, and operations. Data gathered from these sources includes insights with

respect to safety, environmental concerns, permitting, construction and commissioning, operations and maintenance, cyber security, supply chain issues, and maritime and operational experience.

The Company conducted a cost analysis that shows that the Project has a positive net present value (“NPV”) of \$2.5 billion, indicating that it is beneficial to customers when compared to the market. The Company also calculated the levelized cost of energy (“LCOE”) of the Project and compared it to that of a convention simple cycle combustion turbine (“CT”). This analysis shows that the CVOW Commercial Project’s LCOE is \$87 per megawatt-hour (“MWh”), which is well within the Code’s limit of 1.4 times the 2019 LCOE of a CT, which is \$125 per MWh.

A substantial majority of the costs of service and equipment associated with the Project, excluding interconnection costs, were subject to competitive procurement. Approximately \$7.6 billion of the \$8.9 billion of total Project costs, excluding interconnection costs, was subject to competitive procurement. In the Generation Appendix, the Company provides reports on the various requests for proposals associated with the Project.

The Company has carefully considered the environmental and social impacts of the Project throughout its development. The Company has compiled a Fisheries and Environmental Impact Mitigation Plan that is included with this filing. Additionally, The Company accounted for the social cost of carbon, which it considers a benefit with this Project. The Company has also compiled an Environmental Justice Report to be submitted with this filing, as well as an Economic Development Plan, which addresses ways in which the Project utilizes local workers and supports economic development, including through capital investments and job creation, consultations with identified government officials, and prioritization of hiring and training of veterans, local workers, and workers from historically economically disadvantaged communities.

Finally, in Section VII of the Generation Appendix, the Company provides answers to questions posed by the State Corporation Commission (“Commission”) in its July 26, 2021 Order in this proceeding.

## I. OVERVIEW OF PROPOSED PROJECT

### A. Provide an overview of the proposed project.

Response: **Project Overview**

Virginia Electric and Power Company (“Dominion Energy Virginia” or the “Company”) proposes to construct, own, and operate offshore wind generation facilities consisting of 176 14.7 megawatt (“MW”) Wind Turbine Generators (“WTGs”) located in a federal lease area beginning approximately 27 statute miles (approximately 24 nautical miles)<sup>1</sup> off the coast of Virginia Beach, Virginia (“Lease Area”) and its related power export facilities, which will transport the generated electricity to the Cable Landing Location at the State Military Reservation (“SMR”) in the City of Virginia Beach, Virginia. From there, the generated electricity will utilize onshore transmission infrastructure (the “Virginia Facilities”) to connect to the electric grid (collectively, the WTGs, related power export facilities, and the Virginia Facilities are the Coastal Virginia Offshore Wind Commercial Project, referred to as the “CVOW Commercial Project” or “Project”).

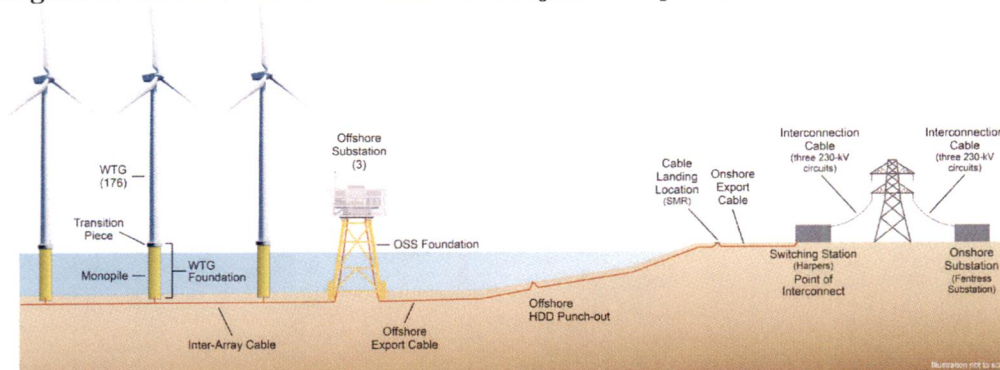
In addition to the 176 WTGs, the “Offshore Export Facilities” include associated foundations on which the WTGs will be installed (“WTG Foundations”) as well as a cable system (“Inter-Array Cables”) that connects the WTGs to each other and to three offshore substations (“Offshore Substations”). Generated electricity flowing from the Offshore Substations will be combined into nine transport cables (“Offshore Export Cables”)<sup>2</sup> that will depart the Lease Area and transmit the energy through an underwater corridor (“Offshore Export Cable Route Corridor”) to the Cable Landing Location at SMR in the City of Virginia Beach, Virginia. The Virginia Facilities, which transport the generated electricity from the Offshore Export Cables to the Cable Landing Location at SMR to the Fentress Substation, are addressed in detail in the Transmission Appendix included in this filing beginning three miles from the coast of Virginia Beach and extending to the Fentress Substation. Figure 1 provides a general overview of Project components.

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<sup>1</sup> Hereinafter, all miles will be noted as approximate statute miles, unless otherwise indicated.

<sup>2</sup> The Transmission Appendix refers to “Offshore Export Circuits.” This terminology is a way of referring to the grouping of three Offshore Export Cables coming from an Offshore Substation for transfer of electricity to the Cable Landing Location at SMR. The Offshore Export Circuit referred to in the Transmission Appendix is not a separate Project component.

**Figure 1: Basic CVOW Commercial Project Components**



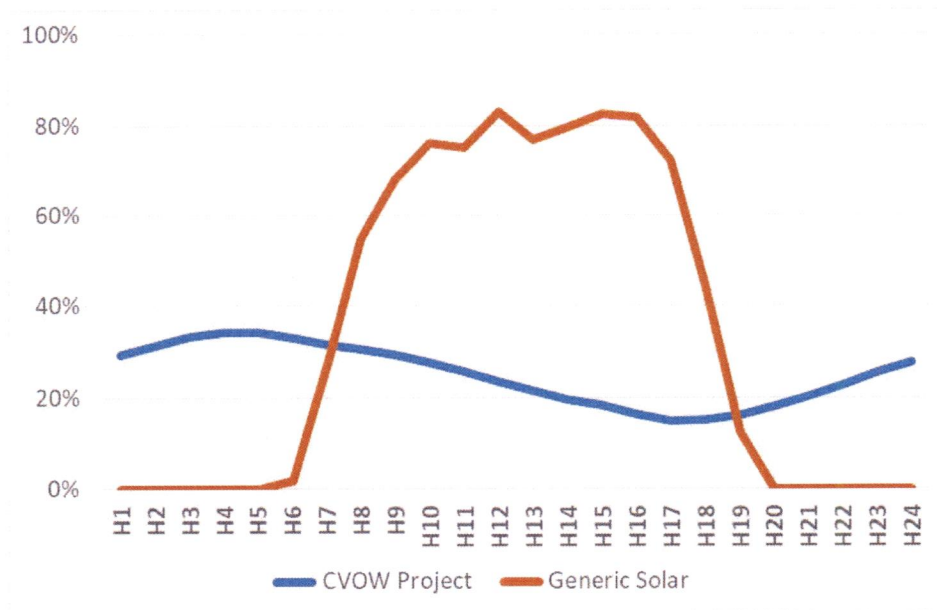
This Appendix addresses the WTGs and the Offshore Export Facilities located in the Lease Area and extending through the Offshore Export Cable Route Corridor to the Cable Landing Location at SMR.

The CVOW Commercial Project will provide clean, reliable offshore wind energy to Virginia customers, create the opportunity to displace electricity generated by fossil fuel-powered plants, and offer substantial economic and environmental benefits to the Commonwealth of Virginia. This Project represents a viable and needed opportunity for Virginia to obtain clean renewable energy and realize its economic and environmental goals.

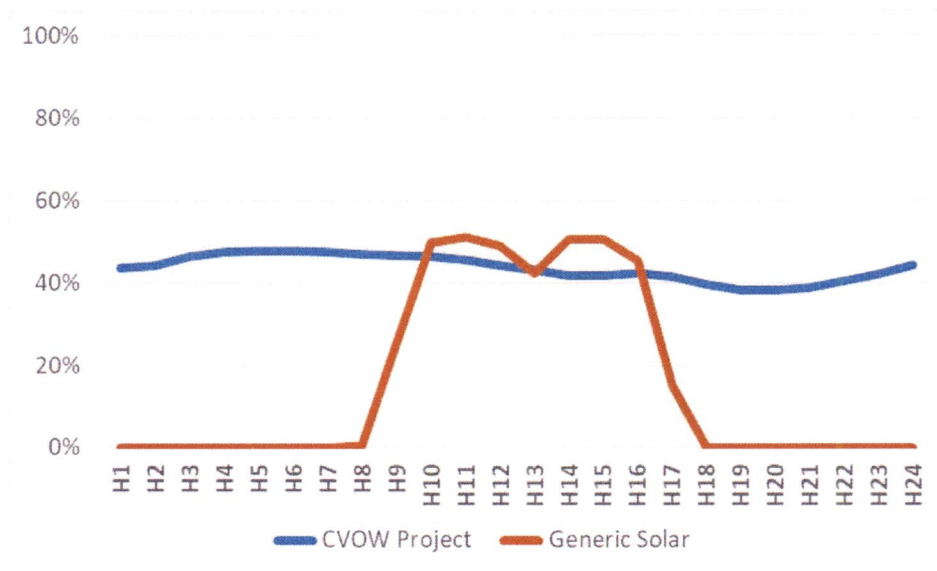
With respect to the Company's generation planning efforts, the Company's general objective is to identify the mix of resources necessary to meet its customers' projected capacity and energy needs in an efficient and reliable manner at the lowest reasonable cost, while considering future changes in public policy and environmental regulations. Such considerations include the need to develop a significant amount of in-state renewable resources to meet the requirements of the recently-enacted Virginia Clean Economy Act ("VCEA"). In addition, with the Commonwealth joining the Regional Greenhouse Gas Initiative ("RGGI") in January 2021, and the Company's need to comply with newly-enacted renewable portfolio standards, renewable energy resources like offshore wind generation will assume an increasingly important role in enabling the Company to comply with carbon emission reduction requirements.

As the Company transitions to a generation portfolio with increasing amounts of renewable resources, offshore wind provides a necessary complement to solar generation, which will constitute much of the Company's renewable fleet. Unlike solar generation, which peaks in the afternoon timeframe and produces more electricity in the summer, offshore wind peaks at night and tends to generate the most electricity during winter months. This day/night and summer/winter complement will be critical to the Company's ability to continue to provide reliable service as the generation fleet transitions to increasing amounts of solar resources. See Figures 2 and 3, below, which depict capacity factor comparison of solar and CVOW in the summer and winter and during the day and night:

**Figure 2: Average Capacity Factor in July**



**Figure 3: Average Capacity Factor in January**



Additional details and specifications of the Project are set forth below and in the Construction and Operations Plan (“COP”) submitted to the Bureau of Ocean Energy Management (“BOEM”) on December 17, 2020, and updated on June 29,

2021. This document was posted for public review on July 2, 2021.<sup>3</sup> The Company filed a supplement to the COP on October 29, 2021. The BOEM permitting process is described in more detail in section III.L of the Transmission Appendix filed in this proceeding.

## **CVOW Interconnect Facilities**

The Company projects that offshore Project construction will commence in Q4 2023, with initial work focused on WTG Foundations and the start of subsea cable installation. WTGs are projected to be installed beginning in Q2 2025. See Attachment IV.B for a detailed projected Project schedule.

### **A. Lease Area and Project Location**

The Project will be located in the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf Offshore Virginia (Lease No. OCS-A-0483), which was awarded to Dominion Energy Virginia through the BOEM competitive renewable energy lease auction of the Wind Energy Area offshore of Virginia in 2013. The Lease Area covers approximately 112,799 acres and begins approximately 27 statute miles (approximately 24 nautical miles or “nm”) off the Virginia Beach coastline. Attachment I.A.1 outlines BOEM’s renewable energy regulations applicable to the Project. Attachment I.A.2 depicts the general location of the Lease Area and infrastructure to transmit energy onshore.

Inside the Lease Area, WTGs would be arranged in a grid pattern with each WTG spaced approximately 0.75 nm in an east-west direction and 0.93 nm in a north-south direction. The grid pattern contains 205 positions for WTG installation. Under current specifications, the Company will install 176 WTGs. Three grid positions will be utilized for Offshore Substations. 26 spare grid positions will be available for WTG installation if seabed conditions in other grid positions are not recommended for construction. The proposed WTG layout is shown in Attachment I.A.3.

### **B. Wind Turbine Generators**

The Company selected Siemens Gamesa Renewable Energy (“Siemens” or “SGRE”) as the preferred WTG supplier and has identified the Siemens SG 14-222 DD WTG as the model to be used in this Project. To anticipate advancements in the available WTG technology, the front-end engineering and design (“FEED”) process will continue to optimize the selected WTG design. The WTGs are projected to have a nominal capacity of 14.7 MW, and the final WTG specifications are expected to follow the traditional offshore WTG design with three blades and a horizontal rotor axis. Specifically, the blades will be connected to a central hub, forming a rotor that turns a shaft connected to the generator. The generator will be

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<sup>3</sup> The COP can be found at <https://www.boem.gov/renewable-energy/state-activities/cvow-construction-and-operations-plan>.

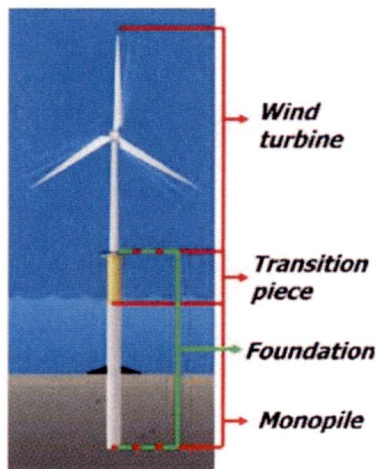
located within a containing structure known as the nacelle situated adjacent to the rotor hub. The nacelle will be supported by a tower structure affixed to the WTG Foundation. The nacelle will be able to rotate or “yaw” on the vertical axis to face the oncoming wind direction. Rotor diameter will range between 725 and 761 ft (221 to 232 m). Attachment I.A.4 provides a summary of the physical characteristics of the SG 14-222 DD WTG.

The SG 14-222 DD WTG is also equipped with the Siemens Gamesa Supervisory Control and Data Acquisition (“SCADA”) system. This system offers remote control and a variety of status views and useful reports. The status views present information including electrical and mechanical data, operation and fault status, meteorological data and grid station data.

### C. WTG Foundations

For the purpose of this Project, monopiles will be used to support Project WTGs. The WTG Foundation concept consists of two parts: (1) a lower foundation pile (monopile) driven into the seabed; and (2) an upper transition piece mounted on top of the monopile (these components together make up the WTG Foundation). The transition piece is connected to the WTG tower with a flange. Each WTG Foundation will consist of a monopile structure and transition piece that will contain supporting structures such as access ladders, boat landing, and platforms. Illustrative examples of the WTG Foundation are provided in Attachment I.A.5.

**Figure 4: Turbine Components**



### D. Offshore Substations

The Offshore Substation is an offshore platform, also known as a “topside,” installed atop piled jacket foundations. The topside contains the electrical components necessary to collect the power generated by the WTGs (via the Inter-Array Cable system) and transform it to a higher voltage for transmission and

transport of that power to the Project's onshore electricity infrastructure (via the Offshore Export Cable). The Company is proposing to construct three Offshore Substations, each with a rated capacity of 880 MW. The Offshore Substation is comprised of two main components: (1) a jacket foundation attached to the seafloor; and (2) a topside that contains the decks holding the main electrical and support equipment. Each Offshore Substation will contain equipment for high-voltage transmission, including three main transformers and other facilities such as heating and ventilation systems, low-voltage distribution, emergency diesel generators, uninterrupted power supply/batteries, pollution prevention system, SCADA systems, and control panels for operation of the substation auxiliary systems, WTGs, and the high voltage/medium voltage power transmission.

The Offshore Substation will contain multiple deck levels, including the roof deck, utility deck, cooler deck, main deck, cable deck and cellar deck (located on the Offshore Substation foundation), which will hold the equipment, cables, and maintenance/shelter area. A helideck will be included to support monitoring and maintenance to each of the Offshore Substations for normal and emergency access by helicopters.

#### **Figure 5: Offshore Substation Example**



#### **E. Inter-Array Cable**

The Inter-Array Cables will carry the electrical current produced by the WTGs to the Offshore Substations. The Inter-Array Cable system will be comprised of a series of cable "strings" that interconnect a small grouping of WTGs to the Offshore Substations. The Inter-Array Cables will consist of strings of three-core copper and/or aluminum conductor, with a rated voltage of 72.5 kV and an operating voltage of 66 kV, connecting up to eight WTGs per string. The smallest diameter cable would be used to connect the WTGs located furthest from the Offshore Substation, which would then transition to the medium and then largest cable diameter as the Inter-Array Cables approach the Offshore Substation. Inter-Array Cables would be installed by jet trenching, chain cutting, trench former, and/or other available technologies.



Assuming utilization of the preferred positions within the WTG layout, the company anticipates up to 12 WTG strings would be connected to each Offshore Substation, for a total of up to 36 WTG strings. Subject to the FEED process, if WTGs are shifted to spare locations, the Inter-Array Cable layout would need to be reassessed and the number of WTGs per string and/or the number of WTG strings connecting to each Offshore Substation may be modified to maintain a reasonable balance of power between Offshore Substations. The Project will utilize up to 300 total miles (484 km) of Inter-Array Cables. The Inter-Array Cable length is anticipated to range from 4,528 to 6,923 feet depending on location. An illustration of a representative cross-section of an Inter-Array Cable can be found in Attachment I.A.6 and an illustration of a representative Inter-Array Cable layout is provided in Attachment I.A.7.

#### F. Offshore Export Cables

Nine 230 kV export cables buried 3.3 to 16.4 ft (1 to 5 m) beneath the seabed will transfer the electricity from the Offshore Substations to the Cable Landing Location at SMR. The Offshore Export Cables have been designed based on the energy capacity needs of the Project as well as consideration of site-specific installation conditions, including seabed temperature, burial depth, and seabed thermal resistivity. The design of the Offshore Export Cables will be further refined based on the results of system studies, geotechnical surveys, and landfall design. Three Offshore Export Cables, consisting of three-core copper and/or aluminum conductor 230-kV subsea cables, will transmit electricity from each of the three Offshore Substations to the Cable Landing Location, for a total of nine Offshore Export Cables that will make landfall.

Upon exiting the Lease Area, the three Offshore Export Cable Route Corridors originating at the Offshore Substations will merge to become one overall Offshore Export Cable Route Corridor containing all nine Offshore Export Cables. The Offshore Export Cable Route Corridor between the western edge of the Lease Area and the Cable Landing Location will range from 9,400 ft (2,865 m) down to 1,970 ft (600 m) wide. The variability in corridor diameter is driven by several external constraints that are present at different locations along the Offshore Export Cable Route Corridor, which is explained in more detail in the COP.

Within the Offshore Export Cable Route Corridor, the nine Offshore Export Cables would generally be spaced approximately 164 to 558 ft (50 to 170 m) apart. At certain locations, the Offshore Export Cables may be spaced 164 to 328 ft (50 to 100 m) apart based on natural and environmental constraints. The Offshore Export Cable Route Corridor and individual Offshore Export Cable Routes within the corridor are shown in Attachment I.A.8.

G. Portsmouth Marine Terminal (Port of Virginia)

Pursuant to a lease agreement executed in August 2021 between the Company and the Virginia Port Authority (“Authority”), the Company leased from the Authority an approximately 72-acre portion of the Portsmouth Marine Terminal (“Terminal”) located in Portsmouth, Virginia. The Company will use the leased portion of the deep-water, multi-use marine cargo Terminal as a staging and pre-assembly area for the foundations and turbines that will be installed at the CVOW Commercial Project. This aspect of the Project is described in more detail in Attachment I.A.9.

Table 1.1-1. BOEM Requirements

BOEM Requirement	Location in COP
<b>30 CFR § 585.105(a)</b>	
(1) Design your projects and conduct all activities in a manner that ensures safety and will not cause undue harm or damage to natural resources, including their physical, atmospheric, and biological components to the extent practicable; and take measures to prevent unauthorized discharge of pollutants including marine trash and debris into the offshore environment.	Section 4, Site Characterization and Assessment of Impact Producing Factors Appendix A, Safety Management System
<b>30 CFR § 585.621(a-g)</b>	
(a) The project will conform to all applicable laws, implementing regulations, lease provisions, and stipulations or conditions of the lease.	Section 1.4, Regulatory Framework
(b) The project will be safe.	Appendix A, Safety Management System
(c) The project will not unreasonably interfere with other uses of the OCS, including those involved with National security or defense.	Section 4.4.8, Department of Defense and Outer Continental Shelf National Security Maritime Uses,
(d) The project will not cause undue harm or damage to natural resources; life (including human and wildlife); property; the marine, coastal, or human environment; or sites, structures, or objects of historical or archaeological significance.	Section 4, Site Characterization and Assessment of Impact Producing Factors
(e) The project will use the best available and safest technology.	Section 1.10, Design Standards Section 3, Description of Proposed Activity Appendix B, Preliminary Hierarchy of Standards
(f) The project will use best management practices.	Section 4, Site Characterization and Assessment of Impact Producing Factors
(g) The project will use properly trained personnel.	Appendix A, Safety Management System
<b>30 CFR § 585.626(a)</b>	
(1) Shallow Hazards	
(1)(ii) Gas Seeps or shallow gas;	Section 4.1, Physical Resources Appendix C, Marine Site Investigation Report
(1)(iii) Slump blocks or slump sediments;	Section 4.1, Physical Resources Appendix C, Marine Site Investigation Report
(1)(iv) Hydrates;	Section 4.1, Physical Resources Appendix C, Marine Site Investigation Report
(1)(v) Ice Scour of seabed sediments;	Section 4.1, Physical Resources Appendix C, Marine Site Investigation Report
(2) Geological survey relevant to the design and siting of facility	Section 4.1, Physical Resources Appendix C, Marine Site Investigation Report
(2)(i) Seismic activity at your proposed site;	Section 4.1, Physical Resources Appendix C, Marine Site Investigation Report
(2)(ii) Fault zones;	Section 4.1, Physical Resources Appendix C, Marine Site Investigation Report
(2)(iii) The possibility and effects of seabed subsidence; and	Section 4.1, Physical Resources Appendix C, Marine Site Investigation Report

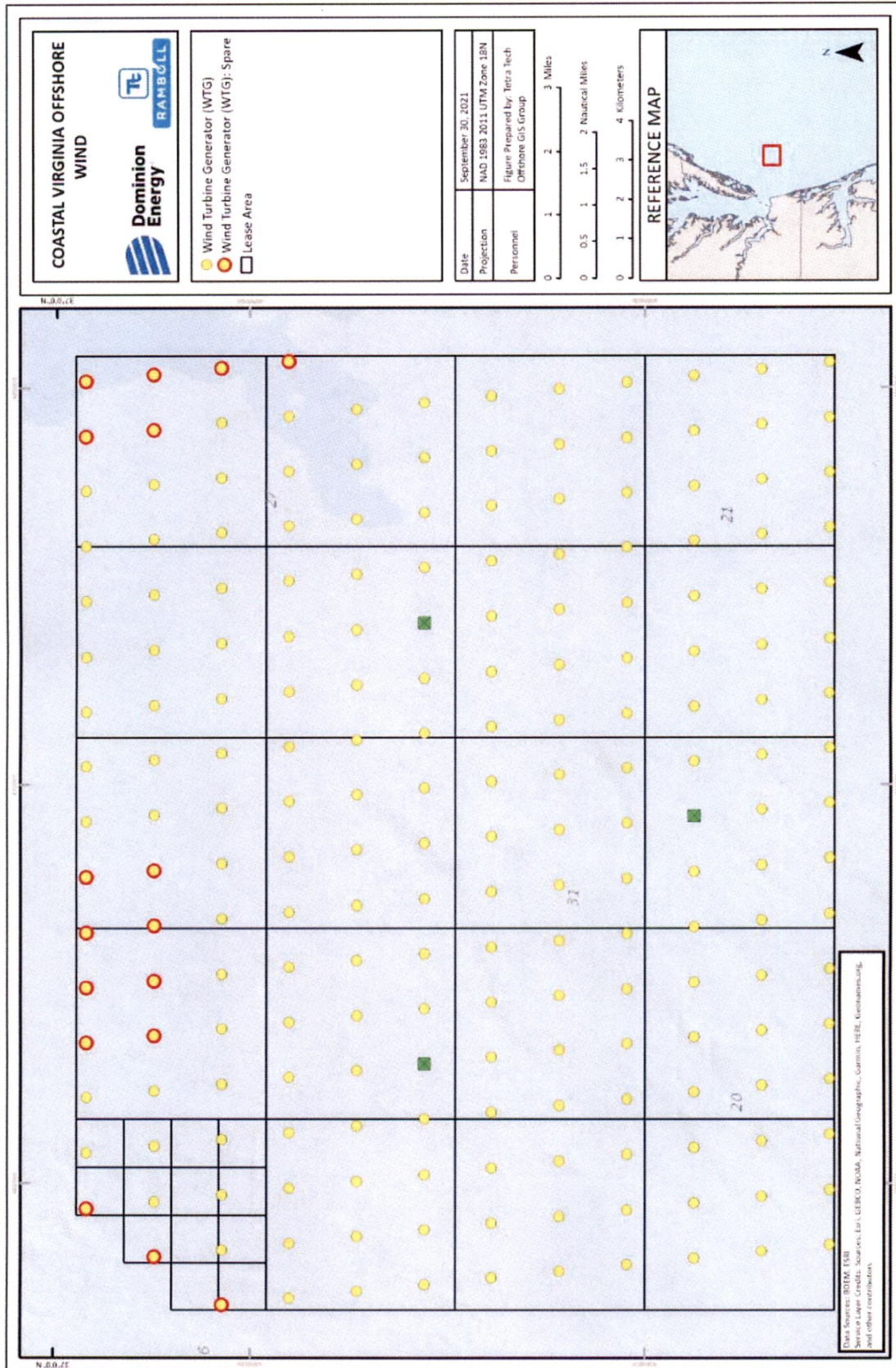
BOEM Requirement	Location in COP
(2)(iv) The extent and geometry of faulting attenuation effects of geological conditions near your site.	Section 4.1, Physical Resources Appendix C, Marine Site Investigation Report
(3) Biological	
(3)(i) A description of the results of biological surveys used to determine the presence of live bottoms, hard bottoms, and topographic features, and surveys of other marine resources such as fish populations (including migratory populations), marine mammals, sea turtles, and sea birds.	Section 4.2, Biological Resources Appendix D, Benthic Resource Characterization Report Appendix E, Essential Fish Habitat Assessment
(4) Geotechnical Survey	
(4)(i) The results of a testing program used to investigate the stratigraphic and engineering properties of the sediment that may affect the foundations or anchoring systems for your facility.	Section 4.1, Physical Resources Appendix C, Marine Site Investigation Report
(4)(ii) The results of adequate in situ testing, boring, and sampling at each foundation location, to examine all important sediment and rock strata to determine its strength classification, deformation properties, and dynamic characteristics.	Section 4.1, Physical Resources Appendix C, Marine Site Investigation Report
(4)(iii) The results of a minimum of one deep boring (with soil sampling and testing) at each edge of the project area and within the project area as needed to determine the vertical and lateral variation in seabed conditions and to provide the relevant geotechnical data required for design.	Section 4.1, Physical Resources Appendix C, Marine Site Investigation Report
(5) Archaeological Resources	
(5)(i) A description of the historic and prehistoric archaeological resources, as required by the National Historic Preservation Act of 1966 (NHPA) (16 U.S.C. §§ 470 <i>et seq.</i> ), as amended.	Section 4.3, Cultural Resources Appendix F, Marine Archaeological Resource Assessment Appendix G, Terrestrial Archaeological Resource Assessment Appendix H, Historic Properties Assessment Appendix I, Visual Impact Assessment
(6) Overall Site Investigation	
(6) (i) Scouring of the seabed;	Appendix C, Marine Site Investigation Report
(6) (ii) Hydraulic instability;	Appendix C, Marine Site Investigation Report
(6) (iii) The occurrence of sand waves;	Appendix C, Marine Site Investigation Report
(6) (iv) Instability of slopes at the facility location;	Appendix C, Marine Site Investigation Report
(6) (v) Liquefaction, or possible reduction of sediment strength due to increased pore pressures;	Appendix C, Marine Site Investigation Report Appendix J, Sediment Transport Analysis
(6) (vi) Degradation of subsea permafrost layers;	Appendix C, Marine Site Investigation Report
(6) (vii) Cyclic loading;	Appendix C, Marine Site Investigation Report
(6) (viii) Lateral loading;	Appendix C, Marine Site Investigation Report
(6) (ix) Dynamic loading;	Appendix C, Marine Site Investigation Report
(6) (x) Settlements and displacements;	Appendix C, Marine Site Investigation Report Appendix J, Sediment Transport Analysis
(6) (xi) Plastic deformation and formation collapse mechanisms; and	Appendix C, Marine Site Investigation Report

BOEM Requirement	Location in COP
(6) (xii) Sediment reactions on the facility foundations or anchoring systems.	Appendix J, Sediment Transport Analysis
<b>30 CFR § 585.626(b)</b>	
(1) Contact information	Section 1.7, Authorized Representative and Designated Operator
(2) Designation of operator, if applicable	Section 1.7, Authorized Representative and Designated Operator
(3) The construction and operation concept	Section 3, Description of Proposed Activity
(4) Commercial lease stipulations and compliance	Section 1.4, Regulatory Framework
(5) A location plat	Appendix K, Conceptual Project Design Drawings
(6) General structural and project design, fabrication, and installation	Section 3, Description of Proposed Activity Appendix K, Conceptual Project Design Drawings
(7) All cables and pipelines, including cables on project easements	Section 3, Description of Proposed Activity
(8) A description of the deployment activities	Section 3, Description of Proposed Activity
(9) A list of solid and liquid wastes generated	Section 3, Description of Proposed Activity
(10) A listing of chemical products used (if stored volume exceeds U.S. Environmental Protection Agency [EPA] Reportable Quantities)	Section 3, Description of Proposed Activity
(11) A description of any vessels, vehicles, and aircraft you will use to support your activities	Section 3, Description of Proposed Activity
(12)(i) A general description of the operating procedures and systems under normal conditions	Section 3, Description of Proposed Activity
(12)(ii) A general description of the operating procedures and systems in the case of accidents or emergencies, including those that are natural or manmade	Appendix A, Safety Management System
(13) Decommissioning and site clearance procedures	Section 3, Description of Proposed Activity
(14)(i) A listing of all Federal, State, and local authorizations, approvals, or permits that are required to conduct the proposed activities, including commercial operations. The U.S. Coast Guard (USCG), U.S. Army Corps of Engineers (USACE), and any other applicable authorizations, approvals, or permits, including any federal, state, or local authorizations pertaining to energy gathering, transmission or distribution (e.g., interconnection authorizations)	Section 1.4, Regulatory Framework
(14)(ii) A statement indicating whether you have applied for or obtained such authorization, approval, or permit	Section 1.4, Regulatory Framework
(15) Your proposed measures for avoiding, minimizing, reducing, eliminating, and monitoring environmental impacts	Section 4, Site Characterization and Assessment of Impact Producing Factors
(16) Information you incorporate by reference	Section 5, References
(17) A list of agencies and persons with whom you have communicated, or with whom you will communicate, regarding potential impacts associated with your proposed activities	Appendix L, Summary of Agency and Stakeholder Engagement
(18) Reference	Section 5, References

BOEM Requirement	Location in COP
(19) Financial assurance	Section 1.9, Financial Assurance
(20) Certified Verification Agent (CVA) nominations for reports required in subpart G of this part	Appendix M, Certified Verification Agency Nomination
(21) Construction schedule	Section 1.1.1, Indicative Construction Schedule
(22) Air quality information	Section 4.1.3, Air Quality Appendix N, Air Emissions Calculations and Methodology
(23) Other information	Various locations, throughout COP
<b>30 CFR § 585.627(a)</b>	
(1) Hazard information	Section 4.1.1, Physical and Oceanographic Conditions
(2) Water quality	Section 4.1.2, Water Quality Appendix J, Sediment Transport Analysis
(3) Biological Resources, including benthic communities, marine mammals, sea turtles, coastal and marine birds, fish and shellfish, plankton, seagrasses, and plant life	Section 4.2.4, Benthic Resources, Fishes, Invertebrates, and Essential Fish Habitat Appendix D, Benthic Resource Characterization Reports, Section 4.2.5, Marine Mammals, Section 4.2.6, Sea Turtles, Section 4.2.3, Avian and Bat Species, Appendix O, Avian and Bat Impact Assessment
(4) Threatened or endangered species	Section 4.2, Biological Resources
(5) Sensitive biological resources or habitats	Section 4.2, Biological Resources
(6) Archaeological resources	Section 4.3, Cultural Resources
(7) Social and economic resources	Section 4.4, Socioeconomic Resources
(8) Coastal and marine uses	Section 4.4.11, Other Coastal and Marine Uses
(9) Consistency Certification	Appendix P, Coastal Zone Management Act Consistency Certifications
(10) Other resources, conditions, and activities	Section 4.4.11, Other Coastal and Marine Uses
<b>30 CFR § 585.627(b)</b>	
Consistency certification	Appendix P, Coastal Zone Management Act Consistency Certifications
<b>30 CFR § 585.627(c)</b>	
Oil Spill Response Plan	Appendix Q, Oil Spill Response Plan
<b>30 CFR § 585.627(d)</b>	
Safety Management System	Appendix A, Safety Management System

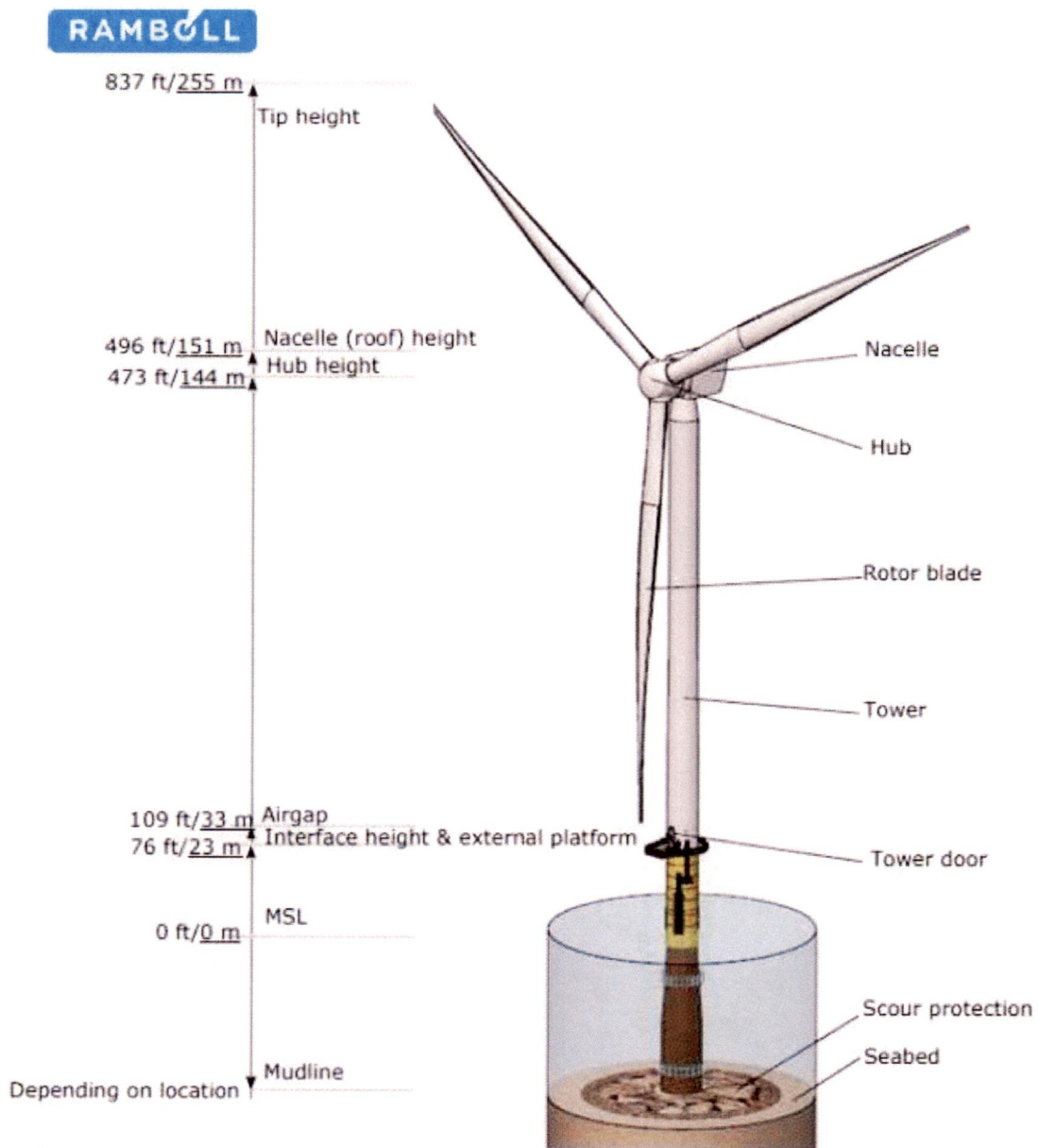


# Wind Turbine Generator Layout Map

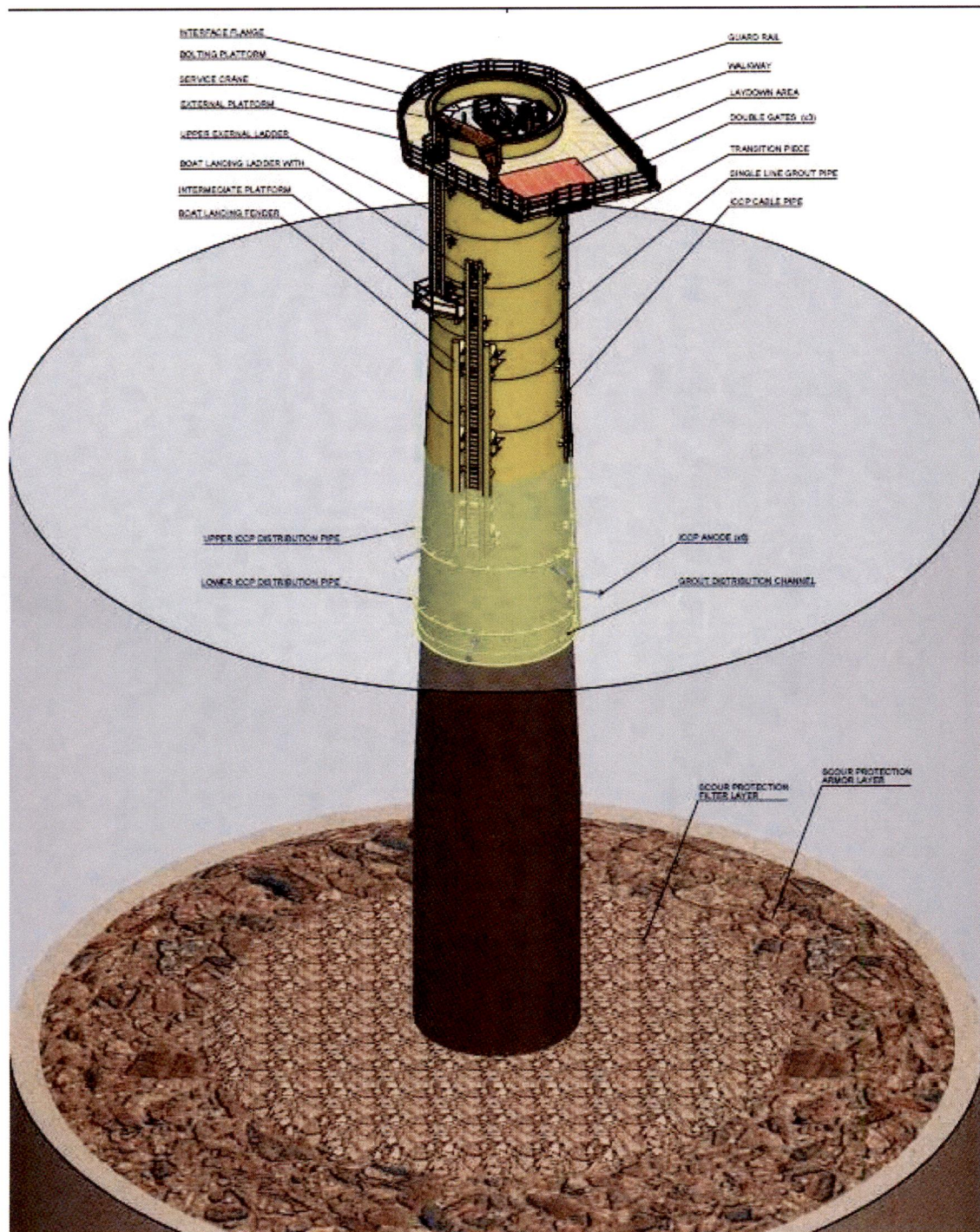




### SG 14-222 DD Wind Turbine Generator

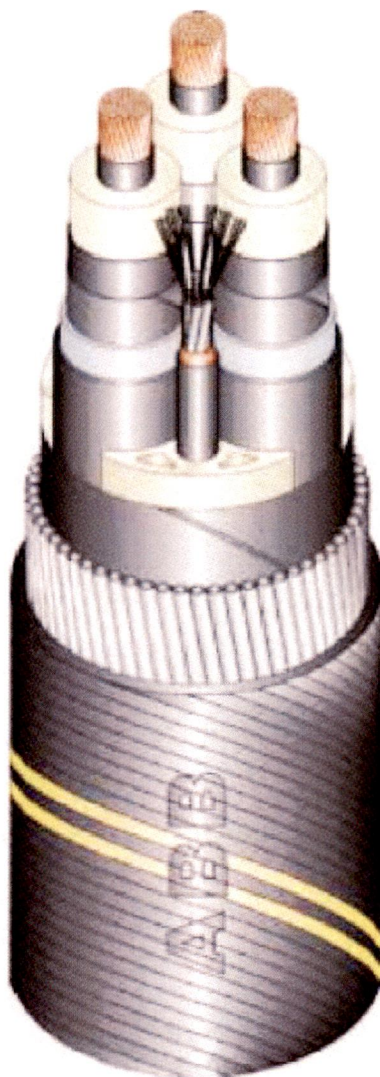


### Wind Turbine Generator Foundation

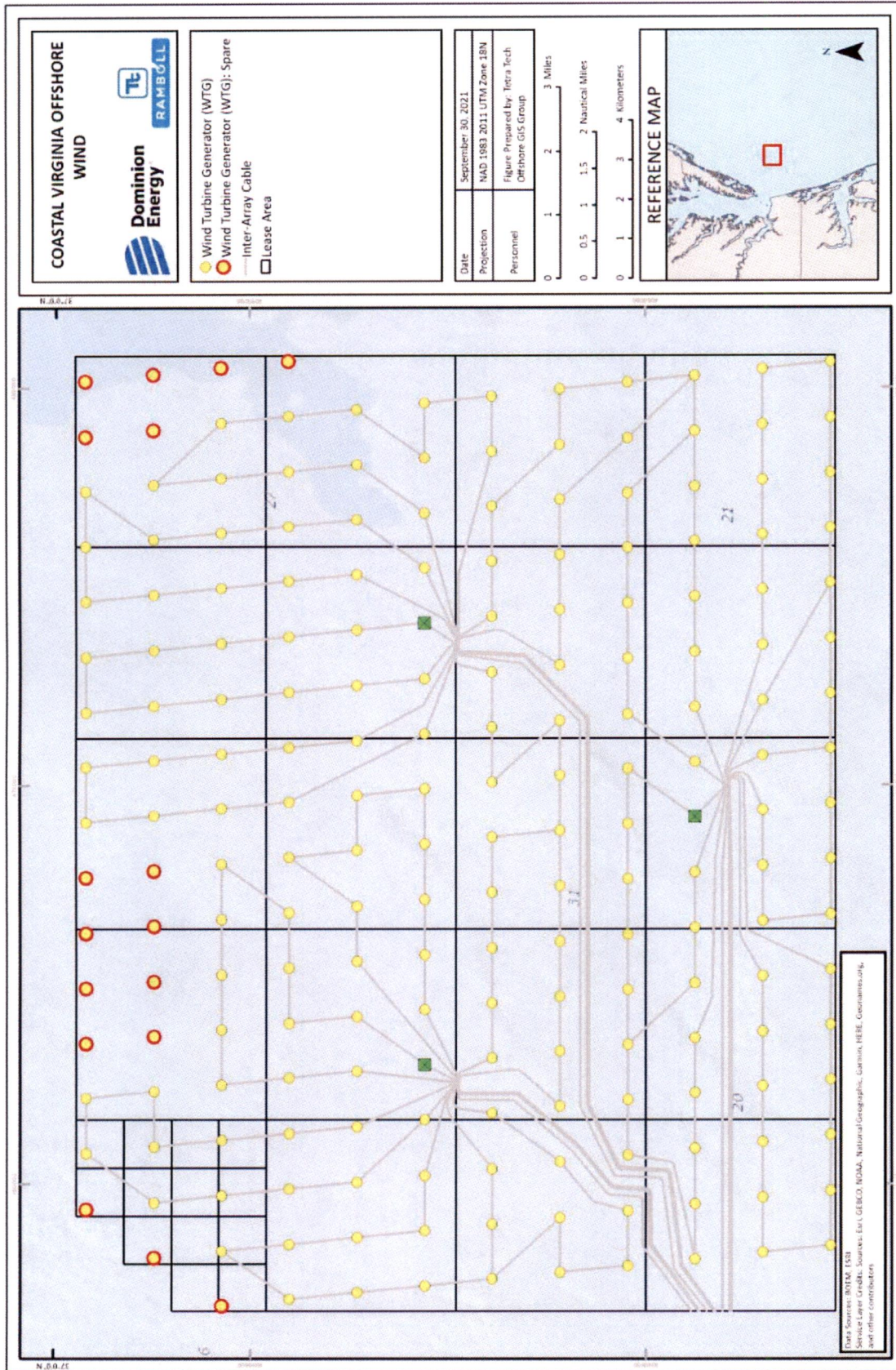


### Inter-Array Cable Cross-Section

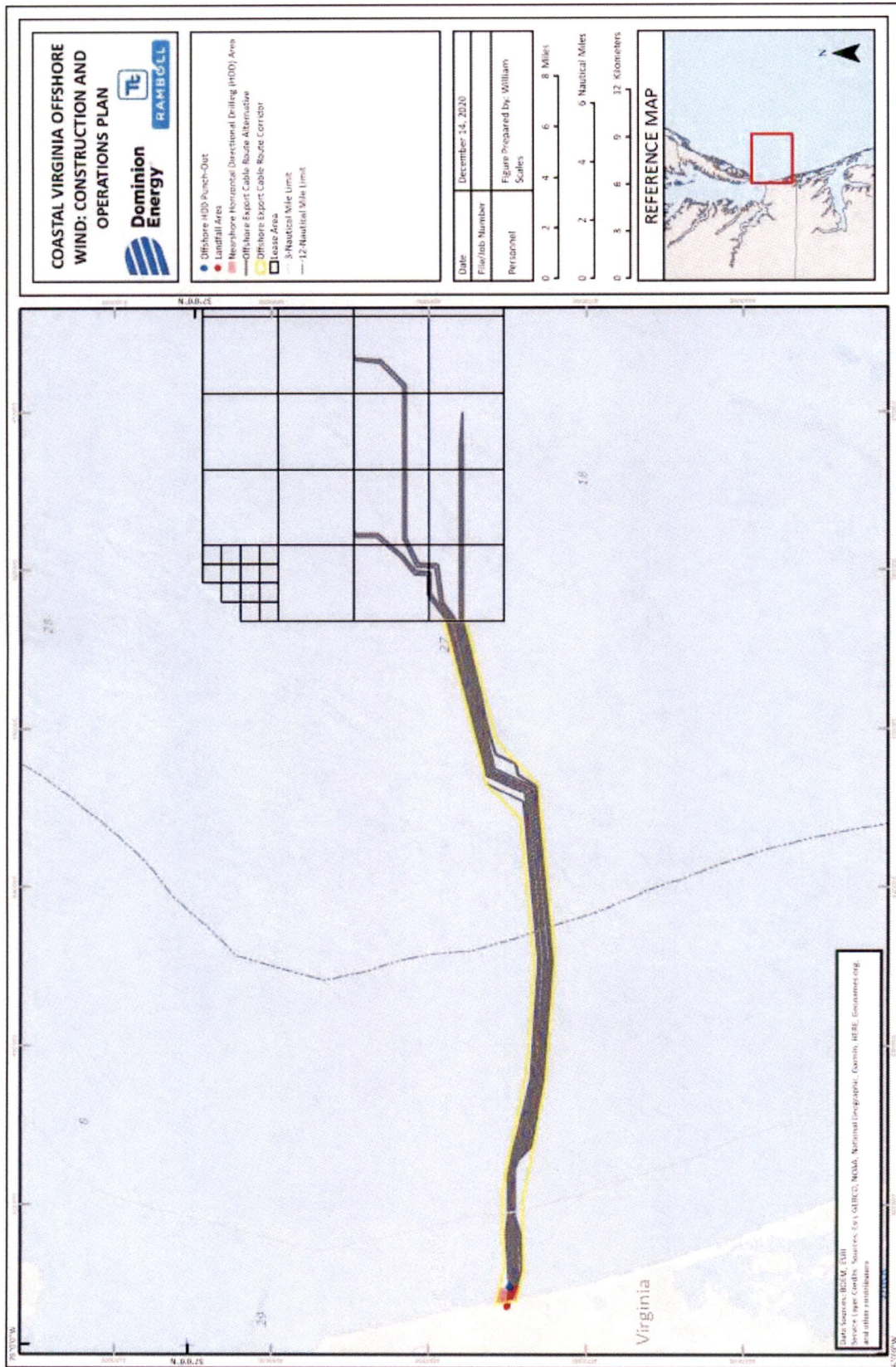
Parameter	Minimum	Maximum	Preferred Alternative
Number of Cables	209	230	209
Length per Cable	4,528 ft (1,380 m)	8,366 ft (2,550 m)	4,528 ft (1,380 m) to 6,923 ft (2,110 m), varies by location
Total Length of Cable	273.4 mi (440 km)	300.7 mi (484 km)	273.4 mi (440 km)
Operating Voltage	59.4 kV	66 kV	66 kV
Cable Diameter	5.6 in (141 mm)	7.9 in (200 mm)	Up to 7.1 in (up to 180 mm)



# Representative Layout of Inter-Array Cables



# Offshore Export Cable Routes / Corridor



## **Description of Port of Virginia/Portsmouth Marine Terminal Lease and Upgrades for Use in CVOW Filings**

### Introduction/Background

Pursuant to a lease agreement executed in August 2021 (“Lease Agreement”) between the Company and the Virginia Port Authority (“Authority”), the Company leases from the Authority an approximately 72-acre portion of the Portsmouth Marine Terminal (“Terminal”) located in Portsmouth, Virginia. As provided in the Lease Agreement, the Company will use the leased portion of the deep-water, multi-use marine cargo Terminal as a staging and pre-assembly area for the foundations and turbines that will be installed at the CVOW Project. The leased portion is located on the north side of the Terminal facing the Western Branch Elizabeth River. From the Terminal, components of the Wind Turbine Generators (“WTGs”) and WTG foundations will be loaded onto the Wind Turbine Installation Vessel (“WTIV”) that will travel to the CVOW Project construction site.

The Terminal is one of six terminals owned and operated by the Port of Virginia. The Port of Virginia terminals are owned by the Authority and operate on a combined 1,864 acres to transport cargo to and from markets around the world.

[<https://www.virginia.gov/agencies/virginia-port-authority-/>] The Terminal occupies 287 acres located on the west bank of the Elizabeth River and is operated and maintained by the Authority’s wholly owned terminal operating subsidiary, Virginia International Terminals, LLC (“VIT”). [<https://www.portofvirginia.com/facilities/portsmouth-marine-terminal-pmt/>]

The Lease Agreement positions the Terminal to be the leading Mid-Atlantic logistics hub for the offshore wind (“OSW”) industry on the U.S. East Coast. While the arrangement enables the Company to utilize the many benefits of the Terminal toward completion of the CVOW Project, the Authority’s improvement of the Terminal to support the offshore wind industry will facilitate the development of the domestic supply chain needed to complete other OSW projects off the eastern U.S. coast, and otherwise positions Tidewater and the Port of Virginia as a national leader in the emerging OSW energy sector.

### Significant Lease Agreement Terms

The “Initial Term” of the Lease Agreement is 10 years with an option for two 5-year renewals. The Company also has a right of first refusal to lease contiguous areas of the Terminal.

In exchange for use of the designated area of the Terminal, the Company will make monthly rent payments, based on the acres subject to the lease (“Base Rent”) to the Authority. The Base Rent commenced in August 2021 and amounts to approximately \$4.4 million annually (\$5,100/acre per month). The Base Rent will increase annually each October 1, beginning October 1, 2022, by 2.5% over the Base Rent in effect during the preceding lease year.

Base Rent payments that would be due prior to December 31, 2023 (“Deferred Rent”) are deferred, prorated over the remaining months of the Initial Term (starting in January 2024), and added to the Base Rent due starting in January 2024.

In addition, starting in April 2022 the Company will pay “Additional Rent,” which the Terminal will use to fund certain upgrades to the leased area discussed below.

### Improvements to Allow for CVOW Project Construction

The Lease Agreement provides for the Authority to install significant upgrades (“Landlord Improvements”), which the Company may utilize once completed, to ensure that the Terminal is equipped to serve CVOW and later the offshore wind industry, including handling the weight of the large components to be deployed to build the offshore foundations, transition pieces, and WTGs. The Authority is responsible for applying for all required permits and completing the Landlord Improvements. When completed, the Authority will own the Landlord Improvements.

The Company’s Additional Rent will assist the Authority in funding the Landlord Improvements. If the Authority receives grant funding from a federal or Commonwealth source that can offset the cost of the Landlord Improvements, such funds will be utilized and the Authority will credit the Company’s Base Rent obligations with any unused Additional Rent.

The Improvements to be constructed by the Terminal pursuant to the Lease Agreement are organized by “Project Phase” as follows:

- **Installation/load-out wharf** – structure that will be utilized for the preparation of WTG towers, nacelles (*i.e.*, the generating components of wind turbines), and blades for load-out on the WTIV to be transported offshore for installation. This upgrade will provide the capacity to allow the towers to be stacked on the wharf in close proximity, so when the vessel arrives, minimal movements are required for the WTG parts to be placed on the vessel. This requires a wharf that has a 5,100 pounds per square foot (psf) capacity. This wharf is designed to be 650 feet x 118 feet, and this area will require a new pile supported structure to achieve the desired capacity.
- **Delivery wharf** – similar to the installation wharf, with similar loading requirements and area. The delivery wharf is anticipated to be used for the delivery of WTG towers, nacelles, and blades, as well as delivery of the Transition Pieces (“TPs”), which are the segments of the offshore wind tower that span between the monopile foundation and the WTG tower. A large crane is required to unload the TPs from the vessel onto the wharf. This crane requires a crane counterweight wagon. Therefore, the delivery wharf is slightly deeper than the installation wharf. The delivery wharf is designed to be 650 feet x 140 feet, with the same 5,100 psf loading capacity as the installation wharf.
- **Monopile wharf** – area designed for the loading and unloading of the monopiles and transportation of the monopiles using Self-Propelled Modular Transporters (“SPMTs”) to the storage area. Structurally, this wharf is anticipated to require similar upgrades as the installation and delivery wharves, but at a lower loading capacity and in a smaller area. The monopile wharf requires 2,050 psf capacity, with the area of wharf replacement of 180 feet x 109 feet. The monopiles are anticipated to be delivered on a Roll-on/Roll-off (“RORO”) vessel that utilizes Mediterranean Moorings (a form of mooring that involves the vessel mooring stern to the wharf (as opposed to alongside mooring)). This will

require additional dredging as the current quayside dredge area assumes vessels are berthed alongside or parallel to the berth.

- **Dredging** – required to support the Mediterranean Mooring utilized for RORO operations at the monopile wharf. Although the existing berth area is dredged to -44 feet, it is anticipated that this additional area will only be dredged to -35 feet to accommodate offshore wind vessels that do not exceed 33 feet of draft.
- **WTG Staging Area** – uplands area located directly behind the installation wharf where the WTG towers can be stood upright in preparation for load-out onto the WTIV. The WTG staging area has the same 5,100 psf bearing capacity of the wharves and storage areas but assumes the average loading does not exceed 1,500 psf. This 4-acre area includes ground improvement displacement piles to increase the capacity of the site, as well as new pavement to support the heavy components.
- **WTG Storage Area** – uplands area behind the wharf where the nacelles, blades, and tower components will be stored. This area is approximately 29 acres and requires a bearing capacity of 5,100 psf to allow the heavy components to be transported on SPMTs and set down on the surface. However, the components in this area are assumed to be spaced out sufficiently that the average loading of the full 29 acres is less than the historical loading of the terminal of 600 psf. The nacelles will also require electrical infrastructure so that they can be plugged in while stored on site. The areas with the nacelle plugs are assumed to have a uniform live load of 1,000 psf.
- **Balance of Plant (BOP) Storage Area** – approximately 31 acres of uplands behind the wharf where the monopiles and TPs will be stored. It is anticipated, based on common industry practice, that the TPs will be stored upright, requiring an approximate bearing capacity of 2,050 psf. The monopiles likely will be stored on frames or mounds horizontally. This area also requires a bearing capacity of 2,050 psf. Due to the space required for the platforms associated with the TPs and monopiles, the average loading in the area will be approximately 750 psf.

The Lease Agreement requires that the Authority will maintain and repair certain portions of the Terminal, including roadways between the leased area and nearby public rights-of-way, dredged areas, security fencing and accessways, the upgrades discussed above, and other improvements constructed by the Terminal.

The Operations Base for CVOW is planned at the site of the Lamberts Point Docks, Inc., a subsidiary of Norfolk-Southern Corporation, located in Portsmouth, VA. Lambert's Point Docks, Inc. ("LPD") occupies 117 acres of breakbulk marine terminal located in Norfolk, Virginia. LPD is located in Norfolk on one of the East Coast's finest natural deep-water harbors. LPD has served shippers, manufacturers, and brokers for more than 65 years. One of Virginia's largest breakbulk marine terminals, the full-service facility specializes in rubber, wood products, machinery, and project cargo. The terminal provides safe, efficient import and export transloading and can move more than a half million tons of general cargo annually.



The Miller Group has entered into lease negotiations for the long-term management of LPD. Upon execution of this Agreement, The Miller Group will have the authority to enter into lease negotiations with Dominion Energy to lease 8 acres of waterfront property for permitting and construction of a build-to-suit Operations Base for the life of the CVOW project. This Lease Agreement will include the construction of a 15,000 square-foot warehouse, and a two story Monitor and Coordination Center (MCC) for the life of the CVOW Project. Preliminary, non-binding terms have been discussed with the Miller Group for the annual lease payment, which is the source of the forecast during the operations period.

## II. PLANNING AND DEVELOPMENT OF PROPOSED PROJECT

### A. Explain whether the proposed project is informed by relevant data and experience.

(Addresses requirement for experienced developer under Va. Code § 56-585.1:11 E(ii))

Response: The CVOW Commercial Project has gained critical operating experience and has received valuable insights from two primary sources. First, the Project has recognized permitting, construction, commissioning, and operational and maintenance efficiencies from the CVOW Pilot Project (“Pilot”),<sup>4</sup> which represents the two 6 MW WTGs installed during 2020, in an area adjacent to the Lease Area. Second, the Company has contracted with firms that have significant experience in offshore windfarm design, construction, and operations to support the Project. These include Orsted during the Pilot, project design support from Ramboll, the Owner’s Engineer for this Project, and Merkur Offshore, which acts as a strategic advisor for the Company. The Company has also actively engaged with multiple stakeholders on all aspects of the Project to inform on permitting, design, construction impacts, marine life, and operations. The Company previously consulted with Bain (formerly Qvartz) in Q1 and Q2 2020, to benchmark against numerous European offshore wind construction and operational organizations in order to determine the optimal organizational structure for this Project.

#### 1. Experience from CVOW Pilot

The Company has prepared a comprehensive report of relevant data and experience gained from construction and operation of the Pilot. That report is attached as Attachment II.A. The following are the top five lessons learned from the Pilot:

- Safety / Environmental: The Company has learned to manage the inherent risks of working in an offshore environment through the development and installation of the wind turbines associated with the Pilot. This insight extends from development to routine maintenance activities. The Company is expanding the Safety Management System from the Pilot to meet requirements for the Project with respect to marine coordination with vendors, and continued coordination with the U.S. Coast Guard.

From an environmental perspective, during the course of the Pilot project, the Company conducted a research effort to determine the efficiency of the double big bubble curtain sound mitigation process used during pile driving. This effort was conducted in coordination with the BOEM and National Marine Fisheries Services (“NMFS”). The results of this effort will inform

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<sup>4</sup> *Petition of Virginia Electric and Power Company For a prudency determination with respect to the Coastal Virginia Offshore Wind Project pursuant to § 56-585.1:4 F of the Code of Virginia, Case No. PUR-2018-00121.*

the commercial Project and provide improved protections for marine mammals.

The Company is also using Protected Species Observers (“PSOs”) on its geotechnical and geophysical (“G&G”) campaign, and will do so again during the construction campaign. While the G&G vessels are on station, PSOs monitor the area for marine life. For example, G&G vessels frequently use sonar devices to scan the sea floor, and PSOs will advise when whales or turtles are in the area so that these devices can be turned off.

The Company has incorporated safety and environmental lessons learned from the Pilot into its contracts for the Project, including use of PSOs, and has benefited from an increased awareness of the need to broaden the evaluation of risk to include global reporting standards (*i.e.*, financial strength, safety, environmental, and regulatory compliance).

- *Permitting*: As the primary regulatory agency overseeing the Pilot and this Project in the Lease Area, BOEM is a critical partner in the development of the Project. The Company now has hands-on experience developing a project design envelope and is better positioned to address inquiries and submit necessary information in an efficient manner.

In its public engagement as part of the Pilot, the Company gained an enhanced understanding from stakeholders on their specific concerns that will further inform the Project. The Company’s experience with the various permitting processes will provide efficiency and greater opportunity for compliance. The Company also has greater insight regarding marine mammal protections administered by NMFS, including an appreciation for how the process impacts scope of work and the nuances of developing a compliant COP.

The process BOEM followed on the Pilot between the completion of the WTG 240-hour reliability test and declaration of commercial operation took from October 13, 2020 to January 11, 2021. During that time BOEM performed a final technical and administrative review of the Fabrication and Installation Report (“FIR”) and Facility Design Report (“FDR”), and required the OEM (Orsted) to provide all the as-built drawings. It has since been recognized by BOEM and the Company that this process would not be practical on a commercial scale as a serial commissioning process for up to 180 turbines could likely take approximately 18 months, thus the final as-built drawings of the entire project would lag considerably behind the first set of installed and tested turbines. Based on this recognition, the Company is developing a commercial commissioning plan that is part of the COP to address the process of serial commissioning such that turbines are able to remain in service directly after completion of their reliability test.

- *Construction / Commissioning Process:* The process of installing and commissioning the Pilot provided invaluable experience that will guide these processes for the Project. For example, the Company now utilizes Rehearsal of Concept drills, as employed by Orsted during the Pilot, which build education and camaraderie around managing potential safety and environmental risks, and encourage active engagement in operational activities. The Company also learned from issues it encountered during Pilot installation, including cable burial and risk assessment. For example, the Company gained a better understanding of how to mark and secure underwater cabling to protect it from damage caused by ship traffic in the area. Similar lessons were learned with respect to commissioning.
- *Operations and Maintenance (“O&M”):* The Company continues to obtain a significant amount of data from the Pilot WTGs that will help improve O&M associated with the Commercial Project. For example, the operations team has improved weather forecasting capabilities and personnel management in order to more efficiently address planned and emergent maintenance issues. Moreover, the Company has used the Pilot to gather helpful information concerning the wind as a capacity resource, the sea states in the vicinity of the WTGs, and best methods for utilizing the crew transport vessel to access the facilities. The Company, working cooperatively with Siemens, is also undertaking surveys of undersea equipment to identify opportunities for process improvement that could be implemented on the larger Project. As another example, working with Siemens, the Company has incorporated use of its chartered Crew Transport Vessel to conduct BOEM-required inspections, minimizing the need to use a second vessel.

As mentioned above, the Pilot is providing excellent information on wind, wave, and capacity factor differences between sea level and hub height wind speeds. It is worth noting that, to date, the Pilot has outperformed its projected capacity factor.

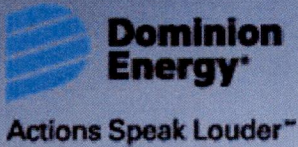
- *Cyber Security:* Working with SGRE and Orsted on the Pilot, the Company recognized that SGRE did not have an appropriate design for the Commercial Project that would meet the Company’s internal cyber security policies, which are based on NERC medium risk bulk electric system (“BES”) requirements. Thus, a great deal of coordination has been undertaken to modify SGRE’s Industrial Control System to make the system compliant with NERC medium risk bulk electric system (“BES”) requirements as well as internal Company policy. This lesson from the Pilot is allowing the Commercial Project team to engage early with SGRE and others to design the network for the Project to be in full NERC compliance and reduce cyber risk to the Project. This should also help achieve cost savings by having the necessary components of cyber security design mapped out during the design phase. Based on this experience, the

Company is updating all commercial contracts to include exhibits defining the regulatory responsibilities of contractors and employees for the Project with respect to cyber security issues. This will reduce the frequency and magnitude of potential change orders related to NERC cybersecurity requirements.

- *Supply Chain:* Based on the Company's experience with the Pilot, the Company has learned how to manage important activities such as sourcing multiple European maritime companies to complete various parts of the Commercial Project, such as underground cable burial, application of scour protection, coordination of heavy lift vessels to transport and install equipment, functional testing of systems, and understanding compliance with the Jones Act related to any and all maritime transport activities.

## 2. Experience from Industry Partnerships

- *Maritime Experience:* In addition to experiences derived from the Pilot, the project team has also gained valuable experience working with Orsted in the area of Marine Coordination. Managing the coordination of vessels and personnel in a maritime environment is critical for successful execution of the Commercial Project. The port of Hampton Roads is one of the busiest in the world with shipping, U.S. naval fleet activity, and commercial and recreational fisheries traffic in the immediate vicinity of the lease area, therefore developing Marine Coordination processes and procedures during the development of the Pilot has allowed the Company to plan for the development of a professional Marine Coordination Center to manage vessel traffic, track personnel assigned to work offshore on the Project, and grant work permits for the facilities.
- *Operational Experience:* The Company is currently in a long-term service agreement with SGRE to provide Operations and Maintenance services for the Pilot. SGRE has assigned an experienced Operations Manager (direct experience from UK Wind Farms) and wind technicians to support the Project. The Dominion Energy Virginia team is shadowing the SGRE team to continue to gain experience in the operations and maintenance of these assets.



# CVOW PILOT LESSONS LEARNED

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Generation Appendix  
Attachment II.A

## Pilot Project Takeaways applicable to CVOW Commercial Project

Dominion Energy Virginia (the “Company”) has acquired valuable knowledge related to managing the inherent risks associated with working in an offshore environment. This knowledge is a result of direct experiences tied to the development and installation of the wind turbine generators (“WTGs”) affiliated with its CVOW Pilot Project (“Pilot” or “Pilot Project”). The insights derived from this project were varied and spanned the full spectrum of the Pilot from its development through commercial operations and maintenance activities. Notably, the Company has gained experience in the areas of Safety, Environmental, Cyber Security, Permitting, Construction, Commissioning, and Operations & Maintenance. These experiences will be leveraged to improve all phases of the CVOW Commercial Project (“Commercial Project”).

### Safety and Environmental

#### *Safety*

From a safety perspective, the Company is expanding the Safety Management System (“SMS”) from its Pilot to meet requirements for the Commercial Project with respect to marine coordination and continued coordination with the U.S. Coast Guard (“USCG”). The goal of the SMS is to identify and mitigate hazards associated with the activities undertaken by employees on the site. The CVOW Pilot SMS was the first of its kind to be reviewed and approved by both Bureau of Ocean Energy Management (“BOEM”) and Bureau of Safety and Environmental Enforcement (BSEE) in the U.S. offshore wind industry. Both groups commended the Company upon completion of its first SMS audit, which was performed in the fall of 2020. As with the Pilot SMS, for the CVOW Commercial Project, senior leadership for the Company will ensure active participation and communication for implementing, monitoring, reviewing, and updating the SMS.

30 CFR Part 585.811 dictates when SMS must be followed. Specifically, it states “*Your Safety Management System must be fully functional when you begin activities described in your approved COP, SAP, or GAP. You must conduct all activities described in your approved COP, SAP, or GAP in accordance with the Safety Management System you described, as required by § 585.810.*”

The ultimate responsibility for health and safety on site rests with the Company, and as a sign of that commitment, the Company will implement a policy and set aside resources devoted to its SMS program.

The SMS is required to manage certain activities:

- Hazard Identification
- Risk Management and Control Measures
- Protection of employees, contractors, and the public

The SMS describes:

- Leadership Commitment
- Health and Safety responsibilities for site employees
- Health and Safety execution

The SMS is applicable to the following locations/instances associated with the Commercial Project:

- Project site (WTGs, vessels, offshore substations, etc.)
- Ports (staging and pre-assembly site and operations and maintenance (“O&M”) facility)
- Offices
- Travel
- Other work locations

The Company intends to adhere to the tenets from its Pilot SMS for the Commercial Project, specifically:

- Engage Early
- Plan and rehearse
- Communicate often, share best practices
- Welcome innovation

More generally, the Company recognizes the need to continually assess and improve safety measures and has undertaken a number of actions on this front. While not exhaustive, these actions include:

- Conducting a full revision of CVOW Safety Supplemental Terms and Conditions to better facilitate requiring contractors to comply with onsite safe working practices.
- Engaging in cross-industry safety working groups to include: G+ (a global health and safety organization), International Marine Contractors Association (IMCA), and Global Wind Organization (“GWO”).
- Working on procurement and implementation of a software system that can track what the Company is currently maintaining and following up on manually, including actions with owners and due dates related to the following:
  - Incident/accident management and hazard observations
  - Proactive safety activities
  - Safety alerts
  - Hazard identification / risk assessment workshops
  - Rehearsal of concept drills
  - Internal audits
  - Site inspections
- Holding internal safety workshops to focus on adjusting SMS to better match the Company’s capabilities as part of continual improvement.
- Modification of the Power Generation Lockout/Tagout (“LOTO”) process for application to offshore wind operations. This is primarily driven by distance and logistical issues in an offshore environment.
- On the Pilot Project, Siemens Gamesa Renewable Energy (“SGRE”) is currently using its internal LOTO program, which was submitted and approved for use by the Company. The SGRE program highlights the following for work under its LOTO system:
  - LOTO is required for work on electrical systems, pressurized systems, mechanical equipment, hydraulic systems, pneumatic systems and tools.
  - No work on energized or pressurized systems shall be carried out without task specific risk assessment, work instruction, LOTO and work permit.
  - Only qualified and competent personnel will perform LOTO and work activities.



Figure 1: Sample photo of safety gear used for LOTO in Offshore Wind



Figure 2: Example of SGRE Risk Assessment

Example SGRE Risk Assessments

Act Hazard	Task	Manual handling	Control	P	Individual risk	Residual risk	Hazard category	Ergonomics	Who/What is at risk	All persons	Residual Risk
	Hazard Description:	Muscular Skeletal Injuries - Lifting and Carrying	C	P	9	3	Hazard: Manual lifting				
ADD (3)	Control Measures (CM) (Control risk from IRI) to Residual		p	p	6	2					
1	The service crane or other lifting equipment such as the lift if it is still serviceable (as determined by the Thorough Examiner) or Actsafe should be used to transport all tools and equipment to the yaw section		3	2	6	2	Team Leader				
2	Safe manual handling techniques shall be adopted i.e. Team Lifts		3	1	3	1	All persons				
3	Split the load where possible and as required		3	1	3	1	Team Leader				
4	Lay-down loads as near to the place of work as possible.		3	1	3	1	Team Leader				
5	Only persons with appropriate competency as determined by the Competency Framework or contractor SSoW may undertake Work		3	1	3	1	Management and CM				
6	Ensure that the weight is known or assessed before attempting to lift.		3	1	3	1	All persons				
7	Be aware of floor conditions at all times. Pay attention whilst negotiating uneven or slippery ground, plan your route.		3	1	3	1	All persons				
8	Good housekeeping to be observed at all times		3	1	3	1	All persons				
9	Adequate rest periods to be taken, carry out stretching and warm up exercises if required.		2	1	2	1	All persons				
	Residual Risk		2	1	2	1	All				

Task specific controls highlighted in RA and transferred to your MS

This highlights who is responsible for implementing the control measure

This indicates that all persons are responsible for accepting the residual risk

- Maritime safety requires careful monitoring to manage both ship transits and work positions (via permit) in the lease area to ensure coordination and safety at sea. This includes tracking of personnel marine qualifications and vessel certifications.
- The Company has been working closely with its LTSA partner SGRE to understand and develop processes and procedures for vessel and transfer safety protocols. One of the most vital lessons from the Pilot Program has been the use of pre-task planning. Key points include:
  - Pre-task planning must be used daily.
  - Personnel must notate changes in scope and initiate conversations that can lead to risk mitigation.
  - Personnel must never forget, or skip, the pre-use equipment checks.

**Figure 3: Example Checklist for Vessel Transfers**

CTV Transfer		Vessel / Turbine Cranes	
Walk to Work		Jack Up -Vessel	
Sea State			

Immersion Suit	
Life jacket	

Sea Sickness		Helicopter Ops	
Vessel Movement During Transport / Operations			

**Figure 4: Example pre-use equipment checks**

Cranes, Hoists, Lifts & Climb Assist System Pre-Use Inspection				
Inspection must be done prior to use. Tagout any system that does not pass. N/A if system does not apply.				
Check "S" for items that are satisfactory and "U" for items that are unsatisfactory				
ITEMS TO BE INSPECTED	S	U	N/A	COMMENTS
1. Nacelle Crane/Hoist pre-use inspected and found in good operating condition according to manufacturer's inspection document? <i>(separate checklist required)</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
2. TP Crane pre-use inspected and found in good operating condition according to manufacturer's inspection document? <i>(separate checklist required)</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
3. Service Lift pre-use inspected and found in good operating condition according to manufacturer's inspection document? <i>(separate checklist required)</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
4. Climb Assist pre-use inspected and found in good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

** Change of Scope / Plan **		
of Change:		
ACTIVITY – LIST JOB STEPS	Potential Hazards	MITIGATION MEASURES – IN FULL

Authorized Person Verifying Change of Scope & Crews Communication of New Plan >>>	Com-	Signature Here:	<input type="text"/>
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- USCG Search and Rescue (“SAR”) coordination is a continued learning experience. The Pilot Project has provided invaluable experience working with the USCG to develop, exercise, and implement processes for SAR operations. Both the Company and the USCG recognize that offshore wind operations provide a new element of maritime risk within the CVOW lease area. These risks include both increased commercial and recreational traffic in and around the lease area. These risks can be mitigated and reduced through effective planning, exercises, and shared sensors. On this front, the Pilot Project has allowed the Company to:
  - Hold a tabletop exercise and workshop to better inform the USCG on offshore wind operations, which allowed the Company to revise its Emergency Response Plan based on USCG input.
  - Conduct an October 2020 field exercise which included multiple USCG vessels and aircraft interacting with the Pilot wind turbine generators in a simulated hoisting of an injured worker from the nacelle.
  - Arrange for USCG helicopter pilots to conduct nighttime flights near the WTGs for training purposes that allowed them to understand how their sensors and equipment (e.g., radar, night vision goggles, etc.) react to the structures and navigation lights.
  - Plan for emergency response training with the Project Crew Transport Vessel (“CTV”), USCG, and Port Maritime Incident Response Team (“MIRT”) to respond to persons injured offshore.
- All of these events have greatly enhanced safety and influenced future emergency response operations and decisions for the Commercial Project. These efforts have also better informed the USCG on offshore wind operations, not just in Virginia, but throughout the country.
- GWO Training requirements – Company personnel are attending training at GWO certified facilities.
- As a result of the Pilot Project, the Company has established the following requirements to work offshore:
  - GWO Sea Survival Course
  - GWO Fire Awareness Course
  - GWO Working at Heights Course
  - GWO Manual Material Handling Course
  - GWO First Aid Course
  - Medical Assessment that meets the requirements of USCG 719K, STCW or UKOG Offshore Medical
  - Satisfactory Chester Step Test for Aerobic capacity or medically administered stress test. Offshore workers will need to score average or better on the aerobic capacity chart below to be certified to work offshore.

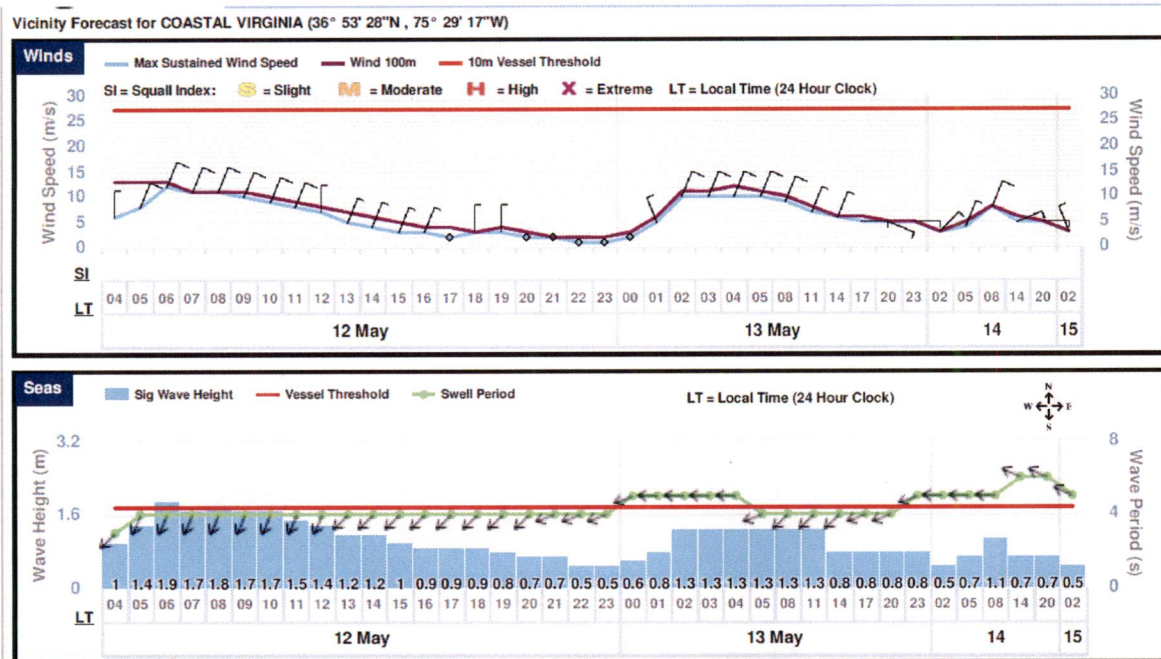
**Figure 5: Aerobic Capacity Chart**

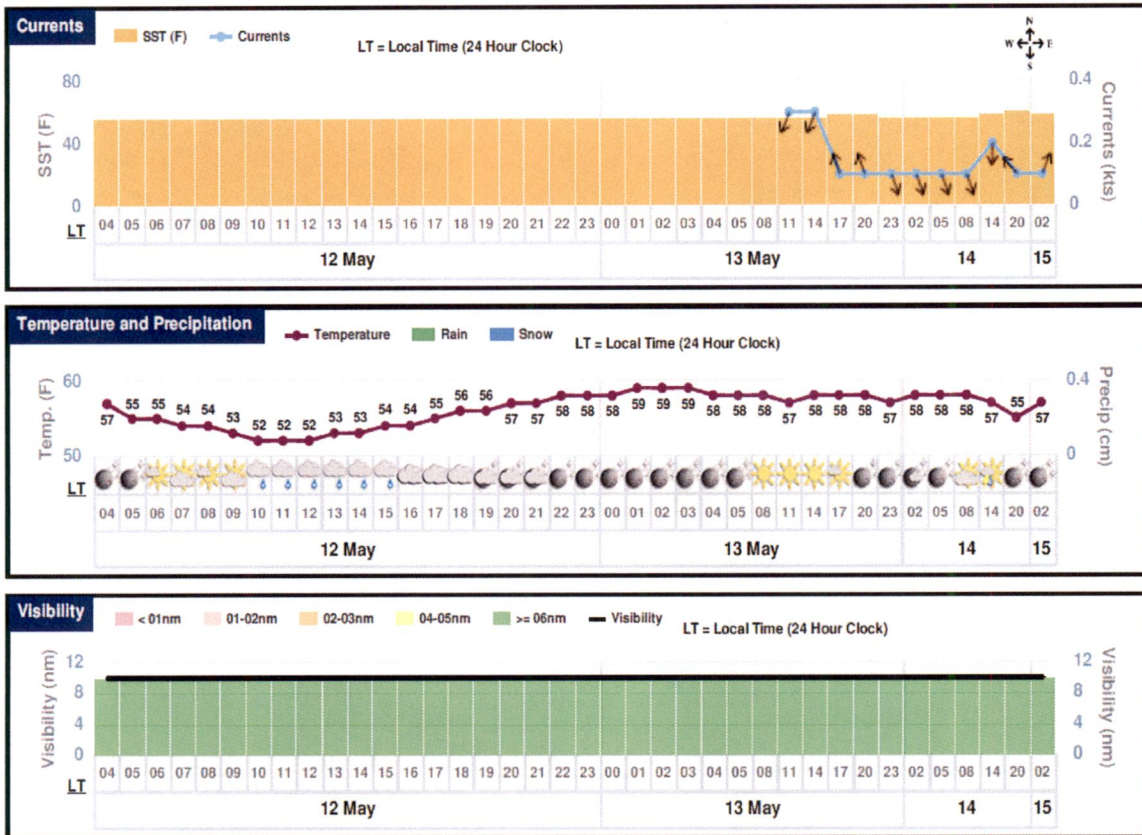
**Norms for Aerobic Capacity (mlsO<sub>2</sub>/kg/min)**

Fitness Rating	MALES Age Group					FEMALES Age Group				
	15-19	20-29	30-39	40-49	50+	15-19	20-29	30-39	40-49	50+
Excellent	60+	55+	50+	46+	44+	55+	50+	46+	43+	41+
Good	48-59	44-54	39-49	37-45	35-43	44-54	39-49	35-45	34-42	33-40
Average	39-47	35-43	32-38	30-38	27-34	36-43	32-38	29-34	27-33	26-32
Below Average	30-38	28-34	22-31	24-29	22-26	29-35	27-31	24-28	22-26	20-25
Poor	<30	<28	<26	<24	<22	<29	<27	<24	<22	<20

- Marine safety is a focus in a high-risk offshore environment, which is constantly changing, especially given unforeseen weather or wave conditions that could jeopardize personnel and equipment safety.
- The Company and SGRE have both engaged with third party providers to obtain daily detailed weather and offshore conditions forecasts. These forecasts are delivered multiple times daily and include severe weather updates beyond the scheduled updates. These updates are provided to the CTV operators (which includes both the back office and vessel crews) in order for severe weather updates to be communicated to personnel working offshore in real time.

Figure 6: Example Forecasts





### Environmental

From an environmental perspective, the pilot project provided numerous examples of learning how to better construct and operate an offshore windfarm. One important example is that the Company evaluated the efficiency of the double big bubble curtain sound mitigation process used during pile driving in the Pilot Project. This evaluation was conducted in coordination with BOEM and the National Marine Fisheries Services (“NMFS”), and data was gathered in similar conditions and in an area adjacent to the Pilot Project. The results from this evaluation will inform the Commercial Project and provide improved protections for marine mammals by providing reduction in underwater noise during pile driving.

More generally, the Company has incorporated safety and environmental lessons learned from the Pilot into contracts associated with the Commercial Project. The Company has also benefitted from increased awareness of the need to broaden the evaluation of risk to include global reporting standards (financial strength, safety, environmental, and regulatory compliance) resulting from the Pilot Project.

### Cyber Security

Early challenges with the Pilot Project network and offshore device management pointed to a larger coordinated effort needed with suppliers of equipment and Dominion Energy Virginia IT and Power Generation Engineering (PGE) groups within Offshore Wind scope.

Working with SGRE and Orsted on the Pilot Project, the Company realized early on that SGRE did not have a design for their offshore project that would be compatible with the Company’s internal cyber security policies.

A great deal of coordination has been undertaken to modify SGRE's Industrial Control System to make the system comply with NERC requirements as well as internal Company policy. This lesson from the Pilot is allowing the Commercial Project team to engage early with SGRE and others to design a network for the project compliant with NERC standards and continue to reduce cyber risk to the project.

## Permitting, Construction, and Commissioning

### *Permitting – BOEM*

The Pilot Project utilized a Project Design Envelope (PDE) in its Construction Operations Plan (“COP”) submittal to provide minimum, maximum, and base case assumptions for BOEM to review and approve. Since the COP review, which is governed by the National Environmental Policy Act (NEPA) process, takes several years this approval allows for flexibility in project parameters as the design advances in level of detail.

The Facility Design Report/Fabrication and Installation Report (“FDR/FIR”) should be started early with BOEM, well in advance of Record of Decision (“ROD”), so that it can be submitted shortly after the ROD is issued. This will minimize time to FDR/FIR approval required for start of major equipment manufacturing.

The FDR/FIR approval requires the third party Certified Verification Agent (“CVA”) to apply a structure aligned with IEC (International Electrotechnical Commission) Standards. This was a different structure than that envisioned by BOEM. This should be worked out ahead of the Commercial Project FDR/FIR submittal.

### *Permitting – VA DEQ and/or U.S. EPA*

The Pilot Project was a minor source air permit, whereas the Commercial Project will be a major source air permit primarily due to the addition of the offshore substations with diesel generators installed for back-up power requirements. Construction emissions must be tracked and reported to regulatory authorities, and the Pilot Project set a precedent for such reporting on a limited scale.

- Permitting – NMFS
- The Incidental Harassment Authorization (“IHA”) for surveying differs from the construction authorization. The scope of work and mitigations are different for the two periods due to the type of equipment employed and the source of noise producing activity. As an example, during survey operations exclusion zones are established due to the use of towed array equipment. These areas are materially different than exclusion zones for noise producing activity during construction such as the installation of monopile foundations.
  - Monitoring for marine mammals and sea life is accomplished by deploying Protected Species Observers (“PSOs”) on vessels with scope and equipment with the potential to interact with species such as turtles, whales, dolphins, and other sea life. Training programs are in place to train both vessel crews and the PSOs on the parameters and conditions of any IHA issued by NMFS. Topics include recognition of species, exclusion zones, and procedures to begin operations (i.e., soft start procedures for towed array equipment) and to stop work if a species is observed in an exclusion zone during operations.
  - The Commercial Project intends to use of a Letter of Authorization (LOA) for the construction period, as it can be issued for multiple years, versus use of IHAs which would need to be issued annually.

### *Construction*

Rehearsal of Concept (“ROC”) Drills, which are conducted well in advance of field activity, played a key role in building team camaraderie and cooperation with the installation contractors. They also serve to identify areas of potential conflict between vessels with different scopes of work to allow for de-confliction in a measured fashion. These are hands-on, interactive sessions with participants at a tabletop and engaged in the exercise. The concept can be extended to our interactions with USCG and the O&M team, to include SGRE.

Cable burial is important. All surface laid cables need to be protected until buried. Ideally cable lay and burial happen concurrently to reduce risk of exposed cable on top of seabed.

Noise management. The Pilot Project implemented a double big bubble curtain for one of the foundation installations (the other had no bubble curtain for research comparison purposes). The Commercial Project, in coordination with the Transport & Installation contractor will explore developing technology to minimize underwater sound producing activities, such as vibratory pile driving versus impact hammer.

### *Commissioning Process*

A key lesson learned from the Pilot Project centers on BOEM’s 30 CFR 585 regulation not recognizing the ability to commission turbines in a serial fashion for a commercial scale project. The regulation requires the FDR/FIR and final “as-built” drawings for the entire project to be verified by the CVA and BOEM prior to approving commercial operations. A waiver was issued for the Pilot turbines due to the research lease. The Company included a commissioning process in the COP to allow for offshore substations to enter service sequentially, with a string of wind turbines provisionally accepted and allowed to remain in commercial service, which will alleviate the issue.

## **Operations and Maintenance**

### *Performance Indicators*

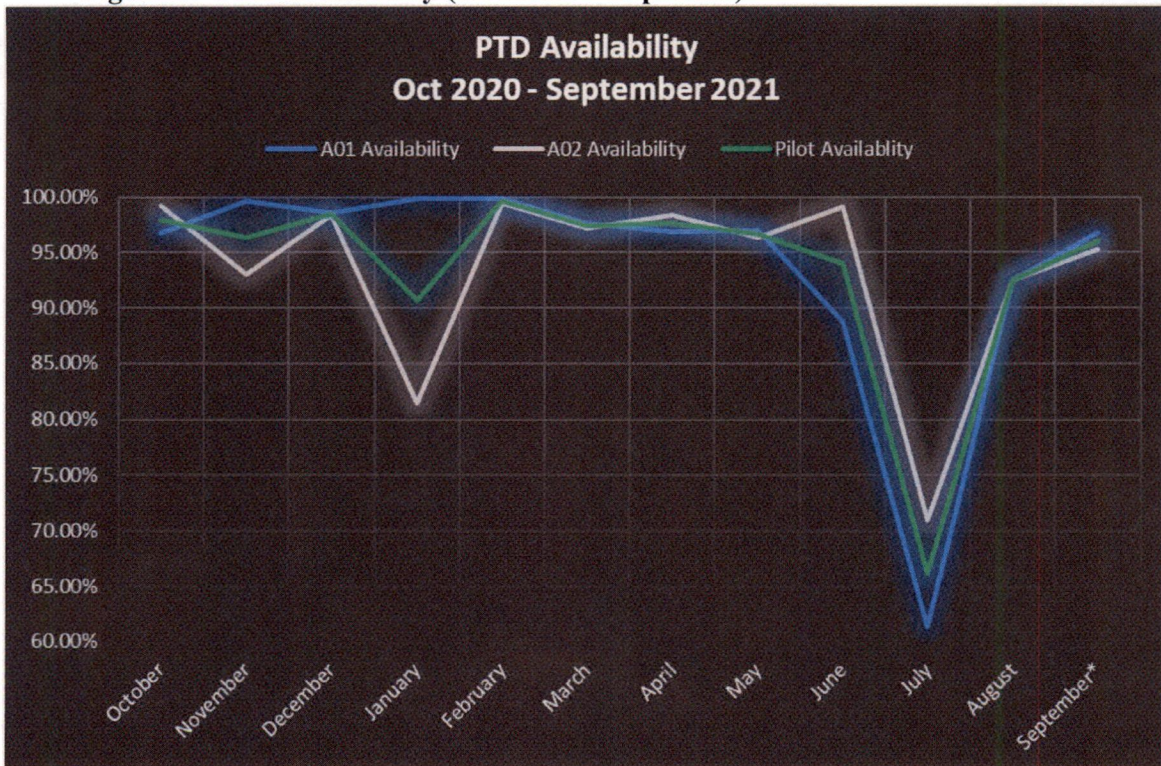
Now that the Pilot is operational, the Company is obtaining significant information that will help it to improve O&M activities for the Commercial Project. For example, it is gathering helpful information about the wind as a capacity resource using measurements taken on the WTGs, the sea states (*i.e.*, general conditions, such as wind waves and swell, of the free surface of the water) around the WTGs, and best methods for utilizing the CTV to access the facilities. The Company is also undertaking surveys of undersea equipment to identify issues that could be corrected in the Commercial Project. The Company is constantly improving its weather forecasting and personnel management to be able to respond to and plan for maintenance issues.

The Pilot is providing excellent information on wind, wave, and capacity factor differences between sea level and hub height wind speeds. To date, the Pilot has outperformed its projected capacity factor.

Figure 7: Monthly Availability (%) per Turbine

Year	Month	A01 Availability	A02 Availability	Pilot Availability
2020	October	96.72%	99.18%	97.95%
2020	November	99.60%	93.03%	96.32%
2020	December	98.55%	98.34%	98.45%
2021	January	99.80%	81.44%	90.62%
2021	February	99.79%	99.45%	99.62%
2021	March	97.58%	97.19%	97.38%
2021	April	96.80%	98.33%	97.56%
2021	May	96.97%	96.26%	96.62%
2021	June	88.71%	99.15%	93.93%
2021	July	61.41%	70.94%	66.18%
2021	August	92.52%	92.44%	92.47%
2021	September	95.94%	94.04%	94.99%
2021	October			
2021	November			
2021	December			
PYD		93.70%	93.32%	93.59%
YTD		92.17%	92.14%	92.15%

Figure 8: PTD Availability (Oct. 2020 – Sep. 2021)





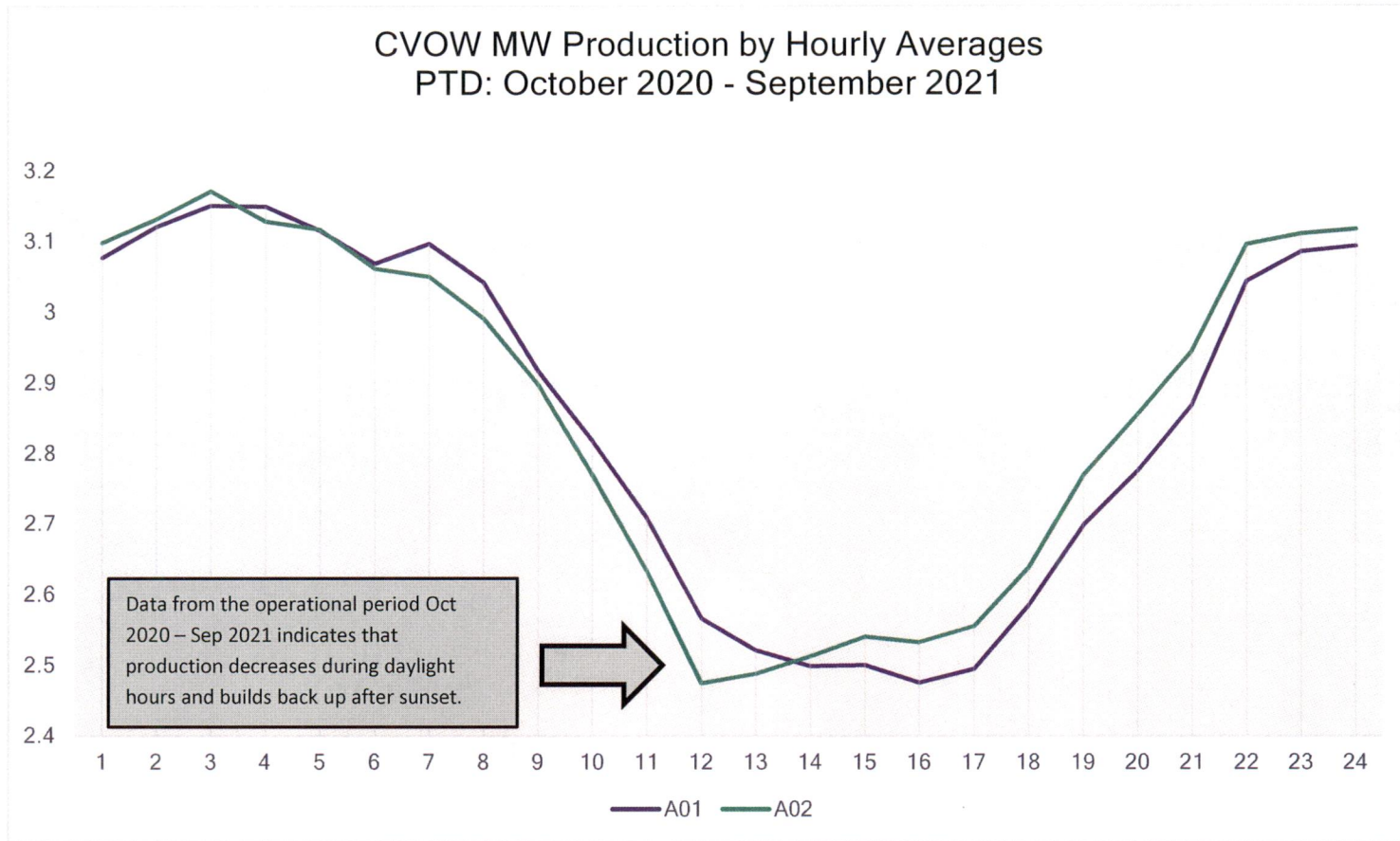
Additional data analysis of Pilot Project operations has revealed that offshore the wind operating profile appears to be complementary to solar generation assets due to the nature of wind behavior offshore in Virginia.

Figure 9: Monthly Energy Produced per Turbine

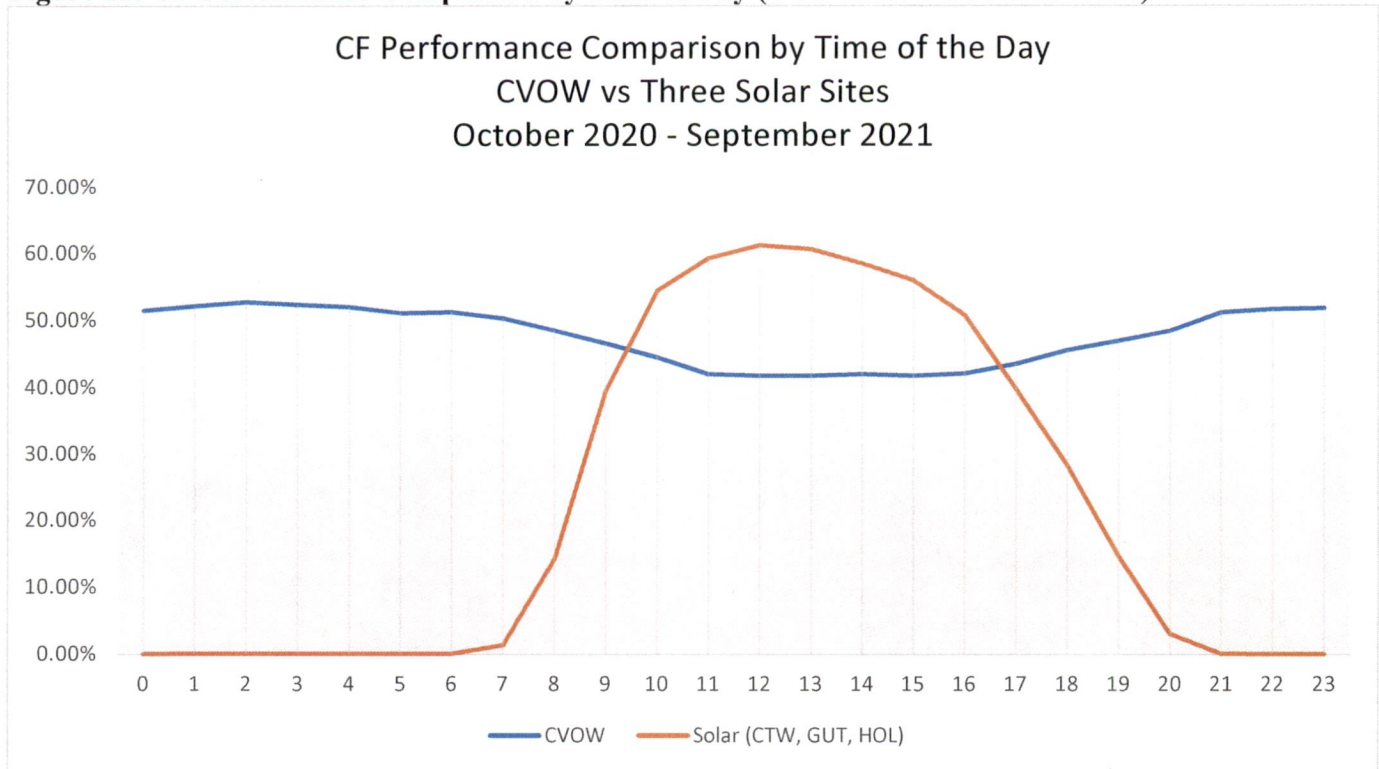
## Monthly Energy Produced per Turbine

Total		2,001,272	3,636,879	5,751,222	4,493,158	6,285,820	5,698,299	5,236,388	3,777,087	3,743,514	3,077,460	2,160,696	45,861,794	
WTG	UT Description	September	October	November	December	January	February	March	April	May	June	July	August	Total
CVOW-A01	Coastal Virginia/ CVOW-A01		1,028,004	1,919,101	2,875,269	2,455,148	3,155,581	2,896,586	2,602,230	1,860,196	1,781,042	1,449,584	1,088,604	23,111,345
CVOW-A02	Coastal Virginia/ CVOW-A02		973,269	1,717,778	2,875,953	2,038,010	3,130,239	2,801,713	2,634,158	1,916,891	1,962,472	1,627,876	1,072,092	22,750,449

Figure 10: CVOW MW Production by Hourly Averages



**Figure 11: CF Performance Comparison by Time of Day (CVOW vs. Three Solar Sites)**



❖ Referenced Dominion Energy Virginia Solar sites are Colonial Trail West, Gutenberg, and Holyfield.

#### *Turbine Maintenance and Downtime*

Turbine maintenance occurrences, while infrequent, require the O&M department to plan effectively. If technicians are not confident in the symptoms or alarms provided by the turbine SCADA system, or inadequately supplied with sufficient parts, or lack the proper tools, the completion of a task may require multiple trips to the worksite. Additionally, those CTV trips could be hindered by unsafe sea states. The O&M team continues to gain experience in managing the variabilities of routine maintenance from a distance.

As an example, the data in the chart below indicates that the majority of asset downtime is relatively short, however in the highlighted example, a short duration repair turned into a multi-day event due to offshore weather and sea states being above the working limits of the CTV. This highlights the emphasis that the Company intends to place on proper planning and execution of Wind Turbine repair efforts.

Figure 12: Example Repair Data

Down Time event Dates	Unit	Duration	Cause
10/14/20	A01 & A02	8H	USCG Field Exercise
10/21/20	A01	8H	500 Hour Service
10/21/20	A02	1H	Orsted punch list – weather station
10/28/20	A02	3H	Orsted Punch list – weather station
11/7/20	A02	2H	Orsted Punch list – Install IP phone cable
11/7/20	A02	5H	Troubleshooting – HTRT fault
11/16/20	A02	6H	Valve supply voltage (Loose Connections)
12/9/20	A02	5H	SSD Trip and RACON reconfiguration
12/10/20	A01 & A02	8H A01 & 2H A02	Add cooling fluid for converter & Orsted Punchlist – IP Phone cable on A01; RACON settings change on A02
1/7 – 1/11/21	A02	80H	Failed Power supply card (72 hours = Weather delay – sea state)
1/21/21	A02	5H	Replace RACON Dome

### Marine Coordination

The project team also gained valuable experience from the Pilot in the area of Marine Coordination. Managing the coordination of vessels and personnel in a maritime environment is critical for both the Pilot Project and the Commercial Project. The port of Hampton Roads is one of the busiest in the world with shipping, fleet forces, and commercial and recreational fishery traffic in the areas around the lease area, so applying effective Marine Coordination processes and procedures during the development of the Pilot allowed the Company to create a professional Marine Coordination Center to manage vessel traffic, track personnel assigned to the projects, and grant work permits in the wind farm.

The Company plans to establish an Onshore Base of Operations which will provide the CVOW project the following advantages:

- Reporting – Daily Progress Reports, daily communications – in the field
- Awareness to all Dominion Energy Virginia stakeholders (keeping stakeholders informed)
- Communications – operational and emergency response
- Maritime compliance – Use of the marine coordination center as the “HUB” for all things maritime
- Personnel – certification, location, and medical
- USCG / evacuations, unforeseen maritime infield asset damage, asset threats, weather related asset plan, CCTV monitoring
- Vessel management – Jones Act compliance, onshore site for personnel, equipment
- Mooring, refueling, insurance, safe haven
- Emergency response times reduced
- Demonstration of concept – plan, inform, and educate
- Operational strategy
- Accountability to project and public
- Support center for offshore personnel
- Centralized asset management
- Integrated HSE plan, SMS and emergency response

- Centralized storage for technician tools, materials, spare parts and coordination with vendor assets
- Contractor integration for maintenance campaigns – improving alignment and planning
- Training center – supporting existing technicians and providing for future development
- Document and data control

## II. PLANNING AND DEVELOPMENT OF PROPOSED PROJECT

- B. Pursuant to Va. Code § 56-585.1 A 6, in connection with planning to meet forecasted demand for electric generation supply and assure the adequate and sufficient reliability of service, consistent with Va. Code § 56-598, describe the planning and development activities for the proposed project.**

(Supports a public interest determination under Va. Code § 56-585.1 A 6.)

Response:

1. With respect to the Company's plans to meet the forecasted demand for electric generation to assure the adequate and sufficient reliability of service, the general objective is to identify a mix of clean resources necessary to meet its customers' projected capacity and energy needs in an efficient and reliable manner at the lowest reasonable cost, while considering future changes in public policy and environmental regulations.

### Cost Analysis

With a combined nominal capacity of 2,587 MW (AC), the CVOW Commercial Project is expected to provide approximately 9,500 gigawatt-hours ("GWh") of carbon-free energy per year of operation.

The analytical process for evaluating the CVOW Commercial Project consisted of comparing the Project's costs (*i.e.*, capital and O&M) with the Project's benefits (*e.g.*, capacity, energy, RECs). PLEXOS modeling software was used to calculate the Project's net present value ("NPV") to customers over its 30-year operating life under a cost of service ("COS") methodology.

The Company contracted with ICF for an independent forecast of future energy, capacity, fuel, and emissions prices for use in evaluating the Project. Positive NPV results indicate that a project is beneficial to customers compared to the PJM market.

For the capacity value, the Company used the effective load carrying capability ("ELCC") methodology annual values from the PJM July 2021 ELCC Report. The value for offshore wind resources starts around 33% in 2027 and drops to 30% in the later years as more renewables are expected to penetrate the market.

Under the current federal tax code and current accounting guidance, approximately 83.27% of the CVOW Commercial Project's capital expenditures will qualify for the 30% offshore wind ITC, worth approximately \$1.05 billion (NPV).

Under the RPS Program, the Company must pay a deficiency payment of \$45 per megawatt-hour ("MWh") if it is unable to meet the RPS Program requirements in any given year. The Company thus incorporated the \$45/MWh deficiency payment into its economic analysis for the CVOW Commercial Project as an avoided cost

because constructing and operating the Project will allow the Company to avoid paying a deficiency payment, thereby increasing the customer value of the Project compared to the market.

The Company conducted a financial analysis comparing the CVOW Commercial Project under a COS price structure to the PJM power market. The assumptions used are consistent with those that were used in the Company's 2021 IRP Update. The economic evaluation results show a positive NPV of \$2.5 billion, indicating that the Project is beneficial to customers when compared to the market. This NPV includes the social cost of carbon benefit of \$2.9 billion which was calculated as discussed in the Direct Testimony of Company Witness Glenn A. Kelly.

2. With respect to planning and development activities for the Project, see the Company's response to Appendix Section I.A. As part of its development efforts, the Company has issued multiple requests for information and proposals. These are discussed in more detail in this Appendix Section IV.

### III. COSTS OF PROPOSED PROJECT

- A. [1] Provide the proposed project's projected total levelized cost of energy, including any tax credit, on a cost per megawatt hour basis, inclusive of the costs of transmission and distribution facilities associated with the facility's interconnection.

[2] Explain whether the proposed project's projected total levelized cost of energy exceeds 1.4 times the comparable cost, on an unweighted average basis, of a conventional simple cycle combustion turbine generating facility as estimated by the U.S. Energy Information Administration in its Annual Energy Outlook 2019.

(Supports presumption under Va. Code § 56-585.1:11 C 1(ii) of reasonably/prudently incurred costs by showing LCOE does not exceed 1.4 times the 2019 comparable cost of a simple cycle CT.)

Response: See Attachment III.A (extraordinarily sensitive), which contains the Company's analysis of the levelized cost of energy ("LCOE") associated with the CVOW Commercial Project.

According to the U.S. Energy Information Administration ("EIA") LCOE refers to the estimates of the revenue required to build and operate a generator over a specified cost recovery period. The Company's busbar model presented in Attachment III.A was designed to estimate the levelized cost of energy of various generating resources on an equivalent basis. The busbar results when modeled for various technologies show the LCOE of these generating resources at relevant capacity factors and represent the Company's initial quantitative comparison of various alternative resources. Inputs to the busbar model include but are not limited to financial assumptions, fixed and variable costs, overnight installed costs, fuel and emission costs as well as expected service life for each technology. The busbar model also factors in applicable ITC and REC benefits.

The CVOW Commercial Project LCOE as shown in Attachment III.A was calculated consistent with the Company's methodology and practices used in its Integrated Resource Plan filings. The LCOE calculation levelizes the present value of the total expected cost of the CVOW Commercial Project, including applicable tax credits, over the life of the CVOW Commercial Project and divides the cost by the expected generation output (MWh) over the same period.

The LCOE of conventional simple cycle combustion turbine ("CT") estimated by the EIA in its Annual Energy Outlook 2019 is \$89 per MWh in 2018 dollars. The VCEA's limit of 1.4 times the 2019 EIA LCOE of a CT is \$125 per MWh in 2018 dollars.

As shown in Attachment III.A, the CVOW Commercial Project LCOE is \$87 per MWh in 2027 dollars, which is well below the VCEA limit. Therefore, the CVOW

Commercial Project meets the VCEA financial criteria and is customer beneficial when considering the societal impact of carbon.



**Generation Appendix**

**Attachment III.A**

**ENTIRE DOCUMENT  
EXTRAORDINARILY SENSITIVE**

**IV. CONSTRUCTION PLAN**

**A. [1] Explain how the Project was or will be subject to competitive procurement or solicitation for a substantial majority of the services and equipment, exclusive of interconnections costs, associated with the facility’s construction.**

**[2] Explain how the utility has complied or will comply with the requirement to involve at least one experienced developer.**

(Addresses Va. Code § 56-585.1:11 E(i) and (ii); supports presumption under Va. Code § 56-585.1:11 C 1(i) of reasonably/prudently incurred costs by showing compliance with the competitive solicitation and procurement requirements in Va. Code § 56-585.1:11 E.)

Response:

1. Competitive Procurement / Solicitation

All major offshore equipment packages, including their transport and installation, were competitively bid. The components of the competitive bidding process are summarized in the table below. These contracts are described in more detail in the testimony of Company Witness Joshua Bennett.

**Figure 6: Summary of Competitively Bid Project Components**

Component	Provider	Contract Details	Cost (in US Dollars) <sup>5</sup> (\$M) (Extraordinarily Sensitive redacted)
Turbine Generator and Tower Supply, Installation, and Commissioning (“TSA”)	Siemens	<ul style="list-style-type: none"> <li>Fixed price (USD, Euros, Kronas)</li> <li>Priced in currency basket of Danish Krone, Euro, US Dollar - subject to currency hedging plan</li> <li>Commodity Indexed (steel)</li> <li>Contract terms and conditions near final. To be executed shortly.</li> </ul>	
Component	Provider	Contract Details	Cost (in US

<sup>5</sup> Where contracts are not executed in US Dollars, conversion as of July 27, 2021.

			Dollars) <sup>6</sup> (\$M) (Extraordinarily Sensitive redacted)
Balance of Plant Engineering, Procurement, Transportation, and Installation Services (“BOP”)	DEME Offshore US, LLC / Prysmian Cables and Systems USA, LLC (“DEME-PRY”)	<ul style="list-style-type: none"> <li>• Fixed price (USD) - supplier currency hedge included</li> <li>• Commodity Indexed (metals, fuel)</li> <li>• Date Executed: November 4, 2021</li> </ul>	
Offshore Substation Design and Supply	Bladt Industries Virginia Offshore Wind, LLC (“Bladt”) / SEMCO Maritime Renewable II, LLC (“SEMCO”)	<ul style="list-style-type: none"> <li>• Fixed price (Euros) - subject to currency hedging plan</li> <li>• Date Executed: October 20, 2021</li> </ul>	
Foundation (Monopiles)	EEW Special Pipe Constructions GmbH (“EEW”)	<ul style="list-style-type: none"> <li>• Fixed price (Euros) - subject to currency hedging plan</li> <li>• Commodity indexed (steel)</li> <li>• Date Executed: May 11, 2021</li> </ul>	
Foundation (Transition Pieces)	Bladt	<ul style="list-style-type: none"> <li>• Fixed price (Euros) - subject to currency hedging plan</li> <li>• Commodity indexed (steel)</li> <li>• Date Executed: October 13, 2021</li> </ul>	
Onshore Export Cables and Installation / Direct Pipe from Punchout to Cable Landing and HDD / Trench Underground to Harpers		<ul style="list-style-type: none"> <li>• USD</li> <li>• Conceptual Bids Received: September 20, 2021</li> <li>• Phase 2 initiated: October 13, 2021</li> </ul>	\$478

<sup>6</sup> Where contracts are not executed in US Dollars, conversion as of July 27, 2021.

Miscellaneous Contracts: Engineering Services, Geotechnical and Geophysical Studies, Certified Verification Agent, and Inter-Array Cable & Switchgear	Multiple contractors and vendors  (see table below)	Various contract and compensation mechanisms including firm fixed price and time and material contracts	
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Competitive Procurements - Misc. Contracts	\$ Millions (Extraordinarily Sensitive)
Geotech - Geoquip Marine	
Owners Engineer - Ramboll	
Geophys - Terrasond	
Tetra Tech Support	
Inter Array Cable / Switchgear	
Geophys Cable Corridor - Alpine	
Certified Verification Agent (CVA) Review	
Lidar Buoy - Ocean Tech Services	
3rd Party EIS (Direct Support to BOEM)	
Marine Warranty Surveyor	
Community Outreach - Power Engineers	
<b>Total</b>	

**Aggregate Competitively Bid Amount: \$7.616 billion project to date**

The Project's construction contracts have been subject to competitive procurement or solicitation for a substantial majority of the service and equipment, exclusive of interconnection costs. As noted in Figure 4 above, the competitively bid contracts listed account for approximately \$7.6 billion in costs, which constitute a substantial majority (~86%) of the approximately \$8.9 billion of total Project costs, excluding interconnection costs.

Details of the competitive solicitation process for each Project component, including RFI specifications, selection criteria, and bidder information are provided in the following attachments:

- Attachment IV.A.1 – Transition Pieces RFP Summary Report
- Attachment IV.A.2 – Offshore Substations RFP Summary Report
- Attachment IV.A.3 – BOP Schedule 1 RFP Summary Report
- Attachment IV.A.4 – Underground Transmission RFP Summary Report
- Attachment IV.A.5 – TSA RFI Summary Report (Extraordinarily Sensitive)

Attachment IV.A.6 – Monopiles RFP Summary Report

Attachment IV.A.7 – Engineering Services, Geotechnical and Geophysical Studies, Certified Verification Agent, Inter-Array Cable & Switchgear, and Localization Agreement for Blade Finishing Facility Contracts RFP Summary Report

Contracts awarded as part of the competitive solicitation processes are provided in Filing Schedule 46.b.1.iv, Statement 2, (Extraordinarily Sensitive). The Project components subject to competitive solicitation include the following:

- Wind Turbine Generator
- Foundation Monopiles
- Foundation Transition Pieces
- Offshore Substations
- Transportation, Installation, and Operations Services
- Offshore / Onshore Export Cables
- Miscellaneous Contracts: Engineering Services, Geotechnical and Geophysical Studies, Certified Verification Agent, Inter-Array Cable & Switchgear, and Localization Agreement for Blade Finishing Facility (see chart above)

2. Experienced Developer

See Appendix Section II.A.2. In addition to relying on its own experience with the CVOW Pilot, the Company is consulting with several experienced developers with a track record in windfarm design, construction, and operations. Ramboll, an engineering consulting firm, is serving as the Owner's Engineer for the Project. Ramboll has more than 30 years of experience in the global wind industry. They offer a full range of services covering the lifecycle of a project, from planning and project development to design, procurement, implementation and follow up on O&M. The Company has additionally engaged Merkur Offshore, which has developed and operated multiple wind farms, as a strategic consultant. Merkur provides advice on market conditions, contract structure, risk mitigation and operation of wind farms. The Company has contracted with SGRE for a long-term service agreement in support of the O&M phase of the project. SGRE has over 3,400 offshore wind turbines with a capacity of 15.2GW installed worldwide and they bring a vast array of experience to the Project. The Company also gained valuable experience working with Orsted in their role as the offshore contractor for the Pilot and continues to rely on insight and lessons learned from the Pilot.

**Generation Appendix**

**Attachment IV.A.1**

**ENTIRE DOCUMENT  
EXTRAORDINARILY SENSITIVE**

**Generation Appendix**

**Attachment IV.A.2**

**ENTIRE DOCUMENT  
EXTRAORDINARILY SENSITIVE**

**Generation Appendix**

**Attachment IV.A.3**

**ENTIRE DOCUMENT  
EXTRAORDINARILY SENSITIVE**



**Generation Appendix**

**Attachment IV.A.4**

**ENTIRE DOCUMENT  
EXTRAORDINARILY SENSITIVE**

**Generation Appendix**

**Attachment IV.A.5**

**ENTIRE DOCUMENT  
EXTRAORDINARILY SENSITIVE**

**Generation Appendix**

**Attachment IV.A.6**

**ENTIRE DOCUMENT  
EXTRAORDINARILY SENSITIVE**

**Generation Appendix**

**Attachment IV.A.7**

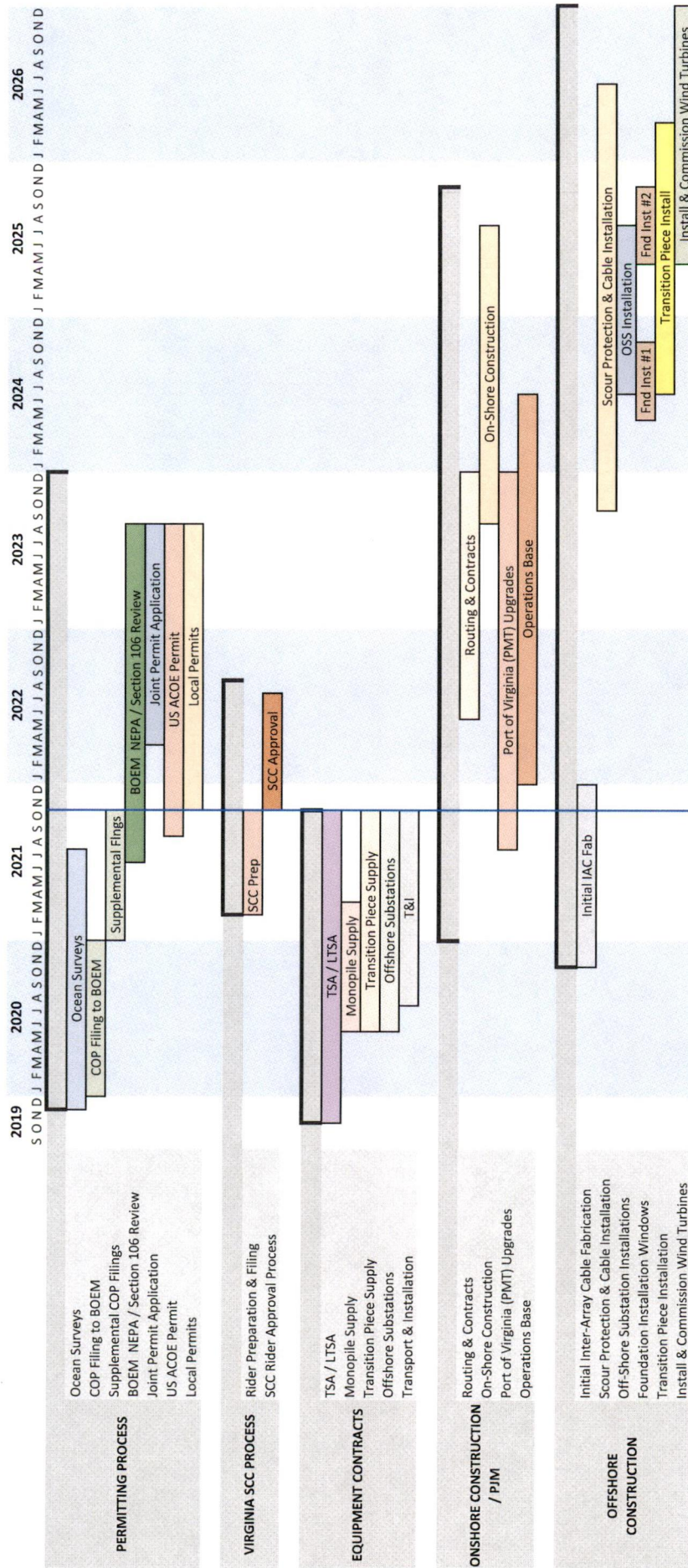
**ENTIRE DOCUMENT  
EXTRAORDINARILY SENSITIVE**

#### IV. CONSTRUCTION PLAN

##### B. Provide a construction schedule for the proposed project.

(Supports presumption under Va. Code § 56-585.1:11 C 1(iii) of reasonably/prudently incurred costs by showing the utility has commenced construction of the facility for U.S. income tax purposes prior to January 1, 2024, or has a plan for the facility to be in service prior to January 1, 2028.

Response: See Attachment IV.B. The Company began constructing the facility in 2020, for U.S. income tax purposes, beginning with fabrication of inter-array cables to secure certain tax credits. Offshore construction is scheduled to commence in Q4, 2023 with scour protection and the start of undersea cable installation. Monopile construction will start in Q2, 2024. The WTGs will be installed and commissioned in 2025 and 2026.



## V. ENVIRONMENTAL & SOCIAL CONSIDERATIONS

- A. Provide an environmental and fisheries mitigation plan submitted to the Commission for the construction and operation of such offshore wind facilities.

[1] Include an explicit description of the best management practices the bidder will employ that considers the latest science at the time the proposal is made to mitigate adverse impacts to wildlife, natural resources, ecosystems, and traditional or existing water-dependent uses.

[2] Include a summary of pre-construction assessment activities, consistent with federal requirements, to determine the spatial and temporal presence and abundance of marine mammals, sea turtles, birds, and bats in the offshore wind lease area.

(Addresses requirements in Va. Code § 56-585.1:11 F)

Response: See Attachment V.A.1, which provides the Company's Fisheries Communications Plan submitted to BOEM as Appendix V to the COP. See also Attachment V.A.2,<sup>6</sup> which provides portions of section 4 of the COP submitted to BOEM. This document addresses various environmental considerations associated with the Project.

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<sup>6</sup> Provided in electronic format only due to size of the document. It is available publicly at <https://www.boem.gov/renewable-energy/state-activities/cvow-construction-and-operations-plan>.

# Appendix V: Fisheries Communications Plan

Coastal Virginia Offshore Wind Commercial Project



Submitted by:  
**Dominion Energy Services, Inc.**  
707 E. Main Street,  
Richmond, VA 23219

Prepared by:  
**Sea Risk Solutions LLC**  
16 Woodland Terrace  
High Bridge, NJ 08829

Submitted to:  
**Bureau of Ocean Energy Management**  
45600 Woodland Road  
Sterling, VA 20166



# Coastal Virginia Offshore Wind Commercial Project

## Fisheries Communication Plan Lease Area (OCS-A 0483)

Prepared for:



**Dominion  
Energy**<sup>®</sup>

Prepared by:

*Sea Risk Solutions LLC*

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- Attachment A - References
- Attachment B - Fisheries Liaison Roles and Responsibilities
- Attachment C - Fishing Industry Representative Roles and Responsibilities
- Attachment D - Fishing Gear Damage or Loss Claim Procedure

## Acronyms and Abbreviations

<b>AIS</b>	Automatic Identification System
<b>ASMFC</b>	Atlantic States Marine Fisheries Commission
<b>BOEM</b>	Bureau of Ocean Energy Management
<b>CFR</b>	Code of Federal Regulations
<b>COP</b>	Construction and Operations Plan
<b>CVOW</b>	Coastal Virginia Offshore Wind (Pilot Project and Commercial Project)
<b>EA</b>	Environmental Assessment
<b>ESA</b>	Endangered Species Act
<b>FCP</b>	Fisheries Communication Plan
<b>FLO</b>	Fisheries Liaison Officer
<b>FIR</b>	Fishing Industry Representative
<b>GARFO</b>	Greater Atlantic Regional Fisheries Office (formerly “Northeast” or NERO)
<b>G&amp;G</b>	Geotechnical and Geophysical
<b>HRG</b>	high-resolution geophysical
<b>HMS</b>	Highly Migratory Species
<b>Lease</b>	Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf OCS-A 0483
<b>m</b>	meter
<b>MAFMC</b>	Mid-Atlantic Fishery Management Council
<b>MMPA</b>	Marine Mammal Protection Act
<b>NEFSC</b>	Northeast Fisheries Science Center
<b>NMFS</b>	National Marine Fisheries Service
<b>NOAA</b>	National Oceanic and Atmospheric Administration
<b>OCS</b>	Outer Continental Shelf
<b>OFL</b>	Offshore Fisheries Liaison
<b>Project</b>	Coastal Virginia Offshore Wind Project
<b>SAP</b>	Site Assessment Plan
<b>TD</b>	Time Differential
<b>VHF</b>	Very High Frequency
<b>VMRC</b>	Virginia Marine Resources Commission
<b>VMS</b>	Vessel Monitoring Systems
<b>VTR</b>	Vessel Trip Report
<b>WEA</b>	Wind Energy Area

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## 1. Introduction

Dominion Energy is the lease holder for Outer Continental Shelf (OCS) Lease Area OCS-A-0483 (Lease). As shown in Figure 1-1, the Lease is located approximately 27-miles off the Virginia coast, encompassing approximately 112,800 acres. The Lease was designated by the Bureau of Ocean Energy Management (BOEM), following a review of existing and targeted environmental studies as well as significant stakeholder engagement and input. The specific activities undertaken and considered when designating the location for Lease Area OCS-A-0483 can be reviewed on the BOEM website, [BOEM Virginia Activities](#).

Dominion Energy is committed to coexistence of the Coastal Virginia Offshore Wind Commercial Project (“Project”) with users of this shared ocean space, including commercial and recreational fisheries. Dominion Energy has assembled and will maintain a fisheries communications team, inclusive of Fisheries Liaison Officers (FLOs), for the duration of the Project. This Fisheries Communication Plan (FCP) is central to the Project's fisheries engagement strategy and will be foundational to the company's efforts to develop and implement best practices and build effective relationships with the fishing community.

The FCP establishes the principles Dominion Energy will use to guide outreach and engagement with the region's marine fisheries. It is a “living document” that will continue to evolve with regular feedback and guidance from fishermen, fishing organizations, and regulatory agencies.

The ongoing participation by fishermen and their representatives will help to inform Project planning activities and Project design while also building relationships to support understanding and, ultimately, coexistence with users of the area. The process of gathering fisheries information to support this effort will be iterative and continuous. It should be understood and expected that credible information received from different sources may be contradictory. Dominion Energy will endeavor to apply the available information to develop fair and equitable plans for shared use of the Lease Area.

For opportunities to provide inputs on improving this plan, receive Project updates or receive updated versions of this FCP when they become available, please visit the page on the [Coastal Virginia Offshore Wind | Dominion Energy](#) website or send an email to the Dominion Energy FLOs:

- Ron Larsen ([ronlarsen@searisksolutions.com](mailto:ronlarsen@searisksolutions.com)), and
- Wolfgang Rain ([wrain@searisksolutions.com](mailto:wrain@searisksolutions.com)).





## **2. Fisheries Communication Plan Principles and Objectives**

Timely communication and information dissemination are essential to identifying and avoiding potential issues during development of the Project. Sharing information on fishing activities, planned infrastructure positions, submarine cable routes, vessel movements, safety zones, etc. can help to reduce and/or prevent the potential for conflicts detrimental to fishing and the Project.

The Dominion Energy FCP has been developed in accordance with the BOEM guidelines and best practices guidance from other relevant resources (Attachment A). The objective is to define outreach and engagement strategies for fisheries interests that may be affected during the planning, construction, operation, and eventual decommissioning of the Project. These strategies will be enhanced with inputs received from the fishing community and updated as the Project progresses.

Development of the Project within the Lease Area and along the export cable route(s) will occur in several stages including Site Assessment and Characterization, Design, COP Preparation and Submission, Construction and Installation, Operations & Maintenance, and Decommissioning. These stages are discussed in greater detail in Section 5.5. The 'adaptive' nature of the FCP will allow it to be updated over time as inputs are received and through different phases of Project development and implementation.

The Project will require the submission of a Construction and Operating Plan (COP) which will be subject to regulatory review, with additional opportunities for public input, prior to construction. Fisheries information used to inform the COP is based on the best available and most credible information, which may include anecdotal information from fishermen as well as direct observations from vessels engaged in offshore operations.

### **2.1 FCP Guiding Principles**

The fundamental principle of the Dominion Energy FCP is facilitation of an open, ongoing dialogue among users of our natural resources shared Outer Continental Shelf so that we may coexist in the responsible utilization of offshore resources for the benefit of all users. This will be achieved by focusing the FCP around the following, more defined set of principles:

- Facilitate timely, coordinated, efficient, accurate and transparent two-way communications to promote Project awareness and mariner safety.
- Seek out and utilize the diverse expertise and knowledge of the commercial and recreational fishing communities.
- Acknowledge and respect the concerns, issues, and interests of the fishing community.

### **2.2 FCP Objectives**

Broadly stated, the objective of this FCP is to define outreach and engagement strategies necessary to inform the fishing communities in a timely manner about Project activities while also building reliable, cooperative, working relationships with Dominion Energy. This outreach and engagement will identify and mitigate, to the extent possible, the challenges that come with

coexistence of the Project and fishing activity in the Project area. In order to realize this overall objective, Dominion Energy has identified a sub-set of defined objectives, which include:

- Promote the safety of fishermen, offshore survey crews and construction crews transiting, working, and fishing in the area.
- Seek out fisheries users and their inputs to provide additional details, filling in data gaps regarding the historic, existing, and potential fisheries opportunities in the Lease area.
- Identify potential adverse impacts to fishermen and make informed decisions on how to avoid impacts where possible and/or mitigate the extent of effects.
- Provide a pathway to quickly and fairly resolve fisheries related conflicts that may develop during the life of the Project.
- Build an authentic, trusting and working relationship with fisheries users and communities to inform the responsible design, development, construction, and operation of the Project.
- Demonstrate how industry relationships established via the FCP have informed the evolution of the Project as well as the FCP.

### **3. Fishing Activities Within the Lease Area**

Fisheries are regional in nature and fishermen from various east coast states have been known to fish within and/or transit through the Lease Area. The Dominion Energy lease was characterized as being 'very lightly fished' in a report prepared by economists from the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) Northeast Fisheries Science Center (NEFSC) that looked at commercial fishing activity (Kirkpatrick et al. 2017). This characterization is consistent with what Dominion Energy has learned during its own observations and outreach to the fishing community.

The commercial fishing in and around the Lease Area almost exclusively utilizes fixed gear (e.g., pots/traps) to target Black Sea Bass (BSB) and Whelk/Conch, which are the primary commercial species landed from within the lease area. Fixed gear fishing using gillnets to target spiny dogfish is conducted outside the lease area and along the export cable route(s). There is historical evidence that commercial fishing using mobile gear (e.g., trawls and dredges) has occurred in the Lease Area but evidence of mobile gear activity in the last decade is absent from available data. This is consistent with anecdotal information from local fixed gear fishermen. Mobile gear fishing using trawls to target shrimp and dogfish is known to exist in the nearshore areas and along the planned export cable route(s). Additionally, exploratory fishing for Surf Clams in August 2021 identified a fishable resource several miles offshore (east) of the lease area that may be subject to future exploitation.

The offshore recreational fishery consists of individual vessel owner/operators as well as a substantial 'for hire' (charter) fleet using hook-and-line. Important recreational target species include flounder, bluefish, BSB, striped bass, scup, tautog, amberjacks, cobia, spadefish, king mackerel, wahoo, shark species, tuna species, billfish species, and other pelagic species (e.g.

mahi mahi). Divers, free-diving or with SCUBA, will also utilize the area; SCUBA divers will target seabed structure while free divers will utilize surface structure/buoys.

In addition to vessels fishing within the area, there will also be fishing vessels that will transit through the area to get to/from the outer continental shelf fishing grounds and/or transit between ports. Fisheries research, resource surveys and other oceanographic studies carried out by federal, state and academic organizations also take place in and around the Lease Area.

### **3.1 Commercial Fishing**

The primary commercial fishery conducted in and around the Lease Area is the harvesting of BSB and Whelk/Conch using pots. These vessels typically work from the smaller Virginia Eastern Shore ports of Cape Charles, Oyster, Willis Warf, Wachapreague and Chincoteague as well as the Virginia Beach area ports of Rudee Inlet and Lynnhaven. The BSB fishery is managed via a federally mandated quota system, catch/effort reporting is required, and there is a single fisherman that targets BSB with pots in the Lease Area. The whelk/conch fishery in federal waters, where the Lease Area exists, does not fall under any specific fishery management plan. Fishermen are required to be permitted to land their catch in the Commonwealth of Virginia, landings reporting are required but reporting specific location of effort is not required.

The BSB gear is typically fished from April into January. The fisherman that works this gear is known to Dominion Energy and an ongoing relationship has been established. The whelk/conch fishery typically runs from October through May in the region, and the fishery is heavily dependent on water temperature. Within the lease area, the whelk/conch fishing typically begins in the December timeframe, fishing will slow when water temperatures decrease in the February timeframe and will then pick up again in the Spring as water temperatures warm. There are a limited number of fishermen that fish whelk/conch in the lease area, and most are known to Dominion Energy; direct outreach and relationship building is ongoing.

Other commercial fishing gear types that work outside the Lease Area, but along the planned export cable route(s), include bottom tending gillnets targeting spiny dogfish and shrimp trawling. The spiny dogfish fishery is a federally managed, quota driven fishery that will typically run from November through April, closing when the quota allocation for the Commonwealth of Virginia is reached, which can be as early as March. Fishermen operating along the export cable route off Virginia Beach will typically work from the ports of Lynnhaven and Rudee Inlet.

Although trawling is prohibited within the 3-nautical mile limit of the Virginia Commonwealth, a small scale beam trawl fishery for shrimp has been authorized in 2021. This fishery is tightly managed and currently restricted in space to remain south of the planned export cable route(s). Outside of 3-nautical miles, within federal waters, large, twin-rigged, shrimp trawlers have begun working from November through December. The shrimp fishing season is largely water temperature dependent and fishing seasons may vary slightly. Some trawling for spiny dogfish may also take place along the planned export cable route(s), outside 3-nautical miles.

The Lease Area is also transited by commercial fishing vessels. Automatic Identification System (AIS) data, although not used by all vessels, provides some indication of transit activity within the

Lease Area. Most commercial vessels approaching the entrance to Chesapeake Bay from the North/South will use vessel fairways that avoid the lease area. Vessels from the Hampton Roads area and/or other Chesapeake Bay area ports (e.g., Cape Charles, VA), fishing offshore of the Lease Area towards the outer continental shelf or Norfolk Canyon area may transit East/West through the northern portion of the Lease Area. Vessels traveling North/South to and from North Carolina ports, that bypass the Chesapeake Bay, may also transit through the Lease Area. Overall, commercial fishing vessel transit traffic through the Lease Area is minimal.

### 3.2 Recreational Fishing

The Virginia recreational fleet, primarily using hook and line, are mostly private vessels, although there is a substantial 'For Hire' fleet that consists of Party/Head Boats and Charter Boats. There is also recreational spearfishing conducted by free-divers and divers using SCUBA.

The recreational fleet takes advantage of existing natural and man-made seabed structure inside and outside the Lease Area, the primary target area being the Triangle Reef fish haven contained within the Lease Area. Recreational vessels will also transit through the Lease Area to reach offshore fishing grounds. Recreational fishing activities are expected to increase within the Lease Area once the wind farm is constructed.

Additionally, there are several offshore fishing tournaments that take place annually, based in Virginia ports, with fishing activity located offshore from the Lease Area; some of these are identified in Table 3-1 below.

**Table 3-1 Offshore Recreational Tournaments**

Tournament	Website
Virginia Beach Tuna Tournament	<a href="http://www.vbtuna.com">www.vbtuna.com</a>
Virginia Beach Billfish Tournament	<a href="http://www.vbbt.com">www.vbbt.com</a>
Virginia Beach Invitational Marlin Tournament	<a href="http://www.vbbt.com">www.vbbt.com</a>
Oceans East Swordfish Tournament	<a href="http://www.oceanseastfishingtournaments.com">www.oceanseastfishingtournaments.com</a>
McLeskey Memorial Marlin Open	<a href="http://www.wmmo.com">www.wmmo.com</a>
Wine, Women & Fishing Billfish Tournament	<a href="http://wine-women-fishing-ladies-only-charity-billfish-tournament">wine-women-fishing-ladies-only-charity-billfish-tournament</a>
<b>Note:</b> this is a representative list, not intended to be comprehensive of all fishing tournaments.	

### 3.3 Fisheries Management and Data

Fisheries operating within the Lease Area are subject to a variety of regulations and reporting protocols that result in multiple data sets capturing fishing activity. The regulatory programs and data collection often involve interjurisdictional management between National Marine Fisheries Service (NMFS), regional fisheries management councils (e.g. MAFMC & NEFMC), the Atlantic States Marine Fisheries Commission (ASMFC) and coastal states.

Many of the fisheries conducted within the Lease Area are subject tracking via a Vessel Monitoring System (VMS), which would create a spatial data record of their activities. Other vessels have permits for regulated species that require effort and landings to be reported via Vessel Trip Reporting (VTR). These fisheries dependent data have been used to assess the historical commercial fishing activity inside the Lease Area.

The FLO will consult with local fishermen to interpret and add context to these data to facilitate a mutually agreed and understandable characterization of the fisheries uses of the Lease Area.

#### **4. Site Assessment and Characterization**

The site assessment activities will include survey vessels working in the lease area gathering Geophysical and Geotechnical (G&G) data to inform Project engineering. Data collection buoys will also be deployed to collect long term meteorological and oceanographic data.

##### **4.1 Offshore Survey Activities**

The G&G surveys initiated in the Spring of 2020, and concluded in the Summer of 2021 within the Lease Area and along the proposed Offshore Export Cable Route Corridor. These G&G surveys were conducted by a suite of special purpose survey vessels which were deployed at various times throughout the period. Large, dynamically positioned vessels worked the offshore areas while smaller, shallow draft vessels conducted surveys in the shallow reaches of the export cable corridor.

The G&G survey activities include the following activities:

- Depth sounding (multibeam echo sounder) to determine site bathymetry and bottom contours.
- Magnetic intensity measurements to identify ferrous objects like shipwrecks and unexploded ordnance.
- Seafloor imaging (side scan sonar) to identify seabed features, natural and/or manmade.
- Shallow and mid-range penetrating sub bottom profiler to map the near geological stratigraphy below the seabed.
- Sediment samples and digital imagery to support interpretation of geophysical data and characterize sediment conditions and benthic habitats, and
- Benthic grab sampling.

These vessels tow survey equipment behind the vessel and are often restricted in their ability to maneuver, and a safety buffer around these vessels is requested. The vessel specifications, operational details and timing are shared via Mariner Updates as schedules are determined and updated as needed.

#### 4.1.1 Survey Team Communications

Prior to survey operations being conducted, the Fisheries Communication Team and the FLOs developed and distributed Survey Awareness Flyers to the recreational and commercial fishing fleets. They also briefed the Survey Team during survey vessel mobilization to promote awareness of the local recreational and commercial fisheries. This practice will be continued for future survey operations (e.g., unexploded ordinance surveys).

During survey operations, survey vessels will monitor VHF channels 16 and 13 for bridge-to-bridge communications with fishing vessels operating in the survey area. The FLOs interact daily with the survey vessel(s) to provide fisheries updates and receive feedback from the survey team.

The FLOs provide the survey team with the following:

- A description of the commercial and recreational fisheries that may be encountered in the Lease Area.
- A schedule of the recreational fishing tournaments that may overlap the survey in space and time, including communications channels for the tournament fleets.
- A gear entanglement protocol and reporting form for the Client Representative on the survey vessels.

The FLOs will be the primary point of contact and will work to resolve fisheries issues or gear conflicts that may arise. Standardized procedures are available to facilitate the filing of a claim for gear damage or loss that a fisherman may suspect was caused by survey activities. The claim procedure can be found in Attachment D.

#### 4.2 Meteorological Buoys

Two meteorological data collection buoys are expected to be deployed within the Lease Area in the fourth quarter of 2021. Planned buoy locations are shown in Table 4-1.

**Table 4-1 Meteorological Buoy Locations**

Met Facility Location	Latitude (decimal degrees)	Longitude (decimal degrees)	Mean Lower Low Water Depth
FL1	36.84537	-75.430221	78 ft (24 m)
FL2	36.96847	-75.244385	105 ft (32 m)

Dominion Energy will collect and analyze meteorological data, inclusive of wind speed and direction at multiple heights, and metocean conditions within the Lease Area as part of site assessment activities. Dominion Energy proposes that the collection of this data will be performed using an FLS200 buoy, which is a continuous-wave LiDAR system that can provide data across ten user-defined heights above the water from 32.8 feet (ft) to 656.2 ft (10.0 meters [m] to 200.0 m). The buoys will be equipped with Automatic Identification System (AIS), and buoy locations will be communicated to all mariners prior to deployment. The proposed Met Facilities represent state-of-the-art equipment that incorporate the best available technologies, mooring components, and mooring designs; ensuring reliable, quality data collection; robust mooring integrity; safety; and minimal environmental impacts.

## 5. Fisheries Communication Strategies

The fishing communities that utilize the Lease Area consist of small family businesses, complex multi-vessel companies, and individual fishermen. Vessels using the area may be resident in a local port, operate from a regional port outside of Virginia and/or move seasonally between multiple ports. The fishing industry is complex in that regard.

Dominion Energy acknowledges these complexities and the challenges they present when attempting to disseminate critical information to large numbers of fishermen in reliable, timely manner. Engagement efforts must embrace differences in the needs of these fishing communities. The Fisheries Communication Team will use methods to target both the commercial and recreational users, and sub-groups of the same, in addition to general outreach strategies designed to engage the entire fishing community. Identifying the best ways to communicate with fishermen will be an ongoing process that will evolve over time with the inputs from fishermen, which are encouraged.

The fishing industry itself has a role to play in ensuring that effective communication and interaction takes place in a timely and constructive manner. Fishermen should be willing to engage, and be engaged, to discuss their concerns in an open and transparent way. These engagements will contribute to the assessment of fisheries in the area necessary to avoid and/or minimize negative impacts, develop solutions based on shared information and understanding, and reduce/eliminate conflicts to the greatest extent practicable.

Ongoing communication during all Project phases will be important in resolving issues or conflicts and informing fishermen of activities that could affect their operations.

### 5.1 Fisheries Communication Team

Dominion Energy has assembled a Fisheries Communication Team (Table 5-1) that is currently comprised of Dominion Energy management, FLOs, and Fishing Industry Representatives (FIRs), if necessary. In this structure, the FLO is responsible for the day-to-day interactions with the fishing community, reporting to the Dominion Energy Management Team. The FLOs are knowledgeable and experienced in local and regional fisheries.

**Table 5-1 Fisheries Communication Team**

Position	Contact	Company	Email	Tel
Sr. Construction Project Manager	Kevin Carroll	Dominion Energy	<a href="mailto:kevin.m.carroll@dominionenergy.com">kevin.m.carroll@dominionenergy.com</a>	(757) 979-0440
Environmental Technical Advisor	Scott Lawton	Dominion Energy	<a href="mailto:Scott.lawton@dominionenergy.com">Scott.lawton@dominionenergy.com</a>	(804) 205-6077
Fisheries Liaison Officer	Ron Larsen	Sea Risk Solutions, LLC.	<a href="mailto:ronlarsen@searisksolutions.com">ronlarsen@searisksolutions.com</a>	(570) 242-5023

**Table 5-1 Fisheries Communication Team**

Position	Contact	Company	Email	Tel
Fisheries Liaison Officer	Wolfgang Rain	Sea Risk Solutions, LLC.	<a href="mailto:wrain@searisksolutions.com">wrain@searisksolutions.com</a>	(570) 242-5023
Fishing Industry Representative	TBD	TBD	TBD	TBD

Any nominated FIRs will be comprised of a mix of recreational and commercial fisheries representatives. This combination of experience and skills, together with the leadership and resources of the Dominion Energy representative, form the Fisheries Communication Team. As with the entire FCP, this team will not remain static and will evolve over time as the Project progresses.

**5.1.1 Fisheries Liaison Officer**

The FLO is responsible for overall implementation of the communications plan, communicating project plans and activities that might impact the fishing industry during all phases of project development and implementation. The FLO will have a direct line of communication to the Project’s senior management, through which to make recommendations for improvement and address complaints, concerns, and share other input received from the fishing communities.

The primary roles and responsibilities of the FLO are detailed in Attachment B of this document.

**5.1.2 Fisheries Industry Representative(s)**

The Fishing Industry Representatives (FIRs), if nominated, will be the main point of contact within a fishing industry and/or fishing organization. They do not work for or on behalf of Dominion Energy, but rather represent their respective fishing communities to the Dominion Energy Communication Team. The FIR should have prior acceptance of the fishing industry they represent and provide unbiased representation of the same. The FIR is normally an individual who has worked extensively within the industry they represent but does not need to be an active fisherman.

The primary roles and responsibilities of a FIR are detailed in Attachment C of this document.

**5.2 General Strategies**

The Dominion Energy Fisheries Communication Team will use an array of general outreach strategies designed to engage the entire fishing community. These strategies will offer various opportunities to access and/or receive timely updates on project activities and stress the need for feedback from fishing communities. Feedback from the fishing community will be encouraged, methods and opportunities to provide that feedback will clearly identified and readily available.

General outreach strategies that will be employed include, but are not limited to, the following:

- Maintain the dedicated webpage on the Dominion Energy website specifically for the



fishing community with the latest project information, including relevant contact information and opportunities to submit feedback ([Coastal Virginia Offshore Wind | Dominion Energy](#)).

- Continue to update the current comprehensive email distribution list to provide regular project updates and other important Project notices.
- Regularly distribute updated asset and operational awareness bulletins showing the development area, depicted on local nautical charts, with a description of the assets in the area, the activities taking place, timelines and relevant contact information.
- Schedule and hold regular meetings, roundtables, open houses, and webinars with activities designed to educate the public, share project information, and solicit community feedback activities.
- Engage the existing Offshore Wind communications networks of the federal management agencies (e.g. USCG, US Navy, BOEM, NMFS, etc.), the regional fisheries management councils (e.g. MAFMC, NEFMC, etc.) and state agencies (e.g. VMRC, etc.) and provide links to the same.
- Publish announcements and share project updates with print and online industry publications and local news outlets.
- Establish a 24-hour phone line to address real-time operational conflicts and/or safety issues.
- Establish specific methods for communicating with fishermen while they are at sea.
- Issue Local Notice to Mariners (LNTM) ahead of offshore activities, as required.

### **5.3 Commercial Fisheries Engagement Strategies**

In all cases, early identification of the commercial fisheries conducted in the Lease Area and engagement with the specific users is paramount to the success of this FCP. Dominion Energy has engaged with existing commercial fishermen's organizations, local leaders that represent the various gear types used in the area and individual fishermen. Additional engagement strategies for specific commercial fisheries users of the Lease Area include:

- Engage fixed gear fishermen to establish a set of guiding principles and procedures for 1) the identification and /or temporary relocation of fixed gear if/when needed, 2) the process for filing compensation claims associated with lost or damaged gear, and 3) agreed methods to determine any required compensation (where applicable).
- Schedule meetings with local fishermen (e.g. port meetings, webinars, etc.) when offshore operational plans and dates are confirmed to discuss the activity and identify potential conflicts.
- As needed, establish and support regular "Port Hours" with an open-door policy in local ports to encourage regular, local engagement to help identify and characterize important local details regarding fisheries operations and practices

- Secure local vessels to act as Scout Boats during offshore activities and if required, engage local fishermen to serve as Offshore Fisheries Liaison Representatives.
- Participate in commercial fishing conferences and trade shows, providing an additional point of engagement.

#### **5.4 Recreational Fisheries Engagement Strategies**

Recreational fisheries users that may be impacted by operations in the Lease Area are also represented by national organizations (e.g., American Sportfishing Association) local organizations (e.g., Virginia Saltwater Sportfishing Association), clubs (e.g., Virginia Beach Angler's Club) and individual fishermen. Additional engagement strategies specific recreational fisheries users of the Lease Area include:

- Engage the professional associations representing the 'For Hire' fleet of party and charter boats; schedule meetings to share information and obtain feedback.
- Identify and engage local offshore fishing clubs, attend meetings, deliver educational presentations and solicit feedback.
- Identify offshore fishing tournaments and dates; engage with tournament organizers, share operational plans and contact information; identify and monitor VHF channel used by tournament.
- Participate in recreational fishing trade shows and have a presence during fishing tournaments

#### **5.5 Planning for Subsequent Project Stages**

- Site Assessment and Characterization – This stage of Project activity includes the marine G&G surveys as well the deployment of multiple environmental monitoring buoys. The Fisheries Communication Team will work with the regional fisheries community to promote awareness of the site assessment activities; the FCP will likely be updated several times during this phase of the Project.
- Design, COP Preparation and Submission- The Fisheries Communication Team will use the survey data fisheries inputs received to date to inform the Project layout. Continued engagement with the industry to review and understand the proposed layout. The FCP will continue to be refined as needed.
- Construction and Installation – Ahead of construction and installation activities, the FCP will be further refined and reviewed with the industry to facilitate ongoing communication and engagement.
- Operations & Maintenance – Following construction, the FCP will continue to be updated during the operational life of the Project in order to address the changing needs of the industry.

- Decommissioning– Prior to the decommissioning, the FCP will be updated to address this final phase of the Project.

As previously stated, the FCP will evolve over the life of the Project. This evolution will be based on shared experiences of Dominion Energy and the fishing community, and requires the continued engagement and dedication of all parties to be effective.

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## **Attachment A - References**

This FCP is based on current best practice guidance and has been improved with input from the fishing industry through feedback and consultation. Best practice guidance that were considered includes but are not limited to:

- Fishing Liaison with Offshore Wind and Wet Renewables Group (FLOWW) Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison, January 2014. Available online: <http://www.thecrownstate.co.uk/media/5693/floww-best-practice-guidance-for-offshore-renewables-developments-recommendations-for-fisheries-liaison.pdf>
- Offshore Wind Best Management Practices Workshop, Feb 5-6, 2014, Final Report, Mid-Atlantic Fishery Management Council.
- Ecology and Environment, Inc. 2014. Development of Mitigation Measures to Address Potential Use Conflicts between Commercial Wind Energy Lessees/Grantees and Commercial Fishermen on the Atlantic Outer Continental Shelf Report on Best Management Practices and Mitigation Measures. A final report for the U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs, Herndon, VA. OCS Study BOEM 2014-654. 98 pp. Available at: <http://www.boem.gov/OCS-Study-BOEM-2014-654>.
- Guidelines for Providing Information on Fisheries Social and Economic Conditions for renewable Energy Development on the Atlantic Outer Continental Shelf Pursuant to 30 CFR Part 585, U.S. Department of The Interior, BOEM, Office of Renewable Energy Program, October 20, 2015.
- Guidelines for Information Requirements for a Renewable Energy Construction and Operations Plan, Attachment A – Version 3.0, BOEM April 2016
- Collaborative Fisheries Planning for Virginia's Offshore Wind Energy Area. OCS Study BOEM 2016-040, prepared by Virginia Coastal Zone Program. Available at: <http://www.deq.virginia.gov/Programs/CoastalZoneManagement/CZMIssuesInitiatives/OceanPlanning/FishingandVirginiaOffshoreWind.aspx>
- Kirkpatrick, A.J., S. Benjamin, G.S. DePiper, T. Murphy, S. Steinback, and C. Demarest. 2017. Socio-Economic Impact of Outer Continental Shelf Wind Energy Development on Fisheries in the U.S. Atlantic. Volume I—Report Narrative. U.S Dept. of the Interior, Bureau of Ocean Energy Management, Atlantic OCS Region, Washington, D.C. OCS Study BOEM 2017-012. 150 pp.
- Guidelines for Providing Information on Fisheries for Renewable Energy Development on the Atlantic Outer Continental Shelf Pursuant to 30 CFR Part 585, U.S. Department of The Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs, June 2019.
- Fishing and Submarine Cables Working Together – International Cable Protection Committee, February 2009, Second Edition

## **Attachment B - Fisheries Liaison Roles and Responsibilities**

The roles & responsibilities of the FLO include but are not limited to:

- Act as the Dominion Energy public outreach representative and principle contact to the fishing communities.
- Effective implementation of the FCP, with support of Fisheries Communication Team.
- Ensure timely communications and dissemination of information to fishermen groups regarding all relevant project activities.
- Support development of communication materials to ensure effective messaging.
- Organize meetings, as necessary, to obtain the fishing community's project feedback and communicate concerns to Dominion Energy management.
- Support development and maintenance of a comprehensive stakeholder database for all identified fisheries operating within the Lease Area throughout all stages of the project. Record relevant project information and communications, including presentations and individual conversations, maintaining confidentiality as appropriate.
- Share, present and discuss this FCP with industry and appropriate agencies; refine and enhance FCP based on real-time fishing industry feedback and ongoing outreach experience(s).
- Maintain awareness and, where possible, participate in meetings with fisheries groups, regulators, non-government organizations, policy makers, contractors working on the Project, and other offshore wind project developers to foster positive working relationships.
- Assess offshore activities and identify the need, if any, for Offshore Fisheries Liaison, static gear clearance and/or Scout Vessel; make recommendations for the same.
- Develop, recommend and/or comment on potential mitigation measures being considered for use during Project design, implementation and operation.
- Investigate and follow-up known complaints or concerns regarding fisheries related issues, including those regarding gear conflicts/interactions with Dominion Energy operational vessels.
- Be available to meet with fishermen representatives in person, via email or social media, phone, or radio outside of regular business hours and on weekends.



**Attachment C - Fishing Industry Representative Roles and  
Responsibilities**

The roles & responsibilities of a Fishing Industry Representative (FIR) include but are not limited to:

- Acting as the main point of contact within a fishing industry organization; accurately represent the views of the fishermen within his or her remit
- Liaise in good faith with the FLO to ensure the objectives of the FCP are achieved.
- Reliably disseminate information to and from the fishing community, in a timely and all-inclusive manner.
- Providing the Project with factual, reliable guidance on fishing activity in the area, drawing attention to fishing sensitivities and promoting responsible, equitable mitigation measures.
- Monitoring real time fishing activities and fleet movements in the lease area and inform Communications Team of the same.
- Advising fishermen of development works, activities and associated operational safety measures.
- Facilitate the organization fisheries meetings, as necessary, to obtain fishermen's feedback on project issues, concerns and potential solutions.
- Participate in negotiations on mitigating the effects of construction, operation and decommissioning which may include temporary movement of static gear, the use of scout vessels and/or deployment of an Offshore Fisheries Liaison Representative. Work with the FLO to identify candidates for the same.
- Immediately share known complaints or concerns regarding fisheries related issues, including those regarding gear conflicts/interactions with Dominion Energy operational vessel. Support any investigation and/or follow-up that may be necessary.
- Be available to meet with FLO and Communications Team in person, via phone and/or video conference on a regular basis.

**Attachment D - Fishing Gear Damage or Loss Claim Procedure**

Dominion Energy recognizes that commercial fishing and the Coastal Virginia Offshore Wind (CVOW) projects share common space and both harvest a resource to benefit the citizens of Virginia and the United States. Dominion Energy also recognizes that coexistence of these user groups in this shared space may result in interactions between CVOW and commercial fishing gear. We believe that with proper planning, outreach, communication and training, fishing gear interactions can be minimized. The following outlines Dominion Energy’s approach to managing this issue, and in the unfortunate event of an interaction we have implemented the following claim process.

**Outreach** - Sea Risk Solutions serves as the Fisheries Liaison Officer (FLO) for the CVOW projects and will be the primary point of contact for fishery related issues. The FLO conducts extensive outreach and interacts with commercial and recreational fishermen, fishermen’s associations, recreational tournament organizers, management authorities and support services to identify mariners that operate in areas where project activities are planned. Communications are established directly with identified fishermen, including methods for real-time communications in order to mutually share operational information and updates. The FLO is available for direct telephone inquiries to assist with coordination of activity between fishing and project operations and to address any fishery related questions and concerns.

**Communications and Planning** – Through the FLO, Dominion Energy provides CVOW Mariner Information Sheets (MIS) and information to USCG Local Notice to Mariners to share operational updates, names of active vessels, activities being conducted and the specific areas of operation. This information can be found on the CVOW Project website listed below. CVOW utilizes local fishing vessels to serve as Scout Vessels to proactively survey upcoming work areas for fishing gear. If gear is located within the planned work area, we will try to identify and contact the owner of the gear. Each offshore vessel contracted by CVOW is advised to communicate early and often with fishing vessels operating in the area of survey activities, while always following USCG Rules of the Road.

**Fisheries Briefing** – CVOW contractors, including survey vessel masters, bridge officers and survey crew are briefed in local fisheries and their respective seasons and gear methods, how to identify and avoid fishing gear, and the importance of coordinating with local and regional fishermen. Fishing observations are recorded by onboard personnel, fixed gear positions are plotted for future reference and avoidance. Fishing vessel sightings and gear information are reported to the FLO for follow-up as necessary. Should an interaction occur, offshore contractors are briefed in how to respond to the event safely and responsibly, document the interaction and report immediately to the FLO. The FLO will follow-up with the fishing vessel operator and gather feedback in order to improve communication on vessel activities.

**Filing a Claim** – If you have experienced gear loss or damage that you believe was caused by or was the result of CVOW activities, please follow the instructions below to submit a claim.

- 1) As soon as safe to do so, report incident via cell phone or email to FLO:

- Ron Larsen at (570) 242-5023 or [ronlarsen@searisksolutions.com](mailto:ronlarsen@searisksolutions.com) and/or
  - Wolfgang Rain at (206) 427-6553 or [wrain@searisksolutions.com](mailto:wrain@searisksolutions.com)
- 2) Within 30-days of the incident submit a complete, legible, executed Claim Form to:
- *[claim-specific email address, to be established]*

**Claim Review** – All Claim Forms will be reviewed by FLO and Dominion Energy.

- 1) Within 30 days of receipt of a complete Claim Form, the Applicant will receive a written response which may include a request for additional information.
- a. If the claim is confirmed, payment will be arranged with the Applicant.
  - b. If the claim is denied, a written explanation will be provided to the Applicant.
- 2) Applicants who disagree with the decision may file a written notice of appeal.

Gear conflict prevention methods should be followed by all parties. Dominion Energy reserves the right to deny a claim should an applicant file multiple claims for gear loss in the same area. Any payment in connection with a filed claim will be considered a full release. Dominion Energy reserves the right to request additional information to support review of claim.

**[Claim Form Appears on the Next Page]**

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### Gear Loss Claim Form (1 of 2)

Name: \_\_\_\_\_ Business Name: \_\_\_\_\_

Address: \_\_\_\_\_ Phone #: \_\_\_\_\_

Homeport: \_\_\_\_\_ Email: \_\_\_\_\_

Vessel Name: \_\_\_\_\_ Vessel Documentation #: \_\_\_\_\_

State License #: \_\_\_\_\_ Federal License #: \_\_\_\_\_

Gear Type: \_\_\_\_\_ Date of Incident: \_\_\_\_\_

Last Time Gear Set/Hauled: \_\_\_\_\_

Specific Gear Location (Lat/Lon or TD) \_\_\_\_\_

Gear Description (Markings, polyballs, Highflyers) \_\_\_\_\_

Description of Incident Causing Damage/Loss: \_\_\_\_\_

Was any of the gear retrieved? \_\_\_\_\_

How many gillnets, pots, highflyers, trawl, doors, ground cables, scissor legs, etc. are lost/damaged? \_\_\_\_\_

Vessel(s) Observed in Area (Yes/No). If yes, Vessel Name(s) \_\_\_\_\_

If claiming lost time, described normal gear configuration and fishing activity. \_\_\_\_\_

Total Claim Amount = \$ \_\_\_\_\_

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**Additional information required to process Claim Form:**

- Copy of a valid fishing permit.
- Proof of landing history through a VTR report, sales slip, or similar type of documentation that the vessel was fishing in the area for period of gear loss/damage.
- Proof of ownership of the vessel capable of fishing area of loss, including photos.
- Sales slip or gear invoice for replacement or repair gear (must be substantially similar to gear that was lost/damaged).
- Location of gear loss/damage – either GPS coordinates and/or photo of chart plotter
- Completed W-9 form (<https://www.irs.gov/pub/irs-pdf/fw9.pdf>)

### Gear Loss Claim Form (2 of 2)

I, \_\_\_\_\_, as the Applicant hereunder authorize Dominion Energy to make whatever reasonable inquiries and investigations it deems necessary to verify my Application and request for compensation. Applicant understands that submitting this Application does not guaranty payment. Applicant further agrees that if this claim is accepted and paid in its entirety, that acceptance of such payment constitutes full, final and complete payment for this particular claim and that neither Dominion Energy, nor any of its affiliates shall have any further outstanding or ongoing obligation with respect to this particular claim and Applicant shall not, directly or indirectly, assert any claim, or commence, join in, prosecute, participate in, or fund any part of, any suit or other proceeding of any kind against Dominion Energy, or any of its affiliates, based upon this particular claim. If a claim is denied in part, Applicant may accept payment for the undisputed part without waiving Applicant's right to appeal the disputed part of the claim. Applicant recognizes that submission of this Application does not affect Applicant's rights concerning matters other than those specifically identified in this particular Application.

I attest, under penalty of perjury, that to the best of my knowledge the information in this Application is true and correct.

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Signature

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Date

Please return this form and the all required information, including a completed W-9 form, by one of the below methods:

- 1) Delivering an electronic copy via email to the FLOs Ron Larsen ([ronlarsen@searisksolutions.com](mailto:ronlarsen@searisksolutions.com)) and Wolfgang Rain ([wrain@searisksolutions.com](mailto:wrain@searisksolutions.com)) with a copy to Dominion Energy's Kevin Carroll ([Kevin.M.Carroll@dominionenergy.com](mailto:Kevin.M.Carroll@dominionenergy.com)); or
- 2) Mail a copy to:  
Dominion Energy  
707 E. Main St.  
Richmond, VA 23219  
ATTN: Kevin Carroll

**Please note that the payment cannot be processed without a signature and W-9 form. Upon acceptance of the Application and confirmation of the validity of the claim, payment will be issued within 10 business days of such confirmation.**



# **Generation Appendix**

## **Attachment V.A.2**

**See the following sections of the Construction and Operation Plan submitted to BOEM.**

**The document is publicly available at the following link:**

**<https://www.boem.gov/renewable-energy/state-activities/cvow-construction-and-operations-plan>**

### **4.1 Physical Resources**

- 4.1.1 Physical and Oceanographic Conditions
- 4.1.2 Water Quality
- 4.1.3 Air Quality
- 4.1.4 In-Air Acoustic Environment
- 4.1.5 Underwater Acoustic Environment

### **4.2 Biological Resources**

- 4.2.1 Wetlands and Waterbodies
- 4.2.3 Avian and Bat Species
- 4.2.4 Benthic Resources, Fishes, Invertebrates, and Essential Fish Habitat
- 4.2.5 Marine Mammals
- 4.2.6 Sea Turtles

### **4.3 Cultural Resources**

- 4.3.1 Marine Archaeological Resources

### **4.4 Socioeconomic Resources**

- 4.4.5 Recreation and Tourism
- 4.4.6 Commercial and Recreational Fishing
- 4.4.7 Marine Transportation and Navigation
- 4.4.8 Department of Defense and Outer Continental Shelf National Security Maritime Users
- 4.4.9 Marine Energy and Infrastructure
- 4.4.10 Aviation and Radar
- 4.4.11 Other Coastal and Marine Users
- 4.4.12 Public Health and Safety

## V. ENVIRONMENTAL & SOCIAL CONSIDERATIONS

### B. Describe how the utility is considering the social cost of carbon as a benefit or cost, as appropriate.

(Addresses requirement in Va. Code § 56-585.1 A 6.)

Response: The Company used the market-driven carbon price as a proxy for the social cost of carbon until a social cost of carbon has been determined by the Commission in a future proceeding. With respect to this Project, because offshore wind is a carbon-free resource, the Company considers the social cost of carbon to be a benefit. Specifically, this carbon-free resource displaces the output from fossil fuel-fired facilities and thus reduces carbon emissions.

To factor this benefit into its analysis, the Company assumed that the CVOW Commercial Project's carbon-free generation would displace PJM purchased power. It thus multiplied the Project's annual generation by the marginal carbon dioxide ("CO<sub>2</sub>") emissions intensity from the 2020 PJM Emission Report to determine how much carbon the Project would displace. It then multiplied that amount by the forecasted social cost of carbon published by the federal government to determine the social cost of carbon benefit for this Project. This was then added to the NPV results. See the Direct Testimony of Company Witness Glenn A. Kelly for more information.

**V. ENVIRONMENTAL & SOCIAL CONSIDERATIONS**

- C. Describe how the development of new, or expansion of existing, energy resources or facilities does not have a disproportionate adverse impact on historically economically disadvantaged communities.**

(Addresses requirements in Va. Code § 56-585.1 A 6; Va. Code § 2.2-234, *et seq.* (Virginia Environmental Justice Act))

Response: See the Company's Environmental Justice Report, which is included as part of the Environmental Routing Study filed with the Transmission Appendix, for a detailed explanation of the Company's consideration of populations within the Project study area that meet the Virginia Environmental Justice Act ("VEJA") definition of an environmental justice community, which is "any low-income community or community of color." It should be noted that the Environmental Justice Report was prepared pursuant to Va. Code § 2.2-234, the Virginia Environmental Justice Act.

Also see Attachment V.C, which contains section 4.4.2 of the COP, pertaining to environmental justice issues.

## **Generation Appendix Attachment V.C**

### **COP Section 4.4.2**

#### 4.4.2 Environmental Justice

This section provides an assessment of environmental justice (EJ) populations in the Onshore Project Area that could be affected by construction, operation, and decommissioning of the Project and the proposed Project-related measures adopted by Dominion Energy to avoid, minimize, and/or mitigate potential impacts to EJ populations. Other resources and recent assessments detailed within this COP that are related to EJ include:

- Air Quality (Section 4.1.3);
- In-Air Acoustic Environment (Section 4.1.4);
- Visual Resources (Section 4.3.4);
- Population, Economy, Employment and Housing and Property Values (Section 4.4.1);
- Land Transportation and Traffic (Section 4.4.4);
- Recreation and Tourism (Section 4.4.5);
- Commercial and Recreational Fishing (Section 4.4.6);
- Public Health and Safety (Section 4.4.12);
- Visual Impact Assessment (Appendix I); and
- Socioeconomics and Environmental Justice (Appendix EE, Environmental Justice report to be provided in Supplemental Filing).

In 1994, President Clinton signed Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, which requires each federal agency to account for EJ as part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. The Executive Order further stipulates that the agencies conduct their programs and activities in a manner that does not have the effect of excluding persons from participation in them, denying persons the benefits of them, or subjecting persons to discrimination because of their race, color, or national origin.

Identifying whether disproportionately high and adverse impacts on minority and/or low-income populations would occur typically involves two steps: first, identifying whether minority and/or low-income populations are present, and then if these types of populations are present, evaluating whether adverse human health or environmental effects would disproportionately affect the identified population or populations.

Guidelines provided by the Council for Environmental Quality (CEQ) (1997) and EPA (1998) indicate that a minority population may be defined as either: 1) where the minority population comprises more than 50 percent of the total population; and/or 2) where the minority population is meaningfully greater than the minority population in the general population of an appropriate benchmark region used for comparison.<sup>3</sup> Minority populations may consist of a group of individuals living in geographic proximity to one another, or a geographically dispersed set of individuals who would be similarly affected by the proposed action or

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<sup>3</sup> The benchmark region used for comparison is also referred to as the “reference community” (Federal Interagency Working Group 2016). The reference community for this analysis is the Commonwealth of Virginia.

program. Further, a minority population exists if there is “more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds (CEQ 1997).”<sup>4</sup> Definitions provided by the Virginia Environmental Justice Act use the term “population of color” and define a “community of color” as a distinct geographic area where the population of color measured as a percent of the total is higher than the population of color in the Commonwealth.<sup>5</sup> The Virginia Environmental Justice Act’s criteria has a lower threshold than the federal guidelines and, therefore, is used to identify potential minority populations in the following analysis. Using these criteria, if the minority percentage in a geographic area is anything above the Commonwealth average, the area is considered to have a potential minority population.

The CEQ and EPA guidelines indicate that low-income populations should be identified based on the annual statistical poverty thresholds established by the U.S. Census Bureau. Like minority populations, low-income populations may consist of individuals living in geographic proximity to one another, or a geographically dispersed set of individuals who would be similarly affected by the proposed action or program. The Virginia Environmental Justice Act defines low-income as “having an annual household income equal to or less than the greater of (i) an amount equal to 80 percent of the median income of the area in which the household is located, ... and (ii) 200 percent of the Federal Poverty Level.” The Act defines a “low-income community” as “any census block group in which 30 percent or more of the population is composed of people with low income.” These definitions are used to identify potential low-income populations in the following analysis.

Dominion Energy is committed to ensuring that communities have a meaningful voice in our planning and development processes. Communications and outreach to foster the meaningful public participation of potential environmental justice communities is ongoing to better understand how communities may be affected. A summary of the targeted outreach to communities of color and low-income populations that Dominion Energy has conducted to date is provided in Appendix EE, Environmental Justice Screening Report (ERM 2021). Further information on the engagement that Dominion Energy has been conducting is provided in Appendix L, Summary of Agency and Stakeholder Engagement.

### **Virginia Environmental Justice Policy**

In March 2020, as part of a larger effort to incorporate EJ into the decision-making of most state agencies, the General Assembly of Virginia passed two amendments to the Code of Virginia: one establishing the Virginia Environmental Justice Act, and the other permanently establishing the Virginia Council on Environmental Justice (the Council) (Virginia House Bill 704 / Senate Bill 406 and Virginia House Bill 1042 / Senate Bill 883) (VLIS 2020). The Virginia Environmental Justice Act states that it is the Commonwealth’s policy “to promote environmental justice and ensure that environmental justice is carried out throughout the Commonwealth.” The Council is established as an advisory council in the executive branch of state government. The purpose of the Council is to advise the Governor and “provide

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<sup>4</sup> Minority populations identified by the U.S. Census Bureau include Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and Other Race, which are considered races, and persons of Hispanic or Latino origin, which is considered an ethnicity.

<sup>5</sup> The Virginia Environmental Justice Act defines a “population of color” as “a population of individuals who identify as belonging to one or more of the following groups: Black, African American, Asian, Pacific Islander, Native American, other non-white race, mixed race, Hispanic, Latino, or linguistically isolated.”

recommendations that maintain a foundation of environmental justice principles intended to protect vulnerable communities from disproportionate impacts of pollution” (VLIS 2020).

Virginia is in the early stages of formalizing state-level agency approaches to addressing EJ. For example, in 2019, the VDEQ began to research options for developing a strategic approach to addressing EJ issues within its purview (VDEQ 2019). While the results of that effort are ongoing, VDEQ published an independent environmental justice study in October 2020 that provides recommendations to VDEQ on how to incorporate EJ goals into its regulatory authority. As such, Dominion Energy continues to monitor state agency regulations and guidance as the Commonwealth of Virginia moves forward with this mission.

#### 4.4.2.1 Affected Environment

For the purposes of this section, the broader Environmental Justice Study Area (the Study Area) is defined as the four cities that have the greatest potential to be directly affected by the construction, operation, and decommissioning of the Project (see Section 4.4.1, Population, Economy, Employment, Housing, and Public Services). In addition, as explained below, the following analysis also includes a more detailed review of the census block groups that either include or are located within 1 mile of Project facilities.

According to the most recent Census estimates, almost two-thirds (62 percent) of the population of Virginia is White. The Black or African American population was identified as the largest minority group, accounting for about 19 percent of the total population (Table 4.4-9). The White share of the population in Virginia Beach was very similar to the state average (61.7 percent and 61.8 percent, respectively), with the corresponding percentages in the other three Study Area cities ranging from about 38 percent (Portsmouth) to 57 percent (Chesapeake). The total minority percentage of the population in Virginia Beach and Chesapeake is less than 50 percent and less than the state average and, therefore, the populations in these two cities do not meet the definition of a minority population. Potential minority populations exist in the other two cities within the Study Area (Norfolk and Portsmouth) because the total minority share of the population is greater than 50 percent in both cases (Table 4.4-9). However, while these cities are part of the Study Area, they do not contain any Project facilities and would not be directly affected by the Project.

**Table 4.4-9. Race, Ethnicity, and Poverty by State and City**

Geographic Area	Total Population	Percent of Total						Total Minority c/
		White a/	Black or African American a/	Hispanic or Latino	Asian	Native American and Alaska Native	Other Race a/ b/	
<b>Virginia</b>	<b>8,454,463</b>	<b>61.8</b>	<b>18.8</b>	<b>9.4</b>	6.3	0.2	3.5	<b>38.2</b>
Virginia Beach	450,201	61.7	18.4	8.2	6.6	0.2	4.9	38.3
Chesapeake	239,982	57.4	29.3	6.2	3.1	0.1	3.9	42.6
Norfolk	244,601	43.4	40.5	8.0	3.5	0.3	4.2	56.6
Portsmouth	95,097	37.7	52.2	4.5	1.4	0.4	3.9	62.3

Source: USCB 2021a

a/ Non-Hispanic only. The Federal Government considers race and Hispanic/Latino origin (ethnicity) to be two separate and distinct concepts. People identifying as Hispanic or Latino origin may be of any race. The data summarized in this table present Hispanic/Latino as a separate category.

b/ The “Other Race” category presented here includes census respondents identified as Native Hawaiian and Other Pacific Islander, Two or More Races, or Some Other Race.

c/ The total minority population is the sum of the Black or African American, Hispanic or Latino, Asian, Native American and Alaska Native, and Other Race categories shown here.

Table 4.4-10 presents median household income and the share of the population with income less than 200 percent of the federal poverty level for Virginia and the four cities in the Study Area. Median household income was higher than the state median in Virginia Beach and Chesapeake, and less than 30 percent of the populations in these cities had income below 200 percent of the federal poverty level, and therefore, the populations in these two cities do not meet the definition of a low-income population. Potential low-income populations exist in the other two Study Area cities (Norfolk and Portsmouth), because median household income is less than 80 percent of the state median and the share of the population with income below 200 percent of the federal poverty level in both cities was greater than 30 percent. However, as noted above, neither of these cities would be directly affected by the Project.

**Table 4.4-10. Median Household Income and Poverty by State and City**

Geographic Area	Total Population	Median Household Income		Income Below Poverty Level (%) b/
		Dollars a/	Percent of State Median	
<b>Virginia</b>	<b>8,454,463</b>	<b>74,222</b>	<b>100</b>	<b>25</b>
Virginia Beach	450,201	76,610	103	20
Chesapeake	239,982	78,640	106	21
Norfolk	244,601	51,590	70	39
Portsmouth	95,097	52,175	70	37

Sources: USCB 2021b, 2021c

a/ Median household income is for the past 12 months expressed in 2019 inflation-adjusted dollars.

b/ These estimates represent the share of the population with income less than 200 percent of the federal poverty level.

Larger and more populated geographic areas may have the effect of “masking” or “diluting” the presence of concentrations of minority and/or low-income populations (CEQ 1997; EPA 1998). Therefore, data was also reviewed separately for the 46 census block groups that either contain and/or are located within 1 mile of Onshore Project Components and infrastructure (Figure 4.4-6). A census block group is a statistical subdivision of a census tract, generally defined to contain between 600 and 3,000 people and 240 and 1,200 housing units. Nineteen census block groups contain or are crossed by Onshore Project Components and infrastructure; the remaining 27 census block groups considered do not contain Onshore Project Components and infrastructure but are located within 1 mile.

This review identified 14 census block groups where the total minority population was more than the statewide average (the reference community), with total shares ranging from 40 percent to 69 percent (Table 4.4-11). Five of these census block groups contain Project components and infrastructure; the remaining nine census block groups are within 1-mile. Six census block groups were identified as potential low-income populations because the share of the population in these areas with income less than 200 percent of the federal poverty level exceeded 30 percent. In addition, median household income in two of these census block groups was less than 80 percent of the state median. The six block groups with potential low-income populations are located within 1 mile; none contain Project components and infrastructure. The 18 block groups with potential EJ populations are highlighted in Figure 4.4-7. Note that the population in two of these block groups met both the minority and low-income definitions (Table 4.4-11). As discussed above, only five of the 18 block groups contain Project components and infrastructure; the remaining 13 block groups are within 1 mile.



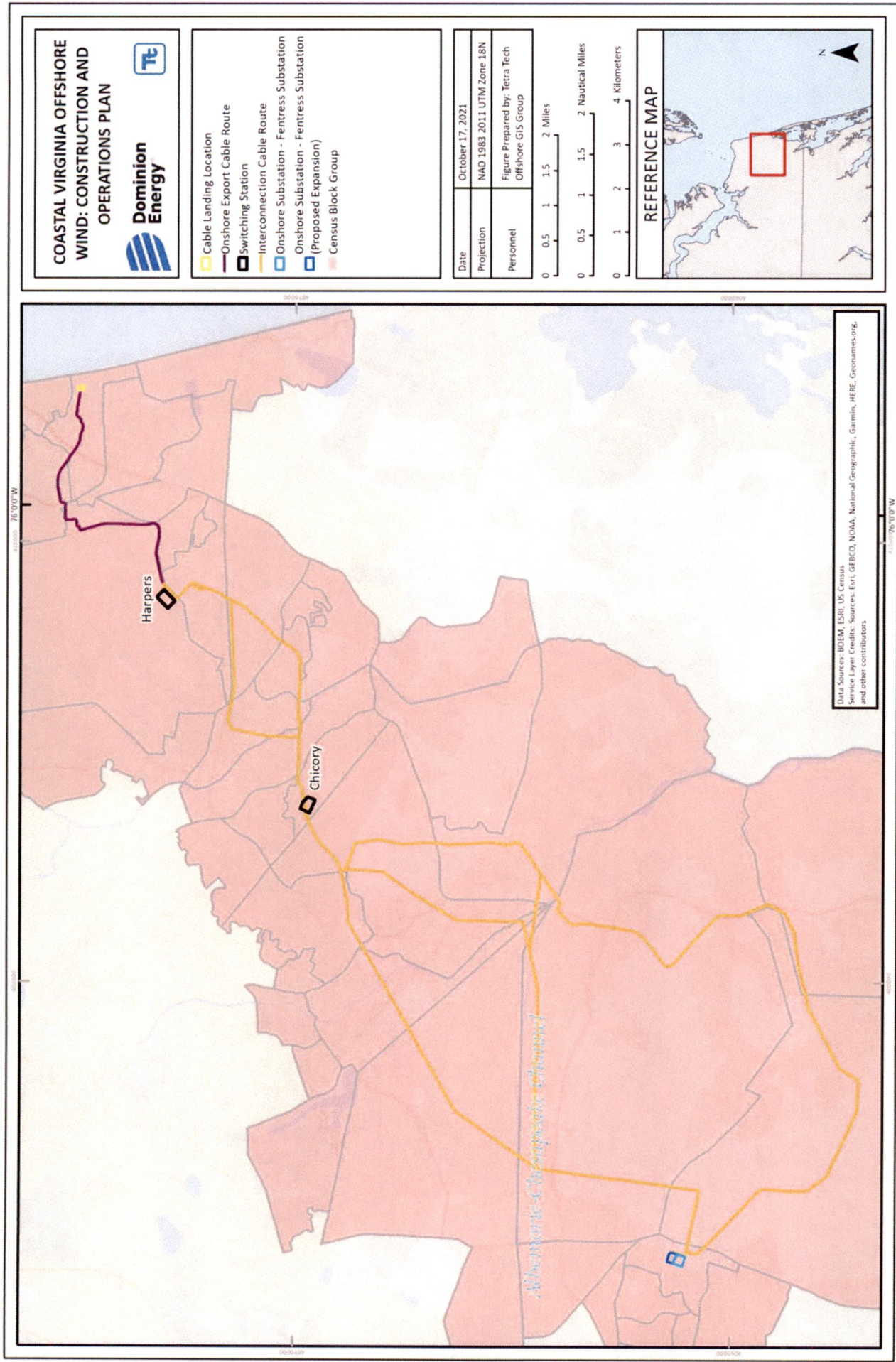


Figure 4.4-6. Environmental Justice Study Area: Census Block Groups Containing Project Facilities and Infrastructure

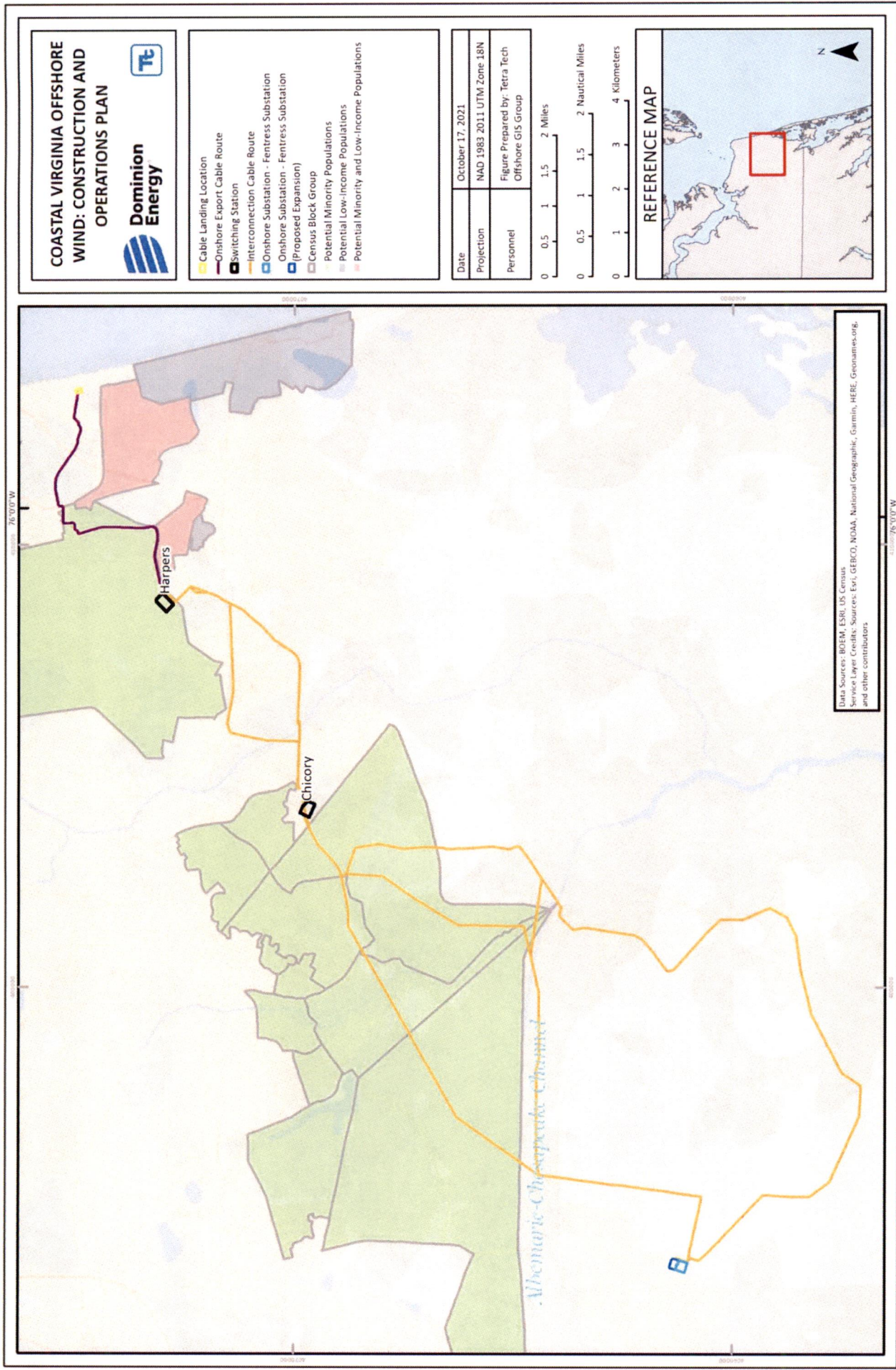


Figure 4.4-7. Potential Environmental Justice Populations

**Table 4.4-11. Potential Minority and Low-Income Populations by Census Block Group**

Geographic Area a/ b/	Total Minority Population (Percent) c/	Income Below Poverty Level (Percent) d/ e/
Virginia	38%	25%
<b>Census Block Groups Crossed by Onshore Project Components</b>		
Block Group 1, Census Tract 450	42%	0%
Block Group 2, Census Tract 454.23	55%	9%
Block Group 1, Census Tract 460.15	54%	5%
Block Group 1, Census Tract 460.16	42%	8%
Block Group 3, Census Tract 208.04	43%	20%
<b>Census Block Groups within 1-mile of Onshore Project Components (not crossed)</b>		
Block Group 1, Census Tract 440.03	14%	33%
Block Group 3, Census Tract 442	9%	31%
Block Group 2, Census Tract 452 *	43%	44%
Block Group 3, Census Tract 452	27%	72%
Block Group 4, Census Tract 454.06	69%	7%
Block Group 1, Census Tract 454.08 *	41%	30%
Block Group 2, Census Tract 454.08	37%	35%
Block Group 2, Census Tract 454.22	40%	16%
Block Group 2, Census Tract 460.15	43%	8%
Block Group 4, Census Tract 460.15	47%	14%
Block Group 1, Census Tract 462.16	47%	15%
Block Group 2, Census Tract 462.16	43%	3%
Block Group 2, Census Tract 462.17	61%	10%

Sources: USCB 2021a, 2021b, 2021c

a/ This table presents the results of a review of 37 census block groups. Data are only presented for those block groups identified as potential minority or low-income populations. Block Group 3, Census Tract 3208.04 is located in Chesapeake; all of the other block groups identified in this table are in Virginia Beach.

b/ Shaded cells identify the measures for each block group that indicate the potential presence of a minority and/or low-income population.

c/ The Commonwealth of Virginia is the reference community for this analysis. Census block groups with total minority populations that are higher than the state average are considered potential minority populations. See Table 4.4-9, footnote d/ for the definition of Total Minority Population used in this analysis.

d/ These estimates represent the share of the population with income less than 200 percent of the federal poverty level. Census block groups in which 30 percent or more of the population have income less than 200 percent are considered potential low-income populations.

e/ Block groups where median household income is less than 80 percent of the state median (the other low-income measure identified in the Virginia Environmental Justice Act) are identified by an asterisk.

#### 4.4.2.2 Impacts Analysis for Construction, Operations and Maintenance, and Decommissioning

##### Construction

During construction, the potential impact-producing factors to EJ populations may include short-term increases in Project-related construction vehicle traffic and activity as well as short-term increases in employment. Dominion Energy proposes to implement measures, as appropriate, to avoid, minimize, and mitigate impacts during Project construction. The following impacts may occur as a consequence of the factors identified above:

- Short-term increase in construction vehicle traffic and activity;
- Temporary shortage of affordable temporary housing due to increased demand;
- Short-term increase in tax revenues for state and local governments;
- Short-term increase in construction-related employment and income in the region and state; and
- Short-term increase in the demand for public services.

**Short-term increase in construction vehicle traffic and activity.** As discussed in Section 4.4.4, Land Transportation and Traffic, an increase in Project-related construction, support, and workforce vehicle traffic along the Onshore Export Cable Route and Interconnection Cable Routes, and to and from the Switching Station and Onshore Substation sites, and to and from the port is anticipated during construction. During this time, nearby communities, including potential EJ populations, would experience an increase in construction-related activities, including a short-term increase in construction-related noise and equipment emissions. The Project would use existing roads, ROWs, and infrastructure where possible; therefore, new impacts resulting from construction activities would be minimized to the extent practicable and are anticipated to be similar in nature to other utility or road improvement works carried out in these locations. Potential public health impacts from the construction stage are discussed in Section 4.4.12, Public Health and Safety, including accidental release of hazardous material. Air quality impacts from Project-related vehicle traffic are discussed in Section 4.1.3, Air Quality. Avoidance, minimization, and mitigation measures proposed to reduce these potential impacts are summarized below. These activities are not expected to have disproportionately high and adverse impacts on the potential EJ populations identified in Table 4.4-11 and Figure 4.4-7.

In addition, construction activities have the potential to affect recreational and/or commercial fishing in the Offshore Project Area, including recreational or commercial fishing by EJ populations. Potential short-term impacts include displacement of fishing activity, disturbance to local commercial fish species, risk of gear entanglements on partially installed structures, and increases in vessel traffic. These potential impacts are discussed in Section 4.4.6, Commercial and Recreational Fishing, which also discusses measures to avoid, minimize, and mitigate these potential impacts.

**Temporary shortage of affordable temporary housing due to increased demand.** As discussed in Section 4.4.1, Population, Economy, Employment, Housing, and Public Services, the temporary relocation of workers to the Onshore Project Area could result in a temporary increase in demand for housing resources during the construction stage. Workers temporarily relocating to the area would likely seek a range of temporary accommodations, including rental housing (e.g., houses, apartments, mobile homes), hotel/motel rooms, and RV parks/campgrounds, as well as other special living situations such as temporarily living units and spare bedrooms. Approximately 2,400 housing units were identified as available for rent in Virginia Beach in 2018, for example, with an additional 4,600 units available in the other three cities in the Socioeconomics Study Area (Table 4.4-3). Given the number of available units, it is unlikely that the short-term demand from workers temporarily relocating to the area would be greater than the available number of temporary housing units or result in a shortage of affordable temporary housing.

**Short-term increase in tax revenues for state and local governments.** As discussed in Section 4.4.1, Population, Economy, Employment, Housing, and Public Services, from 2020 to 2026, Project construction would generate an estimated total of \$41.7 million in tax revenues for state and local governments, with

\$20.4 million in state taxes, \$10.8 million in local taxes in the Hampton Roads area, and \$10.5 million in local taxes elsewhere in Virginia. State and local tax revenues fund many programs that may aid EJ populations. This impact would be beneficial and temporary.

**Short-term increase in construction-related employment and income in the region and state.** As discussed in Section 4.4.1, Population, Economy, Employment, Housing, and Public Services, construction-related expenditures would support total (direct, indirect, and induced) employment estimates of 3,946 job-years in Hampton Roads and 6,360 job-years in Virginia. Construction-related expenditures would also support an estimated total of \$229 million (direct, indirect, and induced) in labor income in the Hampton Roads area and \$398 million in Virginia. Jobs and income would be supported throughout the local and regional economy, including positions occupied by potential EJ populations. Construction-related employment and income impacts would be beneficial and temporary.

**Short-term increase in the demand for public services.** As discussed in Section 4.4.1, Population, Economy, Employment, Housing, and Public Services, the increased workforce and associated construction activities would likely result in an increased demand for public services, including police, fire, healthcare, and educational services. The Study Area contains numerous law enforcement stations, fire departments, hospitals, and public schools, and is thus equipped with sufficient capacity such that the Project would not impact the availability of public services. The provision of public services to EJ populations is not expected to be adversely or disproportionately affected. Dominion Energy would coordinate with local fire and police departments as needed throughout construction of the Project. The Project would use existing roads, ROWs, and infrastructure where possible.

### **Operations and Maintenance**

During O&M, the potential impact-producing factors to EJ populations may include long-term presence of new fixed structures, long-term increases in O&M related vehicle traffic, as well as long-term increases in employment. Dominion Energy proposes to implement measures, as appropriate, to avoid, minimize, and mitigate impacts during Project O&M. The following impacts may occur as a consequence of the factors identified above:

- Decrease in availability of affordable long-term housing due to in-migration of operations workers;
- Long-term presence of new fixed structures in the Lease Area;
- Long-term presence of new fixed structures onshore;
- Increase in O&M-related vehicle traffic;
- Long-term increase in local and regional government tax revenues;
- Long-term increase in O&M-related employment and income in the region; and
- Long-term increase in the demand for public services.

**Decrease in availability of affordable long-term housing due to in-migration of operations workers.** As discussed above in Section 4.4.1, Population, Economy, Employment, Housing, and Public Services, the Project would employ an estimated 200 permanent operations workers, some of whom would likely relocate to the vicinity of the Onshore Project Area. The permanent relocation of this in-migrating workforce is not expected to noticeably affect local housing markets because there were more than 4,000 vacant housing units that were for rent or sale in Virginia Beach in 2018 (Table 4.4-3).

**Long-term presence of new fixed structures in the Lease Area.** The presence of new fixed Offshore Project Components within the Lease Area has the positive beneficial potential to attract new and/or additional marine users to the area. The WTGs may create a new demand for sightseeing trips and charter tours (Section 4.4.5, Recreation and Tourism). It is also expected that the WTGs and Offshore Substations may alter marine recreational usage as they present new navigational hazards.

It is possible that the Offshore Project Area would be used for recreational and/or commercial fishing by EJ populations. Commercial and recreational fishing would continue to be feasible during Project operation. In addition, Dominion Energy has attempted to site the Offshore Project Area where it would have the least impact on commercial and recreational fishing. Further, the addition of new fixed substrates (WTGs and scouring) would facilitate artificial reef building which may result in increases in the abundances for some species. We anticipate this may result in benefits for the certain commercial or recreational fisheries in the area (see Section 4.4.6, Commercial and Recreational Fishing, for additional information).

Section 4.3.4, Visual Resources, identifies those areas where the proposed WTGs could potentially be visible. The visual presence of offshore WTGs is not expected to have disproportionately high and adverse impacts on the potential EJ populations identified in Table 4.4-11 and Figure 4.4-7.

**Long-term presence of new fixed structures onshore.** The Switching Station would be constructed on a parcel north of Harpers Road or north of Princess Anne Road. The Switching Station site north of Harpers Road (Harpers Switching Station) is located in a Census block group with a potential minority population (Block Group 1, Census Tract 450; see Figure 4.4-7 and Table 4.4-11). The Switching Station site north of Princess Anne Road (Chicory Switching Station) is located in a Census block group that does not meet the criteria used to identify potential minority or low-income populations (Figure 4.4-7). The Switching Station would be constructed in an area where there were previously no structures and would generate some operational noises. Potential related impacts are discussed in Section 4.1.4, In-Air Acoustic Environment and Section 4.3.4, Visual Resources. These potential impacts are not expected to have disproportionately high and adverse impacts on the potential EJ populations identified in Table 4.4-11 and Figure 4.4-7. Other new fixed structures onshore include those related to the onshore transmission line. The potential impacts of the transmission line are presently being evaluated with six alternative routes currently under consideration (see Figure 4.4-6 and Figure 4.4-7). The current set of route alternatives reflects the results of public outreach to date, and communication and outreach with potential environmental justice communities is ongoing to better understand how communities may be affected (see Appendix EE and Section 4.4.2.3).

**Increase in O&M-related vehicle traffic.** A small increase in Project-related vehicle traffic around the Onshore Project Area and O&M facilities is anticipated during the O&M stage. The number of workers transiting to the onshore facilities is anticipated to be low. None of this traffic is expected to add a noticeable increase to existing traffic congestion or air emissions (see Section 4.1.3, Air Quality and Section 4.4.4, Land Transportation and Traffic) or result in disproportionately high and adverse impacts on the potential EJ populations.

**Long-term increase in local and regional government tax revenues.** As discussed in Section 4.4.1, Population, Economy, Employment, Housing, and Public Services, O&M associated with the Project would generate an estimated \$10.6 million in annual tax revenues for the state and local governments, with an

estimated \$4.8 million paid to the Commonwealth of Virginia and \$5.8 million paid to local governments in the Hampton Roads area and elsewhere in Virginia. State and local tax revenues fund many programs that may aid EJ populations. This potential impact would be long-term and beneficial.

**Long-term increase in O&M-related employment and income in the region.** As discussed in Section 4.4.1 Population, Economy, Employment, Housing, and Public Services, O&M associated with the Project would support an annual total of 1,110 jobs and \$81.6 million in labor income in the Hampton Roads area each year the facility is in operation. Jobs and income would be supported throughout the local and regional economy, including positions occupied by potential environmental justice populations. These potential impacts would be small and beneficial.

**Long-term increase in the demand for public services.** As discussed in Section 4.4.1, Population, Economy, Employment, Housing, and Public Services, the slight increase in workforce and operations activities would likely result in a correspondingly small increase in demand for public services. The four cities in the Study Area contain numerous law enforcement stations, fire departments, hospitals, and public schools, and is thus equipped with sufficient capacity such that O&M associated with the Project would not impact the availability of public services. Dominion Energy would coordinate with local fire and police departments as needed throughout the operations period of the Project. As a result, this anticipated increase in demand is unlikely to create a shortage of public services available to EJ populations.

### Decommissioning

Impacts resulting from decommissioning of the Project are expected to be similar to or less than those experienced during construction. Decommissioning techniques are further expected to advance during the lifetime of the Project. A full decommissioning plan will be provided to the appropriate regulatory agencies for approval prior to decommissioning activities, and potential impacts will be re-evaluated at that time.

#### 4.4.2.3 Summary of Avoidance, Minimization, and Mitigation Measures

Dominion Energy proposes to implement the following measures to avoid, minimize, and mitigate the potential impact-producing factors described (Table 4.4-12). Dominion Energy would continue discussion and engagement with the appropriate regulatory agencies and environmental non-governmental organizations throughout the life of the Project to develop an adaptive mitigation approach that provides the most flexible and protective mitigation measures.

**Table 4.4-12. Summary of Avoidance, Minimization, and Mitigation Measures**

Project Stage	Location	Impact	Avoidance, Minimization and Mitigation
Construction; Decommissioning	Onshore Project Area	Short-term increase in construction vehicle traffic and activity	<ul style="list-style-type: none"> <li>• Dominion Energy would coordinate with local fire and police departments as needed throughout construction of the Project; and</li> <li>• The Project would use existing roads, rights-of-way, and infrastructure where possible.</li> <li>• Communications and outreach to foster the meaningful public participation of potential</li> </ul>
		Temporary shortage of affordable temporary housing due to increased demand	
		Short-term increase in tax revenues for state and local governments	

Project Stage	Location	Impact	Avoidance, Minimization and Mitigation
		Short-term increase in construction-related employment and income in the region and state	EJ communities is ongoing to better understand how communities may be affected and identify related mitigation measures.
		Short-term increase in the demand for public services	
Operations and Maintenance	Onshore and Offshore Project Area	Decrease in availability of long-term housing due to in-migration of operations workers	<ul style="list-style-type: none"> <li>• Dominion Energy has attempted to site the Offshore Project Area where it would have the least impact on commercial fishing. Further, the addition of Offshore Project Components (WTGs and scouring) would facilitate natural reef building which can increase overall species abundance and diversity. This may have positive benefits for the fishing industries in the area;</li> <li>• Dominion Energy is committed to coexistence with commercial and recreational fishing and is conducting extensive outreach and engagement with the fishing community as part of this Project, which will assist in identifying additional environmental justice populations that may rely on the Offshore Project Area for fishing and who may require additional engagement; and</li> <li>• Dominion Energy would coordinate with local fire and police departments as needed throughout the operations period of the Project.</li> </ul>
		Long-term presence of Offshore Project Components in the Lease Area (e.g., wind turbine generators [WTGs] and Offshore Substations)	
		Long-term presence of Onshore Project Components	
		An increase in operations and maintenance (O&M)-related vehicle traffic	
		Long-term increase in local and regional government tax revenues	
		Long-term increase in O&M-related employment and income in the region	
		Long-term increase in the demand for public services	



## V. ENVIRONMENTAL & SOCIAL CONSIDERATIONS

### D. Describe how the proposed project is consistent with [1] the Commonwealth's renewable portfolio standards and carbon reduction requirements, and [2] the promotion of new renewable generation resources.

(Provides information to support the Commission's requirement to give due consideration for such factors pursuant to Va. Code § 56-585.1:11 C 1(a) and (b). Addresses requirements of Va. Code § 56-585.5 C.)

Response: See the Company's response to Generation Appendix Section II.B.

The CVOW Commercial Project is consistent with the Commonwealth's renewable portfolio standard and carbon reduction requirements as it will contribute 2,587 MW of carbon-free energy to the Company's generation mix. This electric generation brings the Company closer to meeting its statutory requirement of producing 100% clean electricity by 2045.

The VCEA requires the development of significant amounts of renewable energy generation in the Commonwealth, including offshore wind, and sets annual requirements for the sale of renewable energy. The CVOW Commercial Project is vital to compliance with these requirements as it also meets customers' capacity and energy needs. The Project will produce RECs that the Company will use to meet its annual RPS Program requirements. These contributions will be significant. In 2030, for example, the Project is expected to contribute approximately 47% of the required RECs for that year.

The CVOW Commercial Project is consistent with the public policy objectives of the VCEA to promote the construction and development of new renewable resources in the Commonwealth. The CVOW Commercial Project, in combination with other carbon-free resources such as nuclear, solar, and energy efficiency, are required to support the Company's continued efforts to reduce regional CO<sub>2</sub> emissions and promote fuel diversity by avoiding overreliance on any single fuel commodity.

See the Direct Testimony of Company Witness Glenn A. Kelly for more a more detailed discussion of this issue.

## **VI. ECONOMIC DEVELOPMENT BENEFITS**

- A. Demonstrate the economic development benefits within the Commonwealth, including capital investments and job creation.**

**Provide an economic development plan that includes the following considerations:**

- (i) options for utilizing local workers;**
- (ii) the economic development benefits of the project for the Commonwealth, including capital investments and job creation;**
- (iii) consultation with the Commonwealth's Chief Workforce Development Officer, the Chief Diversity, Equity, and Inclusion Officer, and the Virginia Economic Development Partnership, on opportunities to advance the Commonwealth's workforce and economic development goals, including furtherance of apprenticeship and other workforce training programs; and**
- (iv) giving priority to the hiring, apprenticeship, and training of veterans, as that term is defined in § 2.2-2000.1, local workers, and workers from historically economically disadvantaged communities.**

**Show that the Project demonstrates the economic development benefits within the Commonwealth, including capital investments and job creation. A utility may give appropriate consideration to suppliers and developers that have demonstrated successful experience in offshore wind.**

(Addresses Va. Code § 56-585.1:11 D and Va. Code § 56-585.1:11 E(iii). Provides information to support the Commission's requirement to give due consideration for economic development benefits for the Commonwealth, including capital investments and job creation pursuant to Va. Code § 56-585.1:11 C 1(c).)

Response: See Attachment VI.A for the Company's Economic Development Plan.

ATTACHMENT VI.A  
ECONOMIC DEVELOPMENT PLAN

**I. Introduction**

Virginia Electric and Power Company (“Dominion Energy Virginia” or the “Company”) submits this Offshore Wind Economic Development Plan (“Plan”) pursuant to Virginia Code § 56-585.1:11 D, which requires that:

In constructing any such facility contemplated in subsection B, the utility shall develop and submit a plan to the Commission for review that includes the following considerations: (i) options for utilizing local workers; (ii) the economic development benefits of the project for the Commonwealth, including capital investments and job creation; (iii) consultation with the Commonwealth’s Chief Workforce Development Officer, the Chief Diversity, Equity, and Inclusion Officer, and the Virginia Economic Development Partnership on opportunities to advance the Commonwealth’s workforce and economic development goals, including furtherance of apprenticeship and other workforce training programs; (iv) giving priority to the hiring, apprenticeship, and training of veterans, as that term is defined in § 2.2-2000.1, local workers, and workers from historically economically disadvantaged communities; and (v) procurement of equipment from Virginia-based or United States-based manufacturers using materials or product components made in Virginia or the United States, if reasonably available and competitively priced.

Since the Virginia Clean Economy Act (the “VCEA” or “the Act”) became effective on July 1, 2020, Dominion Energy Virginia has worked to implement the hiring and economic development objectives of the law with respect to the Coastal Virginia Offshore Wind Commercial Project (“CVOW Commercial Project” or “Project”). The Company’s approach was twofold: 1) understand the magnitude of economic benefits, including job creation and state and local tax revenue, that would accrue from construction and operation of a 2,500 MW offshore wind installation off the Virginia coast; and 2) identify and engage strategic partners with the capability and resources to support Dominion Energy Virginia’s efforts to achieve the Act’s objectives. While the Act’s plan requirements appear to limit the focus on a plan related to “constructing” an offshore wind facility, the Company’s Plan embraces a more comprehensive approach that also includes the longer-term operation of these facilities, as the discussion below illustrates.

In short, the Plan focuses on fostering and leading widespread and ongoing community, workforce, business/industry, governmental, and stakeholder outreach and engagement, with the goal of obtaining business, training, and hiring commitments and actions from key actors related to the Project and the offshore wind industry (*i.e.*, supply chain) in Virginia. Dominion Energy Virginia is cognizant, of course, as all should be, that its actions alone under this Plan will not produce the desired economic development and jobs impacts desired; it will require actions from all of the groups, and individuals therein, to work collectively to achieve the Commonwealth’s policies, as outlined in Virginia Code § 56-585.1:11 D, and our shared goals. Of note, the offshore wind industry is nascent in the United States. Thus, the Company views a key goal of this Plan as

working to develop a strong base to build and train an industry and workforce that, for many aspects of offshore wind construction and operation, does not currently exist. Nevertheless, consistent with the economic development and jobs studies referenced below, the Company believes that the actions it has taken to date under and consistent with this Plan, and those it plans to continue to undertake thereunder, will catalyze and lead to positive economic development and jobs results in Virginia during the construction of the Project, and beyond.

This Plan's approach is to take, and work to develop with stakeholders, actions focused on three pillars to achieve the Commonwealth's policy goals of prioritizing the hiring, apprenticeship, and training of veterans, local workers, and workers from historically economically disadvantaged communities, advancing economic development benefits for the Commonwealth, and seeking procurement of equipment from Virginia and U.S. suppliers:

- **Economic Development:** attracting businesses to be part of a larger offshore wind development and supply chain hub in Virginia that can serve the CVOW project in construction and long-term operation;
- **Fostering Supply Chain Readiness:** engaging and preparing existing Virginia businesses to participate in the offshore wind supply chain; and
- **Workforce Development:** collaborating with Virginia's educational institutions and unions to ensure curricula and apprenticeships support training the offshore wind workforce, and engaging community organizations for outreach to individuals interested in a career in offshore wind.

Virginia's business-friendly climate, the competitive advantages of the Port of Virginia, well-established maritime industry and workforce, and excellent educational institutions position the Commonwealth as an optimal East Coast location for the burgeoning domestic offshore wind industry. These advantages are important factors that complement the Company's approach to helping to attract offshore wind providers to Virginia and creating a robust locally based offshore wind supply chain, which would lead to the generation of economic benefits and creation of offshore wind industry jobs for Virginians as a result of the CVOW Commercial Project.

Therefore, the Company's efforts have led to the formation of collaborative relationships with a wide array of public, private, and governmental organizations. These include state and local economic development organizations, as well as workforce development institutions and agencies, to maximize the economic development benefits, including capital investment and job creation, from the construction and operation of the CVOW Commercial Project.

The remainder of this Plan expounds on these relationships and the outreach and engagement undertaken by the Company with business and community stakeholders. The total number of business and community engagement events and the level of stakeholder participation has been substantial. Since December 2020, working with its strategic partners, the Company has participated in a total of 153 stakeholder meetings and engagement events involving more than 3,500 participants, as shown in the following figure.

Time Period	Events/Mtgs by Category	Number of Participants
Dec 2020	Regional B2B Events	394
Feb through Sep 2021	Supplier and Workforce Topical Forums	1096
Aug 2021	Bus Network for Offshore Wind International Partnering Forum	500
June & Sep 2021	Hiring Roundtables	53
Jan through Sep 2021	Various Other Engagement Events/Meetings	1489
	<b>TOTAL</b>	<b>3,532</b>

## II. Plan Details

### A. Economic Development Benefits (addresses Va. Code § 56-585.1:11 D (ii))

The Hampton Roads Alliance (“HRA”) is a leading collaborator in the effort to build the offshore wind supply chain to support, not only the CVOW Commercial Project, but the other offshore wind projects under development along the East Coast. In July 2020, HRA announced a new initiative to support the development of a comprehensive supply chain to serve the East Coast offshore wind industry. This HRA effort has been facilitated by a Virginia Department of Housing & Community Development *GO Virginia* grant of more than \$520,000 that will fund the first two years of the program.<sup>1</sup>

One of HRA’s initial objectives was to assess the economic potential that could result from the construction and operation of the CVOW Commercial Project. To do so, it commissioned Glen Allen-based Mangum Economics to conduct an economic impact study of the Project.<sup>2</sup> The report of that study (“Mangum Report”) estimates that, from 2020 through the end of 2026, the Project will support about 900 direct and indirect Virginia jobs annually, with almost \$57 million in pay and benefits, and over \$143 million in economic output, generating almost \$2 million in revenues for local governments in the Hampton Roads area, and an additional \$3 million in Virginia state tax revenues.

The Mangum Report also estimates that beginning in 2027, once the CVOW Commercial Project is operational, the annual operation and maintenance of the Project will support over 1,100 direct and indirect jobs annually in Hampton Roads, generating almost \$82 million in pay and benefits and spurring almost \$210 million in economic output. The Mangum Report further estimates that the operations and maintenance activities associated with the CVOW Commercial Project will generate almost \$6 million in revenues for local governments in the Hampton Roads area, and an additional \$5 million in Virginia state tax revenues on an annual basis.

The Mangum Report concludes that given the advantages of the port areas in Hampton Roads, it is reasonable to anticipate that new businesses will ultimately locate in Hampton Roads to serve a growing domestic offshore wind energy industry. To the extent businesses in Hampton Roads

<sup>1</sup> <https://hamptonroadsalliance.com/news/alliance-announces-offshore-wind-supply-chain-development-initiative/> (all websites cited herein were last visited Oct. 25, 2021).

<sup>2</sup> Mangum Economics, *Potential Impact of the Development of the Offshore Wind Energy Industry on Hampton Roads and Virginia*, September 28, 2020 (“Mangum Report”) (available at [Offshore-Wind-Economic-Impact-Report-092820.pdf](#) (hamptonroadsalliance.com)).

cultivate industry-specific expertise and supply chain manufacturing businesses locate in the area, Hampton Roads would be uniquely positioned to support offshore wind development elsewhere along the East Coast. The Mangum Report estimates that every gigawatt of new offshore wind energy supported by Hampton Roads businesses will result in about 5,200 direct and indirect Virginia jobs annually (almost all in Hampton Roads) and about \$270 million in accompanying pay and benefits. Each gigawatt of offshore wind supported is estimated to produce about \$740 million in overall economic output, generating about \$21 million in revenues for Hampton Roads jurisdictions and an additional \$18 million in Virginia state tax revenues.

A summary of the economic development benefits projected in the Mangum Report is detailed in the below table.<sup>3</sup>

<b>Statewide Total Economic Activity from CVOW Commercial Project</b>				
	<b>Total Jobs</b>	<b>Pay (\$M)</b>	<b>Taxes (\$M)</b>	<b>Output (\$M)</b>
<b>Annualized Construction</b>	909	57	4.4	143
<b>Annual Operation</b>	1,110	82	10.6	210

Source: Mangum Economics, September 2020

HRA is also leading a Supply Chain Development Committee as part of the Commonwealth Offshore Wind Task Force, which was formed in partnership with Old Dominion University to align, enable, and accelerate actions to advance Virginia as a leader in the offshore wind industry. The Supply Chain Development Committee includes statewide representation and is chaired by Doug Smith, President and CEO of the Hampton Roads Alliance. The purpose of the Committee is to guide activities that can help establish Virginia as a hub of the domestic offshore wind industry. As an active member of the Committee, the Company is in a unique position to share information that not only aligns the needs and objectives of the Project, but also of the offshore wind industry, with economic development and business organization leaders from across Virginia.

Additional information regarding economic development and plans for capital investment in Virginia is provided below.

**B. Virginia (local) Workforce & Hiring (addresses Va. Code § 56-585.1:11 D (i), (iii), and (iv))**

As a foundational project, the CVOW Commercial Project offers a unique opportunity that positions Virginia to become the leading offshore wind supply chain hub capable of supporting the construction and operations for U.S. East Coast offshore wind projects. The Project serves as a catalyst to hire and train the initial wave of the offshore wind workforce to meet the needs of the Company and the creation of a Virginia supply chain.

Dominion Energy Virginia is working diligently, in collaboration with Virginia's workforce agencies and organizations as well as primary and secondary educational institutions, and the North America's Building Trade Unions ("NABTU") and NABTU's state affiliate, Virginia

<sup>3</sup> This data is based on data from Table 19, p. 14 in the Mangum Report.

Building Trades (“VBT”) (collectively referred to as “Unions”) to attract local workers and students who will make up the clean energy workforce of tomorrow. The goal is to enable Virginia’s workforce development and educational partners to leverage existing curricula and, where needed, develop programs to fill gaps and prepare Virginia’s students and workers for this new industry. Through these relationships, the Company is sharing the range of job roles that will be needed to support the CVOW Commercial Project. This outreach was informed by a July 2021 analysis commissioned by HRA from XODUS Consulting (“XODUS Report”),<sup>4</sup> which provides recommendations for advancing an offshore wind supply chain hub based in Hampton Roads.

## 1. Jobs Classification Guide

The XODUS Report includes a jobs classification guide (“XODUS Jobs Classification Guide”) that details:

- job roles by offshore wind project component;
- training, certification or experience necessary for the roles; and
- job categories and project timeline.

In recognition that supply chain hiring will provide many of the opportunities for Virginia workers to transition into the offshore wind workforce, the Company and HRA have shared the XODUS Jobs Classification Guide with the companies that compose the potential Virginia supply chain to ensure they have an appreciation of and can plan for the training and skills their workers will need to participate in the emerging offshore wind industry. As Dominion Energy Virginia contracts for the Project, it plans to engage with the major equipment suppliers to identify the scopes of work that the suppliers plan to execute using the Virginia supply chain. When these scopes of work are known, the Company will engage with economic development authorities, business trade organizations, and businesses to educate them on the commercial opportunities to engage in the offshore wind supply chain.

## 2. Workforce & Hiring Stakeholder Engagement

The Company is mindful of the priority afforded by the VCEA to veterans, local workers, and workers from historically economically disadvantaged communities in terms of hiring, apprenticeship, and training related to the CVOW Commercial Project. Dominion Energy Virginia projects that it will hire approximately 130 employees to support the CVOW Commercial Project. As Virginia businesses are selected to provide equipment and services for the Project, both their and the Company’s staffing needs can be shared with workforce councils, educational institutions, community organizations, and Unions. The Company plans to conduct career days with these businesses and collaborate with the Unions to communicate the job opportunities to support recruiting events directed to veterans, local workers and workers from historically economically disadvantaged communities. Already, the Company broadly has engaged community groups and organizations to share the XODUS Jobs Classification Guide in its efforts to promote awareness, interest, and engagement among these prioritized communities.

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<sup>4</sup> The XODUS Report can be accessed at the following link:  
<https://www.dropbox.com/s/in1qy3d8jgtsrm/Hampton%20Roads%20OSW%20Supply%20Chain%20Analysis%20-%20Project%20Report%20v2.pdf?dl=0>.

### **a. Commonwealth of Virginia Collaborations**

The Company has met and continued its engagement with the Commonwealth's Chief Workforce Development Officer and the Chief Diversity, Equity, and Inclusion Officer ("Chief Officers") on opportunities to advance the Commonwealth's workforce development goals. The Company's consultations with Dr. Megan Healy, Virginia Secretary of Labor and Chief Workforce Development Officer, and with Dr. Janice Underwood, the Commonwealth's Chief Diversity, Equity, and Inclusion Officer have included discussions with respect to: (a) economic and workforce development related to the Project; (b) workforce and hiring roundtable discussions, including identification of potential panelists and participant organizations, the structure of the roundtable events, and how best to convey information from the XODUS Jobs Classification Guide; and (c) best practices on gathering feedback and creating relationships, including a focused communications campaign that involves community organizations and local student ambassadors to maximize engagement throughout veteran, local, and historically economically disadvantaged communities. The Company assessed and incorporated the information gained from these consultations regarding the Commonwealth's workforce and economic development goals into the Plan for meeting the objectives in the VCEA. Relatedly, and as discussed in detail below, the Company also is engaged with other agencies and groups with the Commonwealth (*e.g.*, the Virginia Department of Energy and the Virginia Economic Development Partnership) to promote the development of supply chain infrastructure and jobs in Virginia.

Outcomes from these consultations have led the Company to conduct workforce roundtables with local leaders of veteran and diverse organizations and to engage with the Hampton Roads Workforce Council and community organizations for outreach to the communities identified in the Act.

As Dominion Energy Virginia continues to advance its Plan, the Company plans to continue to engage with the Chief Officers regarding activities and accomplishments.

### **b. The Hampton Roads Workforce Council**

The Hampton Roads Workforce Council ("HRWC") has become an important partner for workforce development and hiring engagement. HRWC and the Company have discussed ways to facilitate the hiring, apprenticeship, and training of veterans, local workers, and workers from historically economically disadvantaged communities. Based on those discussions, the Company and HRWC agreed to work together to facilitate roundtables to solicit feedback from a variety of organizations supporting these communities with the objective of gathering input on how to best to conduct outreach and engagement. The two workforce roundtables held in June and September 2021 attracted 53 participants, including state agencies such as the Virginia Department of Veterans Services, workforce organizations, local and diverse chambers of commerce, and advocacy groups supporting low-income and underserved communities. Outcomes of the roundtables are discussed further in section 2.e. below.

The Company also serves on the HRWC's Higher Education Subcommittee. The Subcommittee is focused on preparing a Virginia workforce to realize the benefits of a career in the clean energy



sector. The Subcommittee engages with public school districts, community colleges, state universities, and private technical training programs to ensure they are prepared to support the offshore wind supply chain workforce training opportunities. As a member of the Subcommittee, the Company has shared information about the Project's schedule to inform members as they assess the timing for curriculum development and implementation. As the Project moves forward, the Company will outline the services and equipment expected to be provided by Virginia businesses, offering an opportunity to identify the timing and types of jobs to support the Project.

Additionally, Dominion Energy Virginia and HRWC developed plans for and are hosting "Workforce Wednesdays," a series of forums to connect the Company and major equipment suppliers and subcontractors with educational institutions, community organizations and, in the future, persons seeking offshore wind careers. The Workforce Wednesday Series began in October 2021 and are planned to continue into 2022, and potentially beyond.

The XODUS Report recommends developing a system of central coordination of offshore wind workforce members to assist workers in self-identifying for roles and understanding expectations with respect to qualifications, work schedules, required certifications, etc. Recommended actions include creating a searchable online portal as a repository for information, linking the portal with training resources, and creating a phased approach of communicating industry needs, available talent, and training requirements. In alignment with this recommendation, the HRWC has developed a website<sup>5</sup> for individuals to register their interest in pursuing clean energy careers in offshore wind. Consistent with the XODUS Report and its other work with HRWC, Dominion Energy Virginia plans to collaborate with HRWC to engage website registrants and encourage them to attend events where they will have the opportunity to learn more about offshore wind careers, understand the education and training requirements, and meet the businesses hiring that will support the installation and operation of the CVOW Commercial Project, and in building the larger offshore wind industry supply chain in Virginia.

### **c. North America's Building Trade Unions/Virginia Building Trades**

In September 2021, Dominion Energy Virginia, NABTU, and NABTU's state affiliate, Virginia Building Trades, executed a Memorandum of Understanding ("MOU")<sup>6</sup> that reaffirms the MOU parties' commitment to the participation of a unionized workforce in the construction of the CVOW Commercial Project. The MOU also affirms the parties' commitment to the hiring, apprenticeship, and training of veterans, local workers, and workers from historically economically disadvantaged communities. The Company will work collaboratively with the Unions on tripartite discussions with Project suppliers to promote project labor agreements for agreed upon jobs/roles, inclusive of the incorporation the Commonwealth's hiring priorities for veterans, local workers, and workers from historically disadvantaged communities. To this end, the parties met on October 15, 2021, to discuss developing a plan to identify the apprenticeships, hiring schedule and outreach necessary to support the union-based roles of offshore wind construction workforce, and the Commonwealth's hiring priorities.

<sup>5</sup> <https://www.theworkforcecouncil.org/offshore-wind/>.

<sup>6</sup> <https://news.dominionenergy.com/2021-09-16-Dominion-Energy,-Trade-Unions-Announce-Coastal-Virginia-Offshore-Wind-Partnership>.

#### d. Education Collaborations

The Company has engaged many of the Hampton Roads K-12 public schools, community colleges, private training institutions, and universities to provide Project overviews and discuss curriculum, job roles, and projected hiring timelines for the Project. These discussions indicate that the curricula existing today in the Commonwealth is positioned to provide the training required for the majority of the offshore wind job roles, as well as having the capability to develop new curricula based on workforce needs. When coupled with the on-the-job training many companies afford their employees, Virginia appears well-positioned to train and support the needs of the offshore wind workforce. The curriculum with the greatest opportunity for expansion in Virginia's educational institutions is The Global Wind Organisation ("GWO") safety and survival training, which is an industry standard for working offshore on wind turbine installation vessels, turbines, and substations. The Company and its major offshore equipment and service providers will require GWO certification to work on the Project offshore. In recognition of the need for Virginia based GWO training programs, the Company supports Governor Northam's decision to form the Mid-Atlantic Wind Training Alliance,<sup>7</sup> which positions the Commonwealth to facilitate Virginian offshore workers' access to this essential training.

To enhance engagement with public school systems, Dominion Energy Virginia has gone well beyond sharing Project information to include meetings with K-12 Science/Technology/Engineering/Mathematics ("STEM") and career and technical education ("CTE") program leaders to discuss how students can be engaged to generate interest in offshore wind careers. These meetings have led to opportunities for the Company to present a series of Project topical matters for Virginia Beach School's Environmental Studies Program, as well as Dominion Energy Virginia's plans to develop offshore wind case studies to share with the region's schools for classwork activity. As the Project advances and offshore wind industry develops, the Company plans to work with school systems to identify new opportunities for the Company to continue to provide speakers and materials to support programmatic offshore wind curricula, and otherwise generate interest in offshore wind-related careers.

As discussed in Section 2.b, the Company is a member of HRWC's Higher Education Subcommittee. Through its participation on that subcommittee, the Company identified another workforce educational/training opportunity for the Project and the larger offshore wind industry and supply chain in Virginia. Specifically, the Community College Workforce Cooperative<sup>8</sup> has existing initiatives, such as Virginia's G3 program,<sup>9</sup> with the Company, community organizations and educational institutions. The G3 program provides tuition assistance for any Virginia resident who qualifies for in-state tuition and whose household income falls below a certain threshold. G3 funding affords a "stackable" pathway such that most programs begin with skills training and culminate in a certificate that provides immediate value in the job market. Because that certificate is part of an applied associate's degree program, a working student can continue to "stack"

<sup>7</sup> <https://www.governor.virginia.gov/newsroom/all-releases/2020/october/headline-860851-en.html>.

<sup>8</sup> <https://www.vccs.edu/news/new-community-college-collaboration-aims-to-boost-hampton-roads-business-and-industry-priorities-and-address-regional-skill-gaps/>.

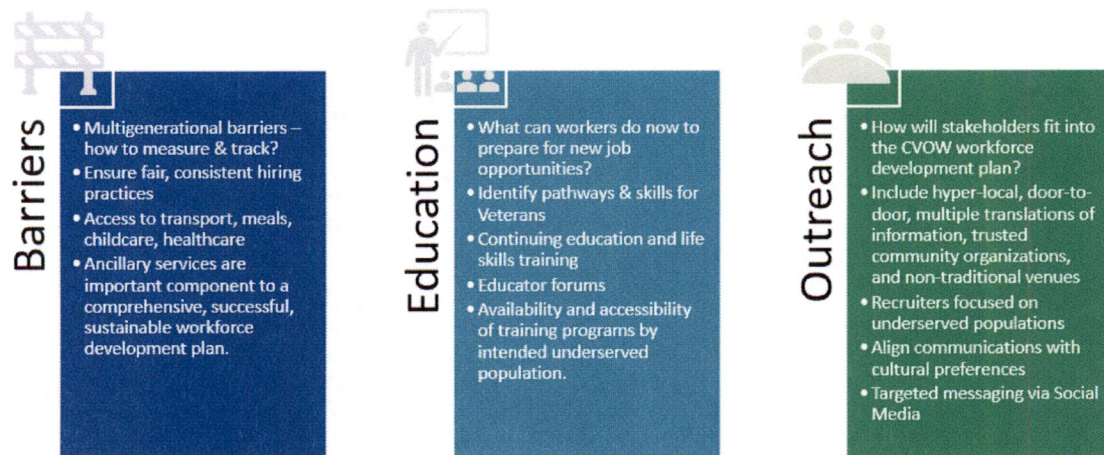
<sup>9</sup> <https://www.governor.virginia.gov/newsroom/all-releases/2021/march/headline-894095-en.html>.

additional certificates on their pathway to an associate's degree. The Company, in working with the Community College Workforce Cooperative, identified that the program eligibility supports reduced or free tuition assistance for skilled trades at community colleges or employer sponsors that will be needed for the Project and offshore wind supply chain. The Company facilitated a Community College Workforce Collaborative presentation that provided an overview of the G3 program at one of the Project Workforce Roundtables (such roundtables discussed further in Section 2.e), and was able to highlight its application to offshore wind job certifications, among other things. The Company plans to include program information as it continues educational and community organization outreach.

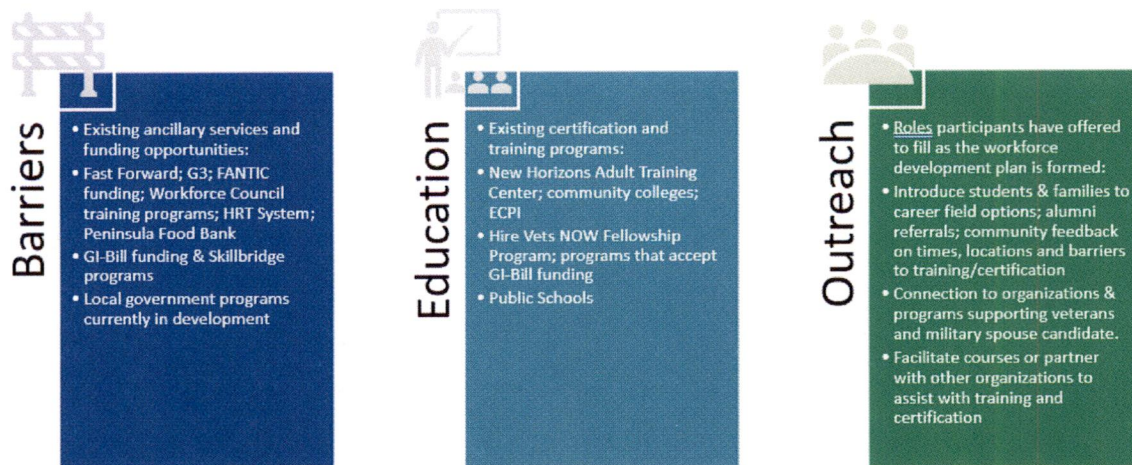
### e. Workforce Roundtables

The Company collaborated with HRWC to hold workforce roundtables in June and September 2021. Participants included state agencies such as the Virginia Department of Veterans Services, local minority business councils, workforce organizations, local and diverse chambers of commerce, and advocacy groups supporting low-income and underserved communities.

At the June roundtable, the Company provided a Project update, Drs. Underwood and Healy served as panelists and HRWC presented a summary of the XODUS Study and overviewed their services. The forum provided an opportunity to engage the presenters and feedback was gathered from roundtable participants specific to understanding and overcoming barriers that may lessen the engagement of historically underrepresented communities. Initial feedback from participants at the June workshop is detailed below:



Participants in the first roundtable returned for the second in September. During this event the Company shared feedback from the first roundtable and information regarding the G3 program, discussed above. The Company requested and received feedback in three key areas: (1) existing ancillary services or funding opportunities to respond to barriers; (2) in the category of training, existing programs that could incorporate certification and training programs related to the CVOW Commercial Project; and (3) in the area of outreach, the role that participants can play as the workforce development plan is formed. Participants shared the following feedback:



While many of the barriers identified are societal in nature, the Company plans to explore and engage the appropriate local and state agencies and community-based organizations providing assistance and aid for overcoming the barriers. The Company will share these resources as they are identified with educational institutions, community organizations, and individuals for their consideration as they explore offshore wind careers.

As a first step, the Company met with Traffix, a division of Hampton Road Transit, to explore how Traffix's resources might be utilized to overcome transportation barriers, enabling access to training facilities and work locations.

The outreach opportunities identified in the roundtables are well aligned with the Company's efforts to provide awareness, encourage interest, and promote engagement in offshore wind careers. The Company will continue to share timing and types of jobs with HRWC, educational institutions, Unions and the organizations that support veteran, local workers and workers from historically economically disadvantaged communities so these entities can incorporate the information in their engagement or recruitment activities as ambassadors for offshore wind careers.

#### **f. Community Assessment & Outreach**

As part of its process to better understand the needs and priorities of diverse, minority, and underserved communities, Dominion Energy Virginia conducted meetings with groups of individuals from across the Hampton Roads region, including faith-based organizations, non-profits, urban advocacy, and other diverse community organizations. Using their collective local knowledge and experience, these individuals provided guidance on the communities' sentiments, concerns, and feelings about the Project, best practices for effective communications to diverse audiences, and potential solutions to identified concerns. This collaborative effort has led to increased understanding and utilization of methods for outreach to the communities and has identified additional stakeholders who represent the interests of these communities to ensure that the Company's approach to economic and workforce development are well-rounded and inclusive.

Acting on the community feedback, the Company has participated in community conversations led by organizations that serve minority and underserved audiences, including non-English speaking communities, to increase awareness about workforce development, as well as supply chain opportunities. To promote greater accessibility, project materials and the Company's dedicated CVOW Commercial Project website have been adapted for non-English speaking communities, in particular Spanish and Tagalog. Bi-lingual Company representatives have participated in Hispanic radio station interviews and presented in their native language to Hispanic community organizations to increase awareness about CVOW Commercial Project's supply chain and job opportunities.

### **C. Supply Chain Stakeholder Engagement**

Dominion Energy Virginia's online supply chain portal<sup>10</sup> offers an opportunity for suppliers to register their interest in becoming a CVOW Commercial Project vendor. HRA links to the Company's portal on its own website<sup>11</sup> to support suppliers exploring offshore wind opportunities through HRA an enhanced path to register their interest. HRA also hosts the Virginia Offshore Wind Supply Chain Partnership Directory maintained by the Business Network for Offshore Wind and the Virginia Department of Energy.<sup>12</sup> To maximize opportunities for Virginia businesses participation in the Project, the companies registered on the Company's and HRA's websites will be contacted and encouraged to attend contractor expositions and the list will be shared with the major offshore providers to provide a Virginia supply chain contact list as solicitations are issued for local content scopes of work.

The Company has engaged a number of state agencies and authorities to support development of the CVOW Commercial Project and the broader objective of establishing the Commonwealth as an offshore wind supply chain hub for the East Coast. These efforts have focused on attraction of direct foreign investment and fulfillment of the VCEA hiring objectives.

#### **1. Virginia Department of Energy**

The Company has worked with the Virginia Department of Energy ("Virginia Energy") to advance the clean energy policies of the Commonwealth by participating in forums organized by VDOE with entities affiliated with offshore wind to better understand how Virginia can realize its potential to establish itself as a national leader in the offshore wind industry supply chain. The Company's engagements have included meetings with Gulf Coast oil and gas workforce development resources, European delegations, and supporting VDOE's activities to promote Virginia at events and trade shows as a panelist and meeting participant. During the most recent event, held October 19, 2021, the VDOE hosted the Danish Trade Delegation and Dominion Energy Virginia participated to provide a project update and to encourage the Danes to invest in Virginia.

<sup>10</sup> <https://coastalvawind.com/partnerships/become-supplier.aspx>.

<sup>11</sup> <https://www.theworkforcecouncil.org/offshore-wind/>.

<sup>12</sup> <https://a812898.fmphost.com/fmi/webd/OSWSupplyChain.fmp12?script=103>.

## 2. Virginia Economic Development Partnership

The Virginia Economic Development Partnership (“VEDP”) has been actively engaged in the identification of and outreach to European trade delegations and offshore wind suppliers. These efforts support a broader collaborative initiative in which the Company participates to seek direct investment from foreign and domestic firms in Virginia as they consider where to establish manufacturing, installation, and operational supply and service facilities along the East Coast. Key assets in attracting offshore wind equipment and service providers include the Commonwealth’s ranking as a top state in which to do business;<sup>13</sup> the advantages of the Port of Virginia’s available marine terminals, including their wide and deep channels and no overhead restrictions; and a robust maritime industry and workforce. VEDP and Company representatives meet to share industry insights, discuss suppliers that have the potential to invest in Virginia, and coordinate meetings and events with the offshore wind suppliers. These cooperative efforts have increased offshore wind suppliers’ interest in Virginia as they assess the U.S. market and evaluate opportunities for making investments to support the growing East Coast offshore wind industry.

## 3. National, State, Regional and Local Economic Development, Trade, and Business Organizations

The *GO Virginia* grant allowed HRA to establish itself as one of the Commonwealth’s leading regional economic development organizations. Dominion Energy Virginia and HRA have collaborated with other local and regional economic development organizations to support direct investment and supply chain readiness. Outreach to Virginia businesses has been conducted through virtual and in-person meetings that began in 2020 and has continued monthly in 2021. The Company plans to continue these outreach efforts in 2022 and potentially beyond as the major offshore suppliers identify opportunities for local suppliers.

The Company has also engaged many of the Hampton Roads Economic Development organizations to provide project updates and communicate its desire to work with these organizations on their efforts to participate in recruitment of offshore wind supply chain businesses and development of the offshore wind supply. As an example, the City of Virginia Beach Economic Development Authority has been particularly active in outreach with the European supply chain, and the Company has participated in their virtual and in-person meetings with foreign delegations and offshore wind supplier representatives. On October 8, 2021, Dominion Energy Virginia presented to the City’s Minority Business Council to provide project updates and share how minority businesses can participate in the offshore wind supply chain.

The Company was a host sponsor of The Business Network for Offshore Wind’s 2021 International Partnering Forum, the nation’s largest offshore wind tradeshow, which was held in Richmond from August 24-26, 2021. During the trade show the Company met with two European trade delegations, numerous offshore wind suppliers, and Virginia businesses interested in learning more about how to become part of the offshore wind supply chain. While the contacts the Company made at the tradeshow were of value to the Project, the occasion also allowed leading offshore wind providers to see first-hand the Commonwealth’s commitment to the offshore wind

<sup>13</sup> <https://www.cnbc.com/2021/07/13/americas-top-states-for-business.html>.

industry and meet leading companies eager to participate in the growing offshore wind supply chain, another important result as Virginia seeks to establish itself as the East Coast offshore wind supply chain hub.

During the weekend prior to the International Partnering Forum, the VDOE, VEDP, HRA, Virginia Beach Economic Development Authority, Port of Virginia, and the Virginia Maritime Association collaborated to host 12 offshore wind-related events in Norfolk and Virginia Beach. These events included meetings with two European trade delegations, local, state and federal elected and appointed officials to demonstrate Virginia's commitment to offshore wind, port tours with 40 attendees, and individual meetings with offshore wind equipment and services suppliers. The purpose of these events was to share the benefits of doing business in Virginia, including highlighting the Port of Virginia's strengths, and introduce Virginia businesses to the world's leading offshore wind suppliers.

The Company further understands that HRA also led an offshore wind mission to Germany, Belgium, and the Netherlands during the last week of October 2021. The purpose of the mission was to continue to build upon existing relationships with key industry players, while also raising the awareness of Hampton Roads as a location of choice for offshore wind companies to invest. HRA conducted meetings with more than 20 companies, including over a dozen businesses at the Offshore Energy Exhibition & Conference in Amsterdam. The mission was supported by the HRA's European office in Frankfurt, and representatives of HRA as well as the Virginia Beach Economic Development Authority from Norfolk and Virginia Beach also participated.

#### **4. Supplier Diversity Efforts**

Beginning with the Supplier Readiness Series in December of 2020, the Company has sought to engage diverse suppliers. The Company has expanded its outreach by participating in events specifically designed for diverse suppliers, including events with the City of Virginia Beach's Minority Business Council and Industry Day, Black Brand, Virginia Asian Chamber of Commerce, Hispanic Chamber of Commerce of Coastal Virginia, and project update events at houses of faith. Events like the Dominion Energy Inc's. second annual virtual supplier event, Convergence 2021, provided an opportunity to reach 320 diverse, minority and women-owned suppliers, some of which were Virginia diverse suppliers interested in CVOW.

Dominion Energy Virginia plans to continue outreach and engagement with minority civic and business organizations to promote supplier diversity and reach minority entrepreneurs and women-owned businesses interested in expanding into offshore wind and opportunities to support offshore wind.

#### **D. Domestic and Virginia Procurement (addresses Va. Code § 56-585.1:11 D (vi))**

An expansive volume of services and goods will be required to support the construction and operations of the CVOW Commercial Project.

## 1. Wind Turbine Installation Vessel Support

In May 2020, Dominion Energy announced the commencement of construction of the first Jones Act-compliant offshore Wind Turbine Installation Vessel (“WTIV”). The *Charybdis* WTIV is being constructed in Texas and will utilize more than 14,000 tons of domestic steel, with nearly 10,000 tons sourced from Alabama, West Virginia and North Carolina suppliers, and is expected to create nearly 700 direct construction jobs. Once commissioned, *Charybdis* will be available to serve offshore wind projects along with East Coast, and potentially beyond. *Charybdis* is expected to have a crew of up to 119 members, and it will be homeported at the Port of Virginia, thereby providing opportunities for Virginia’s maritime businesses to work on the vessel, and service and supply it over its operating life. For each deployment, longshoremen, stevedores, technicians, crane operators, electricians, welders, quality inspectors, and other building and construction trades jobs will be needed to support *Charybdis* operations. The Company expects that the vessel being homeported will result in many local jobs, beginning in 2023. Specifically, in June 2021, Dominion Energy, through its vessel-related subsidiary, entered into an agreement under which *Charybdis* will be chartered by Ørsted and Eversource for the construction of two offshore wind projects located off the coasts of Connecticut and New York.<sup>14</sup> Dominion Energy Virginia is in negotiations to utilize the *Charybdis* for the Project, the use of which would follow *Charybdis*’ work for Ørsted and Eversource. A charter for the Project would continue to support and sustain the jobs and investments related to home-porting this important vessel in Virginia.

## 2. Portsmouth Marine Terminal

On August 25, 2021, Governor Ralph Northam announced an agreement between Dominion Energy Virginia and the Port of Virginia for a long-term lease of Portsmouth Marine Terminal (“PMT”) for staging and pre-assembly of turbine components.<sup>15</sup> The Port of Virginia will perform facility upgrades through capital investment to increase the quayside weight-bearing capacity and make other infrastructure improvements. It is expected that the Port will engage the experienced Hampton Roads-based maritime and construction supply chain to support its scope of work. Once the upgrades are completed, the facility will be capable of offloading, storing, staging, and pre-assembly of incoming shipments of turbine nacelles, towers and blades among other activities. It is estimated that the loading and unloading, staging and pre-assembly work for turbines will support 55-60 full-time staff, including millwrights, iron workers, painters, electrical workers, and quality inspectors as well as additional staffing during the peak of the installation phase. The Company will also use PMT to stage and complete any pre-assembly required for the monopile foundations and transition pieces. The staffing levels will be identified by the transportation and installation provider. The Port of Virginia will hire longshoremen, equipment operators and port operations staff to support these staging and preassembly activities in addition to the vendor staffing. Importantly, the upgrades to PMT performed by the Port will position PMT as a premier offshore wind staging and installation facility, and thus, serve as a key piece of the larger supply chain for the industry for many years to come, including well after the Project is constructed and operational.

<sup>14</sup> <https://news.dominionenergy.com/2021-06-01-Dominion-Energy,-rsted-and-Eversource-Reach-Deal-on-Contract-to-Charter-Offshore-Wind-Turbine-Installation-Vessel>.

<sup>15</sup> <https://www.governor.virginia.gov/newsroom/all-releases/2021/august/headline-907708-en.html>.



Relatedly, the Company has worked with the Commonwealth, the Port of Virginia, and Siemens Gamesa regarding the possible location and operation of a Siemens Gamesa offshore wind blade factory in Virginia. Through this collaboration, Siemens Gamesa has finalized a decision to locate a new blade factory at PMT. As noted by Governor Northam in an October 25, 2021, announcement, the blade factory, located at PMT, will result in a \$200 million capital investment in the Commonwealth, and is expected to create 310 new jobs, of which approximately 50 will be jobs to support the CVOW Project.<sup>16</sup>

### **3. Construction Opportunities**

The Company has encouraged all businesses interested in participating in the Project to register in the Dominion Energy Supply Chain portal<sup>17</sup> as well as the Virginia Offshore Wind Supply Chain Partnership Directory,<sup>18</sup> which is linked on HRA's website.<sup>19</sup> The Company and HRA will provide the Project's major equipment providers and service contractors the list of the businesses that registered in both supply chain registration portals. The Company plans to publicize and host construction expositions to facilitate further opportunities for Virginia's businesses to meet and present their capabilities to these suppliers.

While much of the discussion has focused on the offshore wind equipment installation, procurement activity will provide opportunities for local suppliers and contractors to participate in the construction of the transmission lines and substations required to interconnect the Project to the Company's Fentress substation. Just as with the Project's other suppliers, the CVOW Project team will collaborate with the Company's electric transmission business unit to maximize opportunities for local businesses and for the employment from the communities identified in the Act as the transmission lines and substations are constructed to interconnect the CVOW Project.

### **4. Support of Physical Facilities and Vessels**

The volume of equipment, manufacturing, construction staging, logistics, and operational activities required to support the CVOW Commercial Project creates a need for upgraded or new construction of port and inland facilities. The work related to the upgrade of the PMT will be managed and contracted by the Port of Virginia. The Company plans to lease facilities to support an operations center to house the Project's operations and maintenance team, warehouse, and support vessels. Similarly, the major offshore equipment and service providers and their subcontractors will need upgrade or construct facilities to support the CVOW Commercial Project. It is expected that much of this work will be carried out by local businesses that have successful track records of constructing marine terminal facilities and general office warehouse facilities. The Company plans to work with the major offshore equipment suppliers, the Port of Virginia, and its operations base construction contractors to maximize opportunities for Virginia businesses and hiring from the communities identified in the Act.

<sup>16</sup> <https://www.governor.virginia.gov/newsroom/all-releases/2021/october/headline-910422-en.html>.

<sup>17</sup> <https://coastalvawind.com/partnerships/become-supplier.aspx>.

<sup>18</sup> <https://a812898.fmhost.com/fmi/webd/OSWSupplyChain.fmp12?script=103>.

<sup>19</sup> <https://hamptonroadsalliance.com/offshorewind/>.

With the large number of vessels required to support Project construction and operation, Virginia’s highly respected maritime industry is well-positioned to maintain, fuel, and provision the vessels as they make port calls. As the major offshore equipment and service providers identify their vessel needs, the Company will collaborate with the Port of Virginia and the Virginia Maritime Association to host expositions for the providers to share their needs and create opportunities for Port of Virginia based fleet owners to meet the providers to discuss their capabilities.

The Company is planning for four vessels to support construction and operation of the CVOW Commercial Project. These include two crew transfer vessels, one service operations vessel, and the WTIV. These vessels are planned to be homeported in Virginia, and the Hampton Roads maritime industry will have the opportunities to provide the support for the vessels’ operational requirements.

### **5. Virginia-Based and United States-Based Procurement**

To date, the CVOW Commercial Project activities have focused predominately on development and permitting to support the design, major offshore supplier procurement, onshore transmission route evaluation, and the Construction and Operation Plan preparation, and the Company has endeavored to utilize Virginia-based and U.S.-based resources for these activities where available and competitively priced. While these activities are primarily consulting and services in nature, as opposed to relating to materials and products, the Company has successfully engaged Virginia and U.S.-based firms and the expenditures as of September 30, 2021, are \$14.8 million for Virginia and \$57.0 million for U.S. resources. As the Project advances and the local supply chain opportunities are identified, the Company will continue to seek to engage Virginia and U.S. firms that are reasonably available and competitively priced for these opportunities.

### **III. Moving Forward: 2022 and Beyond**

The Company is dedicated to meeting the economic development and hiring objectives outlined in the VCEA. The Company will continue to involve the organizations engaged to date and expand to include additional stakeholders where applicable to maximize the economic impact and hiring opportunities in the Commonwealth. These efforts will include the Company’s ongoing focus on outreach and engagement work with communities identified in the Act to promote training and apprenticeship opportunities to encourage members of these communities to prepare to enter the offshore wind workforce for the Project. The Company expects to develop and expand its outreach efforts as new information is identified to maximize the opportunities for these communities, including the engagement with resources that can assist in overcoming the barriers to entering the offshore wind workforce.

The completion of contract negotiations major offshore equipment providers is a significant milestone that offers an opportunity for the Company to accelerate its supplier readiness and workforce efforts through partnerships with the Project’s major offshore equipment providers and subcontractors to optimize the opportunities for Virginia businesses and those interested in joining the offshore wind workforce. In November 2021, the Company is assembling a “Virginia Supply Chain Team” composed of project and supply chain subject matter to work with the major equipment suppliers and service providers to identify and maximize second- and third-tier

subcontractor opportunities for Virginia spend and hiring. The Virginia Supply Chain Team will collaborate with the support of the Company representatives conducting the CVOW Commercial Project outreach with local, regional, and state economic development authorities and trade organizations to support engagement with Virginia businesses that can provide the goods and services identified by the equipment suppliers and service providers. Forums, including construction expositions, will be co-sponsored by the Company, the major offshore equipment providers, and economic development authorities to connect local businesses with the major offshore equipment providers and higher tier subcontractors regarding opportunities to participate in the supply chain supporting the Project. These matchmaking events for local businesses are expected to occur in 2022 and 2023 as the major offshore equipment providers enter into contracts with subcontractors.

As the major offshore equipment and transmission infrastructure providers identify Virginia-based scope of services, the Virginia Supply Chain Team will be capable of identifying the jobs and hiring timelines. As jobs and hiring timelines are identified, the Company will engage the workforce agencies, educational institutions, and community organizations to foster engagement with veterans, local workers, and workers from historically disadvantaged communities and encourage the members of those communities to pursue training and employment opportunities for the CVOW Commercial Project. This outreach is planned for 2022 and 2023 as the Company completes identification of the Virginia-based scope of services and can assess the job opportunities the suppliers require to support the Project.

In parallel, the Company will work with the Unions to determine the roles to be provided by union-represented workers subject to Project Labor Agreements with the equipment suppliers and service providers and their subcontractors. These discussions will focus on identifying the project scope that will employ union represented workers and developing a collaborative approach with regard to how the Unions will recruit workers and provide training through apprenticeship programs from the communities identified in the Act.

Similarly, the Company's engagements with Virginia's educational institutions will continue and as the specific roles and hiring timing needed for each role are determined, the Company will communicate this information to those institutions to ensure the training programs are designed and planned for the non-union roles required to successfully complete the project. By coordinating the timing for training, individuals can complete their training such that it aligns with offshore wind job demand to provide meaningful rewards and immediate return on those individuals' investments in training.

The Company will collaborate with the major offshore equipment providers and subcontractors as they recruit workers (both union-represented and non-union) by supporting these businesses' outreach and co-hosting career fairs to allow those interested in offshore wind careers to learn of the specific roles as well as where and when to apply for the jobs.

Dominion Energy Virginia has proactively engaged with economic and workforce development stakeholders in the Commonwealth since the passage and signing of the Act, demonstrating its commitment to meeting its provisions that pertain to generating economic impact and hiring for Virginians. With the Project's advancement and recent awards of contracts to the major offshore

wind providers, the Company is better positioned to further its outreach to Virginia businesses and communities identified in the Act regarding supply chain local content and the corresponding hiring of the offshore wind workforce. The Company's commitment and efforts will continue and adapt as new information becomes available through the installation phase of the Project.

**VII. RESPONSES TO COMMISSION ORDER DATED JULY 26, 2021**

1. **Dominion shall include in the prefiled testimony of specific witnesses the following information concerning the cost of the OSW Project for which Dominion seeks recovery:**
  - a. **What is the lifetime revenue requirement of the OSW Project that Dominion proposes or will propose to recover through a rate adjustment clause (“RAC”)? Of this total lifetime revenue requirement, how much is investment, and how much is the Company’s projected return on equity?**
  - b. **What is the total cost and the lifetime revenue requirement of the transmission necessary to bring the energy generated by the OSW Project to shore? Of this total lifetime revenue requirement, how much is investment, and how much is the Company’s projected return on equity? Identify the rate recovery mechanism(s) Dominion proposes or will propose to use to recover such costs from eligible customers.**
  - c. **What are the total cost and the lifetime revenue requirement of on-land transmission network upgrades that will be necessitated by the proposed OSW Project? When will Dominion request certificates of public convenience and necessity (“CPCNs”) for transmission-related investments related to the OSW Project?**

(Addresses the additional information and analyses required by the Commission’s Order dated July 26, 2021)

Response:

- a) The lifetime revenue requirement of the Project that will be sought for recovery through a RAC, at a Virginia jurisdictional level, is as follows:

<b>(000’s)</b>	
Depreciation*	\$10,099
Operating Expenses/Benefits/Other	(10,526)
Financing Costs – Equity**	5,419
Financing Costs - Debt	2,239
Total Revenue Requirement	\$ 7,231

\*Represents the Company’s capital investment in the Project (includes ongoing capital maintenance)

\*\*Represents the Company’s equity return pursuant to the Commission’s approved ROE rate for the Company

See Attachment VII.1.a and the Direct Testimony of Company Witness Christopher J. Lee.

- b) The total cost and lifetime revenue requirement of the transmission assets (Harpers to Fentress (OH)) associated with the Project, at a Virginia jurisdictional level, are as follows:

<u>(000's)</u>	
Depreciation*	\$555
Operating Expenses/Benefits/Other	148
Financing Costs – Equity**	428
Financing Costs - Debt	177
<b>Total Revenue Requirement</b>	<b>\$1,308</b>

\*Represents the Company's capital investment in the Project (includes ongoing capital maintenance)

\*\*Represents the Company's equity return pursuant to the Commission's approved ROE rate for the Company.

Because the capital costs of the transmission assets are charged through the A6 Rider OSW, they will not be recovered through the FERC transmission formula rate.

Upon energization, the transmission lines from Harpers to Fentress will no longer be considered interconnection lines, but will become system transmission assets. These lines will benefit the larger PJM transmission system and therefore the ongoing O&M costs will be collected through the FERC formula rate. See Attachment VII.1.b.

- c) The total cost and lifetime revenue requirement for the on-land transmission network upgrades necessitated by the Project, at a Virginia jurisdictional level, are as follows:

<u>(000's)</u>	
Depreciation*	\$208
Operating Expenses/Benefits/Other	50
Financing Costs – Equity**	149
Financing Costs - Debt	62
<b>Total Revenue Requirement</b>	<b>\$469</b>

\*Represents the Company's capital investment in the Project (includes ongoing capital maintenance)

\*\*Represents the Company's equity return pursuant to the Commission's approved ROE rate for the Company

See the Direct Testimony of Company Witness Lee. See the Company's response to section VII.3.a below. See Attachment VII.1.c.

(\$000)

		Rider Required Revenues --VA Jurisdiction Only					Total Rider Required Revenues - 100% Total System
Calendar Year	Depreciation Expense	Operating Expenses/Benefits/Other	Financing Costs - Equity	Financing Costs - Debt	Total Revenue Requirement		
9/1/22- 8/31/23	\$0	\$0	\$59,876	\$18,826	\$78,702	\$95,028	
2023	\$0	\$33,506	\$113,506	\$46,280	\$193,292	\$233,390	
2024	\$0	\$69,303	\$202,114	\$86,009	\$359,426	\$433,986	
2025	\$0	\$105,175	\$306,730	\$126,871	\$538,776	\$650,542	
2026	\$22,479	\$100,689	\$364,960	\$150,956	\$639,084	\$770,838	
2027	\$289,118	(\$9,003)	\$360,964	\$149,303	\$790,382	\$947,826	
2028	\$289,118	(\$99,363)	\$334,180	\$138,224	\$662,160	\$792,758	
2029	\$289,118	(\$97,427)	\$309,881	\$128,215	\$629,888	\$753,614	
2030	\$289,118	(\$104,844)	\$288,481	\$119,322	\$592,078	\$707,667	
2031	\$289,118	(\$125,673)	\$269,494	\$111,469	\$544,408	\$649,838	
2032	\$289,118	(\$115,169)	\$254,316	\$105,191	\$533,456	\$636,317	
2033	\$289,118	(\$142,946)	\$241,021	\$99,692	\$486,885	\$579,823	
2034	\$289,118	(\$168,416)	\$227,715	\$94,188	\$442,606	\$526,124	
2035	\$289,118	(\$200,309)	\$214,397	\$88,679	\$391,886	\$464,650	
2036	\$289,118	(\$240,577)	\$201,045	\$83,157	\$332,743	\$392,861	
2037	\$290,854	(\$327,821)	\$188,323	\$77,895	\$229,251	\$267,583	
2038	\$293,554	(\$347,738)	\$176,664	\$73,031	\$195,411	\$226,430	
2039	\$296,646	(\$363,460)	\$165,130	\$68,302	\$166,618	\$191,409	
2040	\$300,191	(\$381,294)	\$153,695	\$63,572	\$136,164	\$154,297	
2041	\$303,405	(\$398,351)	\$142,362	\$58,884	\$106,300	\$118,045	
2042	\$307,177	(\$411,619)	\$131,579	\$54,424	\$81,562	\$87,941	
2043	\$311,626	(\$429,063)	\$121,248	\$50,151	\$53,941	\$54,413	
2044	\$316,888	(\$449,069)	\$110,956	\$45,894	\$24,668	\$18,767	
2045	\$323,145	(\$451,811)	\$100,674	\$41,641	\$13,649	\$5,229	
2046	\$330,631	(\$451,445)	\$90,411	\$37,396	\$6,994	(\$3,049)	
2047	\$339,642	(\$474,539)	\$80,117	\$33,138	(\$21,641)	(\$37,860)	
2048	\$350,579	(\$496,379)	\$68,706	\$28,632	(\$47,261)	(\$69,129)	
2049	\$364,009	(\$509,812)	\$59,140	\$24,461	(\$62,203)	(\$87,374)	
2050	\$380,744	(\$524,562)	\$48,346	\$19,997	(\$75,475)	(\$103,669)	
2051	\$402,004	(\$539,675)	\$37,212	\$15,392	(\$85,068)	(\$115,592)	
2052	\$421,570	(\$553,260)	\$24,866	\$10,285	(\$96,539)	(\$129,853)	
2053	\$443,276	(\$570,337)	\$10,842	\$4,485	(\$111,734)	(\$148,494)	
2054	\$466,139	(\$585,308)	(\$4,941)	(\$1,920)	(\$125,729)	(\$165,754)	
2055	\$483,877	(\$601,620)	(\$21,904)	(\$9,060)	(\$148,706)	(\$193,869)	
2056	\$459,036	(\$542,111)	(\$14,188)	(\$5,869)	(\$103,132)	(\$137,624)	
2057	\$0	(\$121,250)	\$0	\$0	(\$121,250)	(\$146,403)	
<b>Total</b>	<b>\$10,098,657</b>	<b>(\$10,525,595)</b>	<b>\$5,419,220</b>	<b>\$2,239,311</b>	<b>\$7,231,593</b>	<b>\$8,420,707</b>	

(\$000)

Calendar Year	Rider Required Revenues - VA Jurisdiction Only						Total Rider Required Revenues - 100% Total System
	Depreciation Expense	Operating Expenses/Benefits/Other	Financing Costs - Equity	Financing Costs - Debt	Total Revenue Requirement		
9/1/22- 8/31/23	\$0	\$0	\$1,256	\$400	\$1,657	\$2,001	
2023	\$0	\$3,514	\$10,562	\$4,432	\$18,507	\$22,346	
2024	\$0	\$6,439	\$18,779	\$8,177	\$33,395	\$40,322	
2025	\$0	\$8,186	\$23,874	\$9,875	\$41,936	\$50,635	
2026	\$1,542	\$9,217	\$27,046	\$11,187	\$48,992	\$59,155	
2027	\$18,509	\$8,312	\$26,233	\$10,851	\$63,905	\$77,162	
2028	\$18,509	\$7,874	\$24,947	\$10,319	\$61,649	\$74,437	
2029	\$18,509	\$7,458	\$23,726	\$9,814	\$59,507	\$71,852	
2030	\$18,509	\$7,053	\$22,535	\$9,321	\$57,419	\$69,330	
2031	\$18,509	\$7,351	\$21,388	\$8,847	\$56,096	\$67,732	
2032	\$18,509	\$7,108	\$20,268	\$8,383	\$54,268	\$65,525	
2033	\$18,509	\$6,730	\$19,157	\$7,924	\$52,321	\$63,174	
2034	\$18,509	\$6,352	\$18,045	\$7,464	\$50,370	\$60,819	
2035	\$18,509	\$5,974	\$16,933	\$7,004	\$48,420	\$58,464	
2036	\$18,509	\$5,596	\$15,820	\$6,544	\$46,469	\$56,109	
2037	\$18,509	\$5,218	\$14,708	\$6,084	\$44,519	\$53,754	
2038	\$18,509	\$4,840	\$13,596	\$5,623	\$42,568	\$51,399	
2039	\$18,509	\$4,462	\$12,483	\$5,163	\$40,618	\$49,044	
2040	\$18,509	\$4,084	\$11,371	\$4,703	\$38,667	\$46,689	
2041	\$18,509	\$3,745	\$10,371	\$4,290	\$36,915	\$44,573	
2042	\$18,509	\$3,484	\$9,598	\$3,970	\$35,560	\$42,937	
2043	\$18,509	\$3,261	\$8,937	\$3,697	\$34,404	\$41,541	
2044	\$18,509	\$3,039	\$8,276	\$3,423	\$33,247	\$40,144	
2045	\$18,509	\$2,816	\$7,616	\$3,150	\$32,091	\$38,748	
2046	\$18,509	\$2,594	\$6,955	\$2,877	\$30,934	\$37,352	
2047	\$18,509	\$2,371	\$6,294	\$2,603	\$29,778	\$35,955	
2048	\$18,509	\$2,149	\$5,634	\$2,330	\$28,622	\$34,559	
2049	\$18,509	\$1,927	\$4,973	\$2,057	\$27,466	\$33,163	
2050	\$18,509	\$1,705	\$4,312	\$1,784	\$26,310	\$31,767	
2051	\$18,509	\$1,482	\$3,649	\$1,509	\$25,150	\$30,366	
2052	\$18,509	\$1,259	\$2,987	\$1,235	\$23,990	\$28,969	
2053	\$18,509	\$1,037	\$2,326	\$962	\$22,835	\$27,573	
2054	\$18,509	\$816	\$1,665	\$689	\$21,679	\$26,178	
2055	\$18,509	\$0	\$1,005	\$416	\$19,929	\$24,065	
2056	\$16,967	\$0	\$342	\$142	\$17,451	\$21,071	
<b>Total</b>	<b>\$55,274</b>	<b>\$147,453</b>	<b>\$427,668</b>	<b>\$177,247</b>	<b>\$1,307,642</b>	<b>\$1,578,911</b>	



(\$000)

		Rider Required Revenues - VA Jurisdiction Only						Total Rider Required Revenues - 100% Total System
Calendar Year	Depreciation Expense	Operating Expenses/Benefits/OT her	Financing Costs - Equity	Financing Costs - Debt	Total Revenue Requirement			
9/1/22- 8/31/23	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2023	\$0	\$7	\$20	\$8	\$35	\$42	\$42	
2024	\$0	\$1,018	\$2,988	\$1,292	\$5,278	\$6,373	\$6,373	
2025	\$0	\$2,452	\$7,150	\$2,957	\$12,559	\$15,164	\$15,164	
2026	\$578	\$3,115	\$9,166	\$3,791	\$16,661	\$20,105	\$20,105	
2027	\$6,938	\$3,007	\$9,750	\$4,033	\$23,729	\$28,651	\$28,651	
2028	\$6,938	\$2,868	\$9,344	\$3,865	\$23,015	\$27,789	\$27,789	
2029	\$6,938	\$2,711	\$8,888	\$3,676	\$22,214	\$26,822	\$26,822	
2030	\$6,938	\$2,559	\$8,443	\$3,492	\$21,432	\$25,878	\$25,878	
2031	\$6,938	\$2,692	\$8,014	\$3,315	\$20,959	\$25,306	\$25,306	
2032	\$6,938	\$2,604	\$7,594	\$3,141	\$20,278	\$24,484	\$24,484	
2033	\$6,938	\$2,461	\$7,178	\$2,969	\$19,547	\$23,602	\$23,602	
2034	\$6,938	\$2,319	\$6,762	\$2,797	\$18,816	\$22,719	\$22,719	
2035	\$6,938	\$2,176	\$6,345	\$2,625	\$18,084	\$21,835	\$21,835	
2036	\$6,938	\$2,033	\$5,929	\$2,452	\$17,352	\$20,951	\$20,951	
2037	\$6,938	\$1,890	\$5,512	\$2,280	\$16,620	\$20,068	\$20,068	
2038	\$6,938	\$1,747	\$5,095	\$2,108	\$15,888	\$19,184	\$19,184	
2039	\$6,938	\$1,604	\$4,679	\$1,935	\$15,156	\$18,300	\$18,300	
2040	\$6,938	\$1,461	\$4,262	\$1,763	\$14,425	\$17,417	\$17,417	
2041	\$6,938	\$1,333	\$3,888	\$1,608	\$13,767	\$16,623	\$16,623	
2042	\$6,938	\$1,234	\$3,598	\$1,488	\$13,258	\$16,008	\$16,008	
2043	\$6,938	\$1,149	\$3,350	\$1,386	\$12,823	\$15,483	\$15,483	
2044	\$6,938	\$1,064	\$3,102	\$1,283	\$12,388	\$14,957	\$14,957	
2045	\$6,938	\$979	\$2,855	\$1,181	\$11,953	\$14,432	\$14,432	
2046	\$6,938	\$894	\$2,607	\$1,078	\$11,518	\$13,907	\$13,907	
2047	\$6,938	\$809	\$2,359	\$976	\$11,083	\$13,382	\$13,382	
2048	\$6,938	\$724	\$2,112	\$873	\$10,648	\$12,856	\$12,856	
2049	\$6,938	\$639	\$1,864	\$771	\$10,213	\$12,331	\$12,331	
2050	\$6,938	\$554	\$1,616	\$669	\$9,778	\$11,806	\$11,806	
2051	\$6,938	\$469	\$1,369	\$566	\$9,343	\$11,281	\$11,281	
2052	\$6,938	\$384	\$1,121	\$464	\$8,908	\$10,755	\$10,755	
2053	\$6,938	\$300	\$873	\$361	\$8,473	\$10,230	\$10,230	
2054	\$6,938	\$215	\$626	\$259	\$8,038	\$9,705	\$9,705	
2055	\$6,938	\$130	\$378	\$156	\$7,603	\$9,180	\$9,180	
2056	\$6,360	\$44	\$129	\$53	\$6,587	\$7,953	\$7,953	
Total	\$208,147	\$49,644	\$148,947	\$61,673	\$468,411	\$565,579	\$565,579	

**VII. RESPONSES TO COMMISSION ORDER DATED JULY 26, 2021**

- 2. Code § 56-585.1:11 B specifies that “no customers of the utility shall be responsible for costs of any such [offshore wind generation] facility in a proportion greater than the utility’s share of the facility.”**
- a. Will Dominion own 100% of the OSW Project? If not, identify any additional owners.**
  - b. If any proportion of the OSW Project is owned by any entity other than Dominion, how will Dominion ensure that its own customers are not charged for costs in a proportion greater than Dominion’s share?**

(Addresses the additional information and analyses required by the Commission’s Order dated July 26, 2021)

Response:

- a) Yes.
- b) Not applicable.

## VII. RESPONSES TO COMMISSION ORDER DATED JULY 26, 2021

3. Code § 56-585.1:11 C 1 states that in acting upon a request from Dominion for recovery of costs associated with the OSW Project, “the Commission shall determine the reasonableness and prudence of any such costs, provided that such costs shall be presumed to be reasonably and prudently incurred if the Commission determines that . . . (iii) the utility has commenced construction of such facilities for U.S. income taxation purposes prior to January 1, 2024, or has a plan for such facility or facilities to be in service prior to January 1, 2028.” With this provision in mind:

- a. Where in the PJM Interconnection, L.L.C. (“PJM”) generation interconnection queue is the OSW Project?
- b. Could any PJM queue backlog impact costs to consumers in Virginia? If so, in what ways? As an increase or decrease to such costs?

(Addresses the additional information and analyses required by the Commission’s Order dated July 26, 2021)

Response:

- a) On September 25, 2019, Dominion Generation submitted three interconnection queue requests with PJM to construct the following:
  - AF1-123: an 880 MW Off-Shore Wind Facility with a projected in-service date (“ISD”) of December 31, 2025;
  - AF1-124: an 880 MW Off-Shore Wind Facility with a projected ISD of December 31, 2026; and
  - AF1-125: an 880 MW Off-Shore Wind Facility with a projected ISD of December 31, 2024.

Attachments VII.3.a.1, VII.3.a.2, and VII.3.a.3 list the identified potential network upgrades and associated cost allocations for Queue Requests AF1-123, 124, and 125, respectively. The following provides the current status of the CVOW Commercial Project in the PJM Interconnection Queue.

On January 22, 2020, PJM issued the Feasibility Study Reports for the three queue requests that constitute the proposed CVOW Commercial Project. On September 1, 2020, PJM issued the System Impact Study Reports for the three CVOW Commercial Project queue requests. As discussed below, in light of ongoing queue backlogs and continuing reviews by PJM, the Network Upgrades identified in these studies are considered initial and subject to change. Nevertheless, this information represents the most up to date and best information regarding Network Upgrades at this time.

Dominion Generation executed a Facility Study Agreement with PJM on October 20, 2020, with an estimated completion date of April 2022. On January 4, 2021, an Interim ISA was executed between PJM, Dominion Transmission and the Dominion Generation to allow for the permitting and engineering of the transmission facilities between the Interconnection Substation (Harpers Switching Station) and the expansion required at Fentress Substation to interconnect the new transmission facilities.

Since Dominion Generation executed a Facility Study Agreement, PJM placed all ongoing study work in the generation queues on hold in an attempt to resolve the current backlog with regards to issuing Facility Study Reports and ISAs. In October 2021, PJM proposed four frameworks for solutions regarding the backlog.<sup>7</sup> All four options utilize an effective date of October 1, 2022 (“Effective Date”). PJM is planning to complete all projects in queue AD2 by the Effective Date. After the Effective Date, the selected transition option will go into effect. The following are the four options under consideration, and how that relates to the CVOW Commercial Project, which as noted, occupies queue positions AF1-123, -124, and -125. Generally, for all options, PJM is estimating completing (either to an ISA or withdrawal) 300 projects per year.

In Option 1 (called the Classic Queue Option), PJM proposes to treat all projects in queues before AG1 (which would include CVOW) under the existing review process today (with certain new requirements). This option would appear to result in PJM issuing the CVOW Commercial Project’s Facility Study Report and ISA in mid- to late-2025.

In Option 2 (called the Accelerated Queue Option), PJM proposes to leave any remaining AD2 projects in the existing process, and proposes a two cycle transition approach for the AE1 through AG1 queues. Projects that remain and proceed within these transition cycles will need to post readiness requirements and demonstrate site control. The AF1 queue would be in the first transition cycle, and based on the framework proposed by PJM, it appears that PJM would issue CVOW’s Facility Study Report in mid- to late-2023, with the issuance and execution of an ISA in late-2023 or early 2024. In this option, PJM would “co-mingle” projects in AE1 through AG1, which it states could lead to different study results.

In Option 3 (called Alternate Transition Option), PJM proposes to leave any remaining AD2 projects in the existing process, and proposes a four cycle transition approach for the AE1 through AG1 queues. Projects that remain and proceed within these transition cycles will need to post readiness requirements and demonstrate site control. The AF1 queue

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<sup>7</sup> PJM’s summary of Proposed Transition Options is available at <https://www.pjm.com/-/media/committees-groups/task-forces/iprtf/2021/20211007/20211007-item-02a-solution-proposal-framework.ashx>.

would be in the transition cycle #2. Based on this option's framework, it appears that PJM would issue CVOW's Facility Study Report and ISA in early- to mid- 2024.

Finally, in Option 4 (called the Optional Option), PJM proposes to leave any remaining AD2 projects in the existing process, and give all projects in the AE1 through AG1 queues sixty days after the Effective Date to decide whether to remain under the existing process or move to a first transition cycle. Projects that remain will need to post readiness requirements and demonstrate site control, and projects that choose to move to a first transition cycle will lose their place in the queue and be "re-queued" after the last project that chose to remain in the existing process, but before the AG2 queue. Under this option, if the CVOW Commercial Project chose to remain in the existing process, it appears PJM would issue CVOW's Facility Study Report and ISA in mid-2024, and if CVOW chose to move to the first transition cycle, it appears PJM would issue CVOW's Facility Study Report and ISA at the end of 2025.

As can be seen from the CVOW Commercial Project timelines discussed in the Direct Testimonies of Company Witnesses Mark D. Mitchell and Joshua J. Bennett, as well as set forth in the Generation Appendix, under all of the options PJM is currently considering to address the backlog, it appears PJM will likely complete its work for the CVOW Commercial Project prior to the proposed interconnection and energization dates.

The Company anticipates that, once PJM completes its backlog study process and issues the Facility Study Report for the CVOW Commercial Project, the currently identified Network Upgrades likely will change from those preliminarily identified in the System Impacts Study Report, along with their associated costs, as certain Network Upgrades may change or may no longer be required and cost allocations and the associated Network Upgrade Cost are updated. At that time, the Company will assess the need for CPCNs for the Network Upgrades, as appropriate, and will apply to receive those CPCNs from the Commission. These changes in project scopes and required Network Upgrades, along with projected projects cost are a normal part of the PJM Interconnection Queue Process and not unique to the current PJM queue backlog.

- b) See the Company's response to part (a). Since it appears that PJM will complete its work for the CVOW Commercial Project prior to the proposed interconnection and energization dates, the Company does not anticipate that the backlog will increase or decrease costs to customers.

11.6 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-123	Upgrade Number
42881003,42880785,42880784,42881007	14	8ELMONT 500.0 kV - 8LADYSMITH 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : PJM baseline upgrade b3020: Rebuild 500kV Line #574 Ladysmith to Elmont - 26.2 miles long. The baseline project has a projected in-service date of 12/31/2022.  <b>Type</b> : FAC  <b>Ratings</b> : 4330.0/4330.0/4979.0</p> <p>Note 1: Although Queue Project AF1-123 may not have cost responsibility for this upgrade, Queue Project AF1-123 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-123 comes into service prior to completion of the upgrade, Queue Project AF1-123 will need an interim study.</p> <p><b>DVP</b>  <b>Description</b> : PJM Network Upgrade n6063: Replace wave trap at both Ladysmith and Possum Point Substations for the Ladysmith – Possum Pt 500kV line #568. This will increase line rating by 12% to 2913 MVA. The network project had a projected in-service date of 10/01/2019.  <b>Type</b> : FAC  <b>Total Cost</b> : \$300,000  <b>Time Estimate</b> : 14-16 Months  <b>Ratings</b> : 2598.0/2857.0/3637.0</p>			
42880925,42880928,42880769,42880768	16	8LADYSMITH 500.0 kV - 8POSSUM 500.0 kV Ckt 1	<p>Queue Project AF1-123 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-123 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-123 may not have cost responsibility for this upgrade, Queue Project AF1-123 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-123 comes into service prior to completion of the upgrade, Queue Project AF1-123 will need an interim study</p>	See Next Page	See Next Page	b3020, n6063, n6157, n6539

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-123	Upgrade Number																																																		
42881003,42880785,42880784,42881007	14	8ELMONT 500.0 kV - 8LADYSMITH 500.0 kV Ckt 1	<p><b>DVP (cont'd)</b>  <b>Description :</b> PJM Network Upgrade n6157: Relay Change Outs (CT) at Ladysmith and Possum Pt 500 kV substations.  <b>Type :</b> FAC  <b>Total Cost :</b> \$120,000  <b>Time Estimate :</b> 6-12 Months  <b>Ratings :</b> 3424.0/3424.0/3937.0</p> <p>Queue Project AF1-123 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-123 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-123 may not have cost responsibility for this upgrade, Queue Project AF1-123 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-123 comes into service prior to completion of the upgrade, Queue Project AF1-123 will need an interim study</p>	\$400,420,000	\$31,060,205	b3020 n6063, n6157, n6539																																																		
			<p><b>Description :</b> PJM Network Upgrade n6539. Build new 500 kV Line from Rawlings to Morrisville Substation 110 miles.  <b>Type :</b> CON  <b>Total Cost :</b> \$400,000,000  <b>Time Estimate :</b> 60-72 Months</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AE2-007</td><td>111.51</td><td>6.63%</td><td>\$26,511,968</td></tr> <tr><td>AE2-031</td><td>50.74</td><td>3.02%</td><td>\$12,063,647</td></tr> <tr><td>AE2-033</td><td>44.27</td><td>2.63%</td><td>\$10,525,377</td></tr> <tr><td>AE2-051</td><td>46.09</td><td>2.74%</td><td>\$10,958,090</td></tr> <tr><td>AE2-094</td><td>103.22</td><td>6.14%</td><td>\$24,540,986</td></tr> <tr><td>AE2-122</td><td>258.98</td><td>15.39%</td><td>\$61,573,576</td></tr> <tr><td>AE2-123</td><td>258.98</td><td>15.39%</td><td>\$61,573,576</td></tr> <tr><td>AE2-124</td><td>258.90</td><td>15.39%</td><td>\$61,554,556</td></tr> <tr><td>AE2-147</td><td>46.83</td><td>2.78%</td><td>\$11,134,028</td></tr> <tr><td>AE2-156</td><td>32.48</td><td>1.93%</td><td>\$7,722,256</td></tr> <tr><td>AE2-270</td><td>49.68</td><td>2.95%</td><td>\$11,811,627</td></tr> <tr><td>AE2-313</td><td>290.09</td><td>17.24%</td><td>\$68,970,108</td></tr> <tr><td>AF1-123</td><td>130.64</td><td>7.77%</td><td>\$31,060,205</td></tr> </tbody> </table> <p>This upgrade will need to be tested during the Facilities Study phase to ensure it does not cause any additional violations.</p>				Queue	MW	Cost %	Cost \$	AE2-007	111.51	6.63%	\$26,511,968	AE2-031	50.74	3.02%	\$12,063,647	AE2-033	44.27	2.63%	\$10,525,377	AE2-051	46.09	2.74%	\$10,958,090	AE2-094	103.22	6.14%	\$24,540,986	AE2-122	258.98	15.39%	\$61,573,576	AE2-123	258.98	15.39%	\$61,573,576	AE2-124	258.90	15.39%	\$61,554,556	AE2-147	46.83	2.78%	\$11,134,028	AE2-156	32.48	1.93%	\$7,722,256	AE2-270	49.68	2.95%	\$11,811,627	AE2-313	290.09
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89975214	6	AD1-087 TAP 230.0 kV - 6SEEDGE HILL 230.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Rebuild 16.71 miles of 230 kV Line 2068 from AD1-087 Tap to Sedge Hill with 2-795 ACSR.  <b>Type</b> : FAC  <b>Total Cost</b> : \$25,065,000  <b>Time Estimate</b> : 36-40 Months  <b>Ratings</b> : 1225.0/1225.0/1409.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr> <td>AE2-051</td> <td>2.48</td> <td>2.65%</td> <td>\$664,612</td> </tr> <tr> <td>AE2-094</td> <td>23.72</td> <td>25.36%</td> <td>\$6,356,696</td> </tr> <tr> <td>AE2-122</td> <td>11.13</td> <td>11.90%</td> <td>\$2,982,716</td> </tr> <tr> <td>AE2-123</td> <td>11.44</td> <td>12.23%</td> <td>\$3,065,793</td> </tr> <tr> <td>AE2-124</td> <td>10.39</td> <td>11.11%</td> <td>\$2,784,404</td> </tr> <tr> <td>AE2-313</td> <td>23.91</td> <td>25.56%</td> <td>\$6,407,614</td> </tr> <tr> <td>AF1-123</td> <td>10.46</td> <td>11.18%</td> <td>\$2,803,164</td> </tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE2-051	2.48	2.65%	\$664,612	AE2-094	23.72	25.36%	\$6,356,696	AE2-122	11.13	11.90%	\$2,982,716	AE2-123	11.44	12.23%	\$3,065,793	AE2-124	10.39	11.11%	\$2,784,404	AE2-313	23.91	25.56%	\$6,407,614	AF1-123	10.46	11.18%	\$2,803,164	\$25,065,000	\$2,803,164	n6514
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42880843,42880714,42880713,42880844,42880852	12	8CHCKAHM 500.0 kV - BELMONT 500.0 kV Ckt 1	<p><b>DVP</b> Project Id : n5464 Description : Replace wave trap at Chickahominy Substation. Type : FAC Total Cost : \$500,000 Time Estimate : 30-36 Months Ratings : 3424.0/3424.0/3937.0</p> <p>Queue Project AF1-123 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-123 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-123 may not have cost responsibility for this upgrade, Queue Project AF1-123 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-123 comes into service prior to completion of the upgrade, Queue Project AF1-123 will need an interim study</p> <p>Project Id : n6207 (dom-021) Description : Rebuild 3 miles of 230 kV Line 211 from Hopewell to Chesterfield with 2-636 ACSR. Type : FAC Total Cost : \$85,932,000 Time Estimate : 48-60 Months Ratings : 4453.0/4453.0/5121.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>Unknown</td><td>528.74</td><td>21.65%</td><td>\$18,600,372</td></tr> <tr><td>AE1-026</td><td>62.85</td><td>2.57%</td><td>\$2,210,980</td></tr> <tr><td>AE1-103</td><td>11.22</td><td>0.46%</td><td>\$394,705</td></tr> <tr><td>AE1-173</td><td>244.70</td><td>10.02%</td><td>\$8,608,221</td></tr> <tr><td>AE1-248</td><td>40.38</td><td>1.65%</td><td>\$1,420,515</td></tr> <tr><td>AE2-007</td><td>316.41</td><td>12.95%</td><td>\$11,130,884</td></tr> <tr><td>AE2-031</td><td>79.11</td><td>3.24%</td><td>\$2,782,985</td></tr> <tr><td>AE2-051</td><td>44.93</td><td>1.84%</td><td>\$1,580,578</td></tr> <tr><td>AE2-094</td><td>82.66</td><td>3.38%</td><td>\$2,907,869</td></tr> <tr><td>AE2-122</td><td>261.14</td><td>10.69%</td><td>\$9,186,559</td></tr> <tr><td>AE2-123</td><td>261.14</td><td>10.69%</td><td>\$9,186,559</td></tr> <tr><td>AE2-124</td><td>261.15</td><td>10.69%</td><td>\$9,186,910</td></tr> <tr><td>AE2-147</td><td>46.14</td><td>1.89%</td><td>\$1,623,144</td></tr> <tr><td>AE2-156</td><td>31.15</td><td>1.28%</td><td>\$1,095,816</td></tr> <tr><td>AE2-270</td><td>36.93</td><td>1.51%</td><td>\$1,299,148</td></tr> <tr><td>AE2-313</td><td>48.58</td><td>1.99%</td><td>\$1,708,980</td></tr> <tr><td>AF1-123</td><td>85.5</td><td>3.50%</td><td>\$3,007,777</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	Unknown	528.74	21.65%	\$18,600,372	AE1-026	62.85	2.57%	\$2,210,980	AE1-103	11.22	0.46%	\$394,705	AE1-173	244.70	10.02%	\$8,608,221	AE1-248	40.38	1.65%	\$1,420,515	AE2-007	316.41	12.95%	\$11,130,884	AE2-031	79.11	3.24%	\$2,782,985	AE2-051	44.93	1.84%	\$1,580,578	AE2-094	82.66	3.38%	\$2,907,869	AE2-122	261.14	10.69%	\$9,186,559	AE2-123	261.14	10.69%	\$9,186,559	AE2-124	261.15	10.69%	\$9,186,910	AE2-147	46.14	1.89%	\$1,623,144	AE2-156	31.15	1.28%	\$1,095,816	AE2-270	36.93	1.51%	\$1,299,148	AE2-313	48.58	1.99%	\$1,708,980	AF1-123	85.5	3.50%	\$3,007,777	\$86,432,000	\$3,007,777	n5464, n6207
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42880864,5309 7377,42880728, 42880863	3	8MDLTHAN 500.0 kV - 8NO ANNA 500.0 kV Ckt 1	<p><b>DVP</b> Project Id : n6055 Description : Replace Wavetraps at Milothian and North Anna 500kV substations. Type : FAC Total Cost : \$300,000 Time Estimate : 16-18 Months Ratings : 3424.0/3424.0/3938.0</p> <p>Queue Project AF1-123 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-123 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-123 may not have cost responsibility for this upgrade, Queue Project AF1-123 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-123 comes into service prior to completion of the upgrade, Queue Project AF1-123 will need an interim study.</p> <p>Project Id : n5609 (dom-023) Description : Rebuild 41.13 miles of 500 kV Line 576 from Midlothian to North Anna with 3-1351.5 125C ACSR. Type : FAC Total Cost : \$127,503,000 Time Estimate : 48-60 Months Ratings : 4816.0/4816.0/5539.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AC2-141</td><td>77.46</td><td>2.91%</td><td>\$3,711,060</td></tr> <tr><td>AD1-025</td><td>41.93</td><td>1.58%</td><td>\$2,008,840</td></tr> <tr><td>AD1-076</td><td>137.77</td><td>5.18%</td><td>\$6,600,475</td></tr> <tr><td>AD1-151</td><td>41.9</td><td>1.57%</td><td>\$2,007,403</td></tr> <tr><td>AE1-026</td><td>67.94</td><td>2.55%</td><td>\$3,254,963</td></tr> <tr><td>AE1-068</td><td>169.18</td><td>6.36%</td><td>\$8,105,309</td></tr> <tr><td>AE1-069</td><td>135.34</td><td>5.09%</td><td>\$6,484,055</td></tr> <tr><td>AE1-072</td><td>47.387</td><td>1.78%</td><td>\$2,270,282</td></tr> <tr><td>AE1-173</td><td>274.68</td><td>10.32%</td><td>\$13,159,748</td></tr> <tr><td>AE1-248</td><td>44.9</td><td>1.69%</td><td>\$2,151,131</td></tr> <tr><td>AE2-007</td><td>308.19</td><td>11.58%</td><td>\$14,765,191</td></tr> <tr><td>AE2-031</td><td>99.14</td><td>3.73%</td><td>\$4,749,736</td></tr> <tr><td>AE2-033</td><td>44.23</td><td>1.66%</td><td>\$2,119,032</td></tr> <tr><td>AE2-051</td><td>52.79</td><td>1.98%</td><td>\$2,529,136</td></tr> <tr><td>AE2-094</td><td>103.32</td><td>3.88%</td><td>\$4,949,997</td></tr> <tr><td>AE2-122</td><td>254.67</td><td>9.57%</td><td>\$12,201,081</td></tr> <tr><td>AE2-123</td><td>254.67</td><td>9.57%</td><td>\$12,201,081</td></tr> <tr><td>AE2-124</td><td>254.69</td><td>9.57%</td><td>\$12,202,039</td></tr> <tr><td>AE2-147</td><td>46.24</td><td>1.74%</td><td>\$2,215,330</td></tr> <tr><td>AE2-156</td><td>28.76</td><td>1.08%</td><td>\$1,377,874</td></tr> <tr><td>AE2-270</td><td>40.32</td><td>1.52%</td><td>\$1,931,706</td></tr> <tr><td>AE2-313</td><td>60.53</td><td>2.27%</td><td>\$2,899,955</td></tr> <tr><td>AF1-123</td><td>75.3</td><td>2.83%</td><td>\$3,607,576</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AC2-141	77.46	2.91%	\$3,711,060	AD1-025	41.93	1.58%	\$2,008,840	AD1-076	137.77	5.18%	\$6,600,475	AD1-151	41.9	1.57%	\$2,007,403	AE1-026	67.94	2.55%	\$3,254,963	AE1-068	169.18	6.36%	\$8,105,309	AE1-069	135.34	5.09%	\$6,484,055	AE1-072	47.387	1.78%	\$2,270,282	AE1-173	274.68	10.32%	\$13,159,748	AE1-248	44.9	1.69%	\$2,151,131	AE2-007	308.19	11.58%	\$14,765,191	AE2-031	99.14	3.73%	\$4,749,736	AE2-033	44.23	1.66%	\$2,119,032	AE2-051	52.79	1.98%	\$2,529,136	AE2-094	103.32	3.88%	\$4,949,997	AE2-122	254.67	9.57%	\$12,201,081	AE2-123	254.67	9.57%	\$12,201,081	AE2-124	254.69	9.57%	\$12,202,039	AE2-147	46.24	1.74%	\$2,215,330	AE2-156	28.76	1.08%	\$1,377,874	AE2-270	40.32	1.52%	\$1,931,706	AE2-313	60.53	2.27%	\$2,899,955	AF1-123	75.3	2.83%	\$3,607,576	\$127,803,000	\$3,607,576	n6055, n5609
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AC2-141	77.46	2.91%	\$3,711,060																																																																																																			
AD1-025	41.93	1.58%	\$2,008,840																																																																																																			
AD1-076	137.77	5.18%	\$6,600,475																																																																																																			
AD1-151	41.9	1.57%	\$2,007,403																																																																																																			
AE1-026	67.94	2.55%	\$3,254,963																																																																																																			
AE1-068	169.18	6.36%	\$8,105,309																																																																																																			
AE1-069	135.34	5.09%	\$6,484,055																																																																																																			
AE1-072	47.387	1.78%	\$2,270,282																																																																																																			
AE1-173	274.68	10.32%	\$13,159,748																																																																																																			
AE1-248	44.9	1.69%	\$2,151,131																																																																																																			
AE2-007	308.19	11.58%	\$14,765,191																																																																																																			
AE2-031	99.14	3.73%	\$4,749,736																																																																																																			
AE2-033	44.23	1.66%	\$2,119,032																																																																																																			
AE2-051	52.79	1.98%	\$2,529,136																																																																																																			
AE2-094	103.32	3.88%	\$4,949,997																																																																																																			
AE2-122	254.67	9.57%	\$12,201,081																																																																																																			
AE2-123	254.67	9.57%	\$12,201,081																																																																																																			
AE2-124	254.69	9.57%	\$12,202,039																																																																																																			
AE2-147	46.24	1.74%	\$2,215,330																																																																																																			
AE2-156	28.76	1.08%	\$1,377,874																																																																																																			
AE2-270	40.32	1.52%	\$1,931,706																																																																																																			
AE2-313	60.53	2.27%	\$2,899,955																																																																																																			
AF1-123	75.3	2.83%	\$3,607,576																																																																																																			

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-123	Upgrade Number																																																																
42880723,42880724,42880910	2	8CARSON 500.0 kV - 8MDLTHAN 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Rebuild 37.41 miles of 500 kV Line 563 from Carson to Midlothian with 3-1351.5 125C ACSR..  <b>Type</b> : FAC  <b>Total Cost</b> : \$115,971,000  <b>Time Estimate</b> : 48-60 Months  <b>Ratings</b> : 4816.0/4816.0/5539.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AE1-068</td><td>78.16</td><td>3.74%</td><td>\$4,335,489</td></tr> <tr><td>AE1-069</td><td>148.28</td><td>7.09%</td><td>\$8,225,004</td></tr> <tr><td>AE1-072</td><td>45.84</td><td>2.19%</td><td>\$2,542,718</td></tr> <tr><td>AE1-173</td><td>292.3</td><td>13.98%</td><td>\$16,213,708</td></tr> <tr><td>AE2-007</td><td>297.76</td><td>14.24%</td><td>\$16,516,571</td></tr> <tr><td>AE2-031</td><td>108.56</td><td>5.19%</td><td>\$6,021,759</td></tr> <tr><td>AE2-051</td><td>57.57</td><td>2.75%</td><td>\$3,193,374</td></tr> <tr><td>AE2-094</td><td>113.6</td><td>5.43%</td><td>\$6,301,325</td></tr> <tr><td>AE2-122</td><td>246.83</td><td>11.81%</td><td>\$13,691,514</td></tr> <tr><td>AE2-123</td><td>246.83</td><td>11.81%</td><td>\$13,691,514</td></tr> <tr><td>AE2-124</td><td>246.99</td><td>11.81%</td><td>\$13,700,389</td></tr> <tr><td>AE2-147</td><td>44.67</td><td>2.14%</td><td>\$2,477,818</td></tr> <tr><td>AE2-260</td><td>18.76</td><td>0.90%</td><td>\$1,040,606</td></tr> <tr><td>AE2-313</td><td>65.67</td><td>3.14%</td><td>\$3,642,676</td></tr> <tr><td>AF1-123</td><td>78.9</td><td>3.77%</td><td>\$4,376,536</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE1-068	78.16	3.74%	\$4,335,489	AE1-069	148.28	7.09%	\$8,225,004	AE1-072	45.84	2.19%	\$2,542,718	AE1-173	292.3	13.98%	\$16,213,708	AE2-007	297.76	14.24%	\$16,516,571	AE2-031	108.56	5.19%	\$6,021,759	AE2-051	57.57	2.75%	\$3,193,374	AE2-094	113.6	5.43%	\$6,301,325	AE2-122	246.83	11.81%	\$13,691,514	AE2-123	246.83	11.81%	\$13,691,514	AE2-124	246.99	11.81%	\$13,700,389	AE2-147	44.67	2.14%	\$2,477,818	AE2-260	18.76	0.90%	\$1,040,606	AE2-313	65.67	3.14%	\$3,642,676	AF1-123	78.9	3.77%	\$4,376,536	\$115,971,000	\$4,376,536	n6172
Queue	MW	Cost %	Cost \$																																																																			
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71713926,71713925	8	6SKIFF CREEK 230.0 kV - 6KINGS M 230.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : PJM Baseline Upgrade b3057. Rebuild 6.1 miles of Waller-Skiffess Creek 230 kV Line (#2154) between Waller and Kings Mill to current standards with a minimum summer emergency rating of 1047 MVA utilizing single circuit steel structures. Remove this 6.1 mile section of Line #58 between Waller and Kings Mill. Rebuild the 1.6 miles of Line #2154 and #19 between Kings Mill and Skiffes Creek to current standards with a minimum summer emergency rating of 1047 MVA at 230 kV for Line #2154 and 261 MVA at 115 kV for Line #19, utilizing double circuit steel structures. The baseline project has a projected in-service date of 12/30/2024.  <b>Type</b> : FAC  <b>Ratings</b> : 1047.0/1047.0/1204.0</p> <p>Note 1: Although Queue Project AF1-123 may not have cost responsibility for this upgrade, Queue Project AF1-123 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-123 comes into service prior to completion of the upgrade, Queue Project AF1-123 will need an interim study.</p>	\$0	\$0	b3057																																																																
71713971,71713972	11	6KINGS M 230.0 kV - 6PENNIMAN 230.0 kV Ckt 1																																																																				
71714012,71714011	10	6PENNIMAN 230.0 kV - 6WALR209 230.0 kV Ckt 1																																																																				

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42880940,42880733,42880941,42880736	15	8LADYSMITH 500.0 kV - 8CHANCE 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : PJM baseline upgrade b3021: Rebuild 500kV Line #581 Ladysmith to Chancellor - 15.2 miles long. The baseline project has a projected in-service date of 12/31/2023.  <b>Type</b> : FAC  <b>Ratings</b> : 4330.0/4330.0/4979.0</p> <p>Note 1: Although Queue Project AF1-123 may not have cost responsibility for this upgrade, Queue Project AF1-123 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-123 comes into service prior to completion of the upgrade, Queue Project AF1-123 will need an interim study.</p>	\$0	\$0	b3021
42880855	5	AC1-221 TAP 230.0 kV - 6PERSON230 T 230.0 kV Ckt 1	<p><b>DVP</b>  The line rating at DVP portion of this tie line is 904MVA (normal), 904MVA (Emergency) and 1105 MVA (Load Dump). Therefore, the line limiting element is not overloaded on the DVP portion of this line.</p> <p><b>CPL</b>  An affected systems study will need to be completed with Duke/Progress to determine upgrades required on the Duke/Progress system.</p>	\$0	\$0	N/A
42880898,42880749,42880748,42880900	13	8CHANCE 500.0 kV - 8BRISTER 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : PJM baseline upgrade b3019: Rebuild 500kV Line #552 Bristers to Chancellor 21.6 miles long. The baseline project has a projected in-service date of 12/31/2023.  <b>Type</b> : FAC  <b>Ratings</b> : 4330.0/4330.0/4979.0</p> <p>Note 1: Although Queue Project AF1-123 may not have cost responsibility for this upgrade, Queue Project AF1-123 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-123 comes into service prior to completion of the upgrade, Queue Project AF1-123 will need an interim study.</p>	\$0	\$0	b3019
42881042	4	8MORRSVL 500.0 kV - 8LOUDOUN 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : PJM baseline upgrade b3211: Rebuild the 1.3 mile section of 500 kV Line No.569 (Loudoun - Morrisville) with single-circuit 500 kV structures at the current 500 kV standard. This will increase the rating of the line to 3424 MVA. The baseline project has a projected in-service date of 12/31/2024.  <b>Type</b> : FAC</p> <p>Note 1: Although Queue Project AF1-123 may not have cost responsibility for this upgrade, Queue Project AF1-123 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-123 comes into service prior to completion of the upgrade, Queue Project AF1-123 will need an interim study.</p>	\$0	\$0	b3211

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-123	Upgrade Number
71714153	1	6WALR209 230.0 kV - 6LIGH209 230.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : PJM Baseline Upgrade b3056: Partial Rebuild 230 kV Line #2113 Waller to Lightfoot. The baseline project has a projected in-service date of 12/30/2024.  <b>Type</b> : FAC  <b>Ratings</b> : 1047.0/1047.0/1204.0</p> <p>Note 1: Although Queue Project AF1-123 may not have cost responsibility for this upgrade, Queue Project AF1-123 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-123 comes into service prior to completion of the upgrade, Queue Project AF1-123 will need an interim study.</p>	\$0	\$0	b3056
42881058	19	8OX 500.0 kV - 8CLIFTON 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Replace Wavetraps at Ox and Clifton 500 kV substations.  <b>Type</b> : FAC  <b>Total Cost</b> : \$300,000  <b>Time Estimate</b> : 16-18 Months  <b>Ratings</b> : 3424.0/3424.0/3938.0</p> <p>Queue Project AF1-123 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-123 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-123 may not have cost responsibility for this upgrade, Queue Project AF1-123 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-123 comes into service prior to completion of the upgrade, Queue Project AF1-123 will need an interim study</p>	\$300,000	\$0	n6161
42880718,4288 0719	7	8SURRY 500.0 kV - 8CHCKAHM 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Replace Terminal Equipment at Surry and Chickahominy Substations.  <b>Type</b> : FAC  <b>Total Cost</b> : \$4,000,000  <b>Time Estimate</b> : 16-18 Months  <b>Ratings</b> : 3424.0/3424.0/3938.0</p> <p>Queue Project AF1-123 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-123 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-123 may not have cost responsibility for this upgrade, Queue Project AF1-123 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-123 comes into service prior to completion of the upgrade, Queue Project AF1-123 will need an interim study</p>	\$4,000,000	\$0	n6324

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42880738,42880739,42880953,42880954	20	8SPOTSYL 500.0 kV - 8MORRSVL 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Rebuild 18.75 miles of 500 kV Line 594 from Spotsylvania to Morrisville with 3-1351.5 113C ACSR.  <b>Type</b> : FAC  <b>Total Cost</b> : \$58,125,000  <b>Time Estimate</b> : 48-60 Months  <b>Ratings</b> : 4453.0/4453.0/5121.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AE1-069</td><td>11.49</td><td>1.44%</td><td>\$837,942</td></tr> <tr><td>AE1-173</td><td>178.09</td><td>22.34%</td><td>\$12,987,731</td></tr> <tr><td>AE1-206</td><td>62.76</td><td>7.87%</td><td>\$4,576,955</td></tr> <tr><td>AE2-007</td><td>210.87</td><td>26.46%</td><td>\$15,378,308</td></tr> <tr><td>AE2-031</td><td>38.03</td><td>4.77%</td><td>\$2,773,448</td></tr> <tr><td>AE2-034</td><td>9.99</td><td>1.25%</td><td>\$728,550</td></tr> <tr><td>AE2-094</td><td>45.55</td><td>5.72%</td><td>\$3,321,866</td></tr> <tr><td>AE2-122</td><td>34.55</td><td>4.33%</td><td>\$2,519,659</td></tr> <tr><td>AE2-123</td><td>35.51</td><td>4.46%</td><td>\$2,589,670</td></tr> <tr><td>AE2-124</td><td>32.28</td><td>4.05%</td><td>\$2,354,113</td></tr> <tr><td>AE2-250</td><td>8.73</td><td>1.10%</td><td>\$636,661</td></tr> <tr><td>AE2-270</td><td>32.6</td><td>4.09%</td><td>\$2,377,450</td></tr> <tr><td>AE2-313</td><td>41.13</td><td>5.16%</td><td>\$2,999,525</td></tr> <tr><td>AF1-123</td><td>55.44</td><td>6.96%</td><td>\$4,043,123</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE1-069	11.49	1.44%	\$837,942	AE1-173	178.09	22.34%	\$12,987,731	AE1-206	62.76	7.87%	\$4,576,955	AE2-007	210.87	26.46%	\$15,378,308	AE2-031	38.03	4.77%	\$2,773,448	AE2-034	9.99	1.25%	\$728,550	AE2-094	45.55	5.72%	\$3,321,866	AE2-122	34.55	4.33%	\$2,519,659	AE2-123	35.51	4.46%	\$2,589,670	AE2-124	32.28	4.05%	\$2,354,113	AE2-250	8.73	1.10%	\$636,661	AE2-270	32.6	4.09%	\$2,377,450	AE2-313	41.13	5.16%	\$2,999,525	AF1-123	55.44	6.96%	\$4,043,123	\$58,125,000	\$4,043,123	n6160
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42880753,42880989,42880754,42880988	17	8NO ANNA 500.0 kV - 8LADYSMITH 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Rebuild 14.53 miles of 500 kV Line 575 from North Anna to Ladysmith with 3-1351.5 113C ACSR.  <b>Type</b> : FAC  <b>Total Cost</b> : \$45,043,000  <b>Time Estimate</b> : 48-60 Months  <b>Ratings</b> : 4453.0/4453.0/5121.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AE2-031</td><td>34.63</td><td>6.68%</td><td>\$3,006,919</td></tr> <tr><td>AE2-094</td><td>41.5</td><td>8.00%</td><td>\$3,603,440</td></tr> <tr><td>AE2-122</td><td>115.02</td><td>22.17%</td><td>\$9,987,173</td></tr> <tr><td>AE2-123</td><td>115.02</td><td>22.17%</td><td>\$9,987,173</td></tr> <tr><td>AE2-124</td><td>115.08</td><td>22.18%</td><td>\$9,992,383</td></tr> <tr><td>AE2-313</td><td>62.52</td><td>12.05%</td><td>\$5,428,604</td></tr> <tr><td>AF1-123</td><td>34.98</td><td>6.74%</td><td>\$3,037,309</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE2-031	34.63	6.68%	\$3,006,919	AE2-094	41.5	8.00%	\$3,603,440	AE2-122	115.02	22.17%	\$9,987,173	AE2-123	115.02	22.17%	\$9,987,173	AE2-124	115.08	22.18%	\$9,992,383	AE2-313	62.52	12.05%	\$5,428,604	AF1-123	34.98	6.74%	\$3,037,309	\$45,043,000	\$3,037,309	n6574																												
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42880775,42880776,42881020,42881021	18	8NO ANNA 500.0 kV - 8SPOTSYL 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description :</b> Rebuild 14.02 miles of 500 kV Line 573 from North Anna to Spotsylvania with 3-1351.5 113C ACSR.  <b>Type :</b> FAC  <b>Total Cost :</b> \$43,462,000  <b>Time Estimate :</b> 48-60 Months  <b>Ratings :</b> 4453.0/4453.0/5121.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AE1-075</td><td>2.36</td><td>0.33%</td><td>\$145,113</td></tr> <tr><td>AE1-173</td><td>108.39</td><td>15.33%</td><td>\$6,664,751</td></tr> <tr><td>AE1-206</td><td>63.74</td><td>9.02%</td><td>\$3,919,285</td></tr> <tr><td>AE2-007</td><td>213.18</td><td>30.16%</td><td>\$13,108,144</td></tr> <tr><td>AE2-031</td><td>38.46</td><td>5.44%</td><td>\$2,364,852</td></tr> <tr><td>AE2-094</td><td>46.07</td><td>6.52%</td><td>\$2,832,781</td></tr> <tr><td>AE2-122</td><td>34.93</td><td>4.94%</td><td>\$2,147,797</td></tr> <tr><td>AE2-123</td><td>35.9</td><td>5.08%</td><td>\$2,207,441</td></tr> <tr><td>AE2-124</td><td>32.64</td><td>4.62%</td><td>\$2,006,988</td></tr> <tr><td>AE2-270</td><td>32.95</td><td>4.66%</td><td>\$2,026,050</td></tr> <tr><td>AE2-313</td><td>41.59</td><td>5.88%</td><td>\$2,557,312</td></tr> <tr><td>AF1-123</td><td>56.62</td><td>8.01%</td><td>\$3,481,486</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE1-075	2.36	0.33%	\$145,113	AE1-173	108.39	15.33%	\$6,664,751	AE1-206	63.74	9.02%	\$3,919,285	AE2-007	213.18	30.16%	\$13,108,144	AE2-031	38.46	5.44%	\$2,364,852	AE2-094	46.07	6.52%	\$2,832,781	AE2-122	34.93	4.94%	\$2,147,797	AE2-123	35.9	5.08%	\$2,207,441	AE2-124	32.64	4.62%	\$2,006,988	AE2-270	32.95	4.66%	\$2,026,050	AE2-313	41.59	5.88%	\$2,557,312	AF1-123	56.62	8.01%	\$3,481,486	\$43,462,000	\$3,481,486	n6132																
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71893418	9	6CHESTF B 230.0 kV - 6BASIN 230.0 kV Ckt 1	<p><b>DVP</b>  <b>Description :</b> Rebuild 12.4 miles of 230 kV Line 259 from Chesterfield to Basin with 2-636 ACSR.  <b>Type :</b> FAC  <b>Total Cost :</b> \$31,000,000  <b>Time Estimate :</b> 30-36 Months  <b>Ratings :</b> 1047.0/1047.0/1204.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AE1-069</td><td>9.09</td><td>3.38%</td><td>\$1,046,574</td></tr> <tr><td>AE1-085</td><td>9.61</td><td>3.57%</td><td>\$1,106,444</td></tr> <tr><td>AE1-149</td><td>13.77</td><td>5.11%</td><td>\$1,585,404</td></tr> <tr><td>AE1-173</td><td>53.3</td><td>19.80%</td><td>\$6,136,676</td></tr> <tr><td>AE2-000B</td><td>10.26</td><td>3.81%</td><td>\$1,181,281</td></tr> <tr><td>AE2-027</td><td>12.15</td><td>4.51%</td><td>\$1,398,886</td></tr> <tr><td>AE2-031</td><td>21.17</td><td>7.86%</td><td>\$2,437,400</td></tr> <tr><td>AE2-033</td><td>17.96</td><td>6.67%</td><td>\$2,067,818</td></tr> <tr><td>AE2-051</td><td>5.71</td><td>2.12%</td><td>\$657,419</td></tr> <tr><td>AE2-094</td><td>22.19</td><td>8.24%</td><td>\$2,554,838</td></tr> <tr><td>AE2-157</td><td>11.22</td><td>4.17%</td><td>\$1,291,811</td></tr> <tr><td>AE2-250</td><td>9.6</td><td>3.57%</td><td>\$1,105,292</td></tr> <tr><td>AE2-260</td><td>20.47</td><td>7.60%</td><td>\$2,356,806</td></tr> <tr><td>AE2-270</td><td>14.89</td><td>5.53%</td><td>\$1,714,355</td></tr> <tr><td>AE2-313</td><td>22.88</td><td>8.50%</td><td>\$2,634,280</td></tr> <tr><td>AF1-123</td><td>14.98</td><td>5.56%</td><td>\$1,724,717</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE1-069	9.09	3.38%	\$1,046,574	AE1-085	9.61	3.57%	\$1,106,444	AE1-149	13.77	5.11%	\$1,585,404	AE1-173	53.3	19.80%	\$6,136,676	AE2-000B	10.26	3.81%	\$1,181,281	AE2-027	12.15	4.51%	\$1,398,886	AE2-031	21.17	7.86%	\$2,437,400	AE2-033	17.96	6.67%	\$2,067,818	AE2-051	5.71	2.12%	\$657,419	AE2-094	22.19	8.24%	\$2,554,838	AE2-157	11.22	4.17%	\$1,291,811	AE2-250	9.6	3.57%	\$1,105,292	AE2-260	20.47	7.60%	\$2,356,806	AE2-270	14.89	5.53%	\$1,714,355	AE2-313	22.88	8.50%	\$2,634,280	AF1-123	14.98	5.56%	\$1,724,717	\$31,000,000	\$1,724,717	n6130
Queue	MW	Cost %	Cost \$																																																																							
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			<b>TOTAL COST</b>	<b>\$937,621,000</b>	<b>\$57,141,893</b>																																																																					

Note : For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates \$0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently \$0, your project may need this system reinforcement

Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G%	POST PROJECT LOADIN G%	AC D C	MW IMPAC T
71713736	314303	6HOPEWLL	230.0	DVP	314286	6CHESTFA	230.0	DVP	1	DVP_P1-2: LN 211	operation	449.320007324	91.48	100.51	AC	47.76
71713781	314303	6HOPEWLL	230.0	DVP	314287	6CHESTFB	230.0	DVP	1	DVP_P1-2: LN 228	operation	449.320007324	86.27	95.6	AC	49.29
46122161	314536	3SUFFOLK	115.0	DVP	314532	3OAKRIZ3	115.0	DVP	1	DVP_P1-3: 8CARSON-TX#2	operation	110.919998169	80.92	90.32	AC	6.18
71714246	314747	6BREMO	230.0	DVP	314744	3BREMO	115.0	DVP	1	DVP_P1-2: LN 2193	operation	269.779998779	67.1	76.02	AC	18.45

### 12.6 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-123	Upgrade Number																																				
71713780	4	6HOPEWLL 230.0 kV - 6CHESTFB 230.0 kV Ckt 1	n6500 Description : Rebuild 3 miles of 230 kV Line 211 from Hopewell to Chesterfield with 2-636 ACSR.  Type : FAC  Total Cost : \$7,500,000  Time Estimate : 30-36 Months  Ratings : 1047.0/1047.0/1204.0  The cost allocation table is as follows:	\$7,500,000	\$1,091,292	n6500																																				
			<table border="1"> <thead> <tr> <th>Queue</th> <th>MW contribution</th> <th>Percentage of Cost</th> <th>Cost (\$7,500,000)</th> </tr> </thead> <tbody> <tr> <td>AE2-007</td> <td>62.53</td> <td>18.46%</td> <td>\$1,384,428</td> </tr> <tr> <td>AE2-122</td> <td>56.77</td> <td>16.76%</td> <td>\$1,256,900</td> </tr> <tr> <td>AE2-123</td> <td>56.77</td> <td>16.76%</td> <td>\$1,256,900</td> </tr> <tr> <td>AE2-124</td> <td>56.36</td> <td>16.64%</td> <td>\$1,247,823</td> </tr> <tr> <td>AE2-156</td> <td>7.57</td> <td>2.23%</td> <td>\$167,601</td> </tr> <tr> <td>AE2-270</td> <td>36.26</td> <td>10.70%</td> <td>\$802,804</td> </tr> <tr> <td>AF1-115</td> <td>13.2</td> <td>3.90%</td> <td>\$292,251</td> </tr> <tr> <td>AF1-123</td> <td>49.29</td> <td>14.55%</td> <td>\$1,091,292</td> </tr> </tbody> </table>				Queue	MW contribution	Percentage of Cost	Cost (\$7,500,000)	AE2-007	62.53	18.46%	\$1,384,428	AE2-122	56.77	16.76%	\$1,256,900	AE2-123	56.77	16.76%	\$1,256,900	AE2-124	56.36	16.64%	\$1,247,823	AE2-156	7.57	2.23%	\$167,601	AE2-270	36.26	10.70%	\$802,804	AF1-115	13.2	3.90%	\$292,251	AF1-123	49.29	14.55%	\$1,091,292
			Queue				MW contribution	Percentage of Cost	Cost (\$7,500,000)																																	
			AE2-007				62.53	18.46%	\$1,384,428																																	
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			AF1-115				13.2	3.90%	\$292,251																																	
AF1-123	49.29	14.55%	\$1,091,292																																							



ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-123	Upgrade Number			
71713735	3	6HOPEWLL 230.0 kV - 6CHESTF A 230.0 kV Ckt 1	n6155: Rebuild 3 miles of 230 kV Line 228 from Hopewell to Chesterfield with 2-636 ACSR.	\$7,500,000	\$613,579	n6155			
			Project Type : FAC						
			Cost : \$7,500,000						
			Time Estimate : 30-36 Months						
			New Ratings:						
			Rate A: 1047 MVA						
			Rate B: 1047 MVA						
			Rate C: 1204 MVA						
			The cost allocation table is as follows:						
			Queue				MW contribution	Percentage of Cost	Cost(\$7,500,000 M)
			AC2-012				13.98	2.39%	\$179,603
			AD1-025				63.98	10.96%	\$821,959
			AD1-151				63.98	10.96%	\$821,959
			AD2-008				22.22	3.81%	\$285,463
			AE1-085				6.04	1.03%	\$77,571
			AE1-149				7.61	1.30%	\$97,767
			AE2-000B				6.26	1.07%	\$80,423
			AE2-007				84.62	14.49%	\$1,087,124
			AE2-033				8.06	1.38%	\$103,548
AE2-122	56.77	9.72%	\$729,332						
AE2-123	56.77	9.72%	\$729,332						
AE2-124	56.36	9.65%	\$724,064						
AE2-156	7.57	1.30%	\$97,253						
AE2-250	5.18	0.89%	\$66,548						
AE2-260	6.42	1.10%	\$82,479						
AE2-270	56.04	9.60%	\$719,953						
AF1-115	14.17	2.43%	\$182,044						
AF1-123	47.76	8.18%	\$613,579						

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-123	Upgrade Number
42881076	10	3BTLEBRO 115.0 kV - 3ROCKYMT115T 115.0 kV Ckt 1	<p><u>DVP</u> n6118: PJM Network Upgrade n6118: Upgrading the breaker leads at DVP's terminal will bring the rating to 239/239/239 MVA (Limited by terminal equipment at Rocky Mount) Dominion End Ratings: 438/478/581 MVA</p> <p>Project Type : FAC</p> <p>Cost : \$100,000</p> <p>Time Estimate : 30-36 Months</p> <p>New Ratings: Rate A: 239 MVA Rate B: 239 MVA Rate C: 239 MVA</p> <p>Queue Project AF1-123 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: As changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-123 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-123 may not have cost responsibility for this upgrade, Queue Project AF1-123 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-123 comes into service prior to completion of the upgrade, Queue Project AF1-123 will need an interim study.</p>	\$100,000	\$0	n6118
<b>TOTAL COST</b>				\$15,100,000	\$1,704,871	

Note : For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates \$0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently \$0, your project may need this system reinforcement completed to be deliverable to the PJM system. If your project comes into service prior to completion of the system reinforcement, an interim deliverability study for your project will be required.

## 15 Affected Systems

### 15.1 Duke Energy Progress

Potential constraints were identified by PJM on the following Dominion – Duke Energy/Progress (DEP) tie lines. Enter into an Affected System Facilities Study agreement with DEP to determine what, if any, reinforcements are required on their system. The following facilities were identified in this report:

- Person – AC1-221 Tap 230kV line
- Sedge Hill – AC1-221 Tap 230kV line
- Battleboro – Rocky Mt. 138kV line

11.6 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-124	Upgrade Number
42881265,42881264,42881487,42881483	15	8ELMONT 500.0 kV - 8LADYSMITH 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description :</b> PJM baseline upgrade b3020: Rebuild 500kV Line #574 Ladysmith to Elmont - 26.2 miles long. The baseline project has a projected in-service date of 12/31/2022.  <b>Type :</b> FAC  <b>Ratings :</b> 4330.0/4330.0/4979.0</p> <p>Note 1: Although Queue Project AF1-124 may not have cost responsibility for this upgrade, Queue Project AF1-124 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-124 comes into service prior to completion of the upgrade, Queue Project AF1-124 will need an interim study.</p> <p><b>DVP</b>  <b>Description :</b> PJM Network Upgrade n6063: Replace wave trap at both Ladysmith and Possum Point Substations for the Ladysmith – Possum Pt 500kV line #568. This will increase line rating by 12% to 2913 MVA. The network project had a projected in-service date of 10/01/2019.  <b>Type :</b> FAC  <b>Total Cost :</b> \$300,000  <b>Time Estimate :</b> 14-16 Months  <b>Ratings :</b> 2598.0/2857.0/3637.0</p>	See Next Page	See Next Page	b3020, n6063, n6157, n6539
42881405,42881408,42881249,42881248	17	8LADYSMITH 500.0 kV - 8POSSUM 500.0 kV Ckt 1	<p>Queue Project AF1-124 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-124 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-124 may not have cost responsibility for this upgrade, Queue Project AF1-124 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-124 comes into service prior to completion of the upgrade, Queue Project AF1-124 will need an interim study</p>	See Next Page	See Next Page	

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-124	Upgrade Number																																																												
42881265,42881264,42881487,42881483	15	8ELMONT 500.0 kV - 8LADYSMITH 500.0 kV Ckt 1	<p><b>DVP (cont'd)</b>  <b>Description :</b> PJM Network Upgrade n6157: Relay Change Outs (CT) at Ladysmith and Possum Pt 500 kV substations.  <b>Type :</b> FAC  <b>Total Cost :</b> \$120,000  <b>Time Estimate :</b> 6-12 Months  <b>Ratings :</b> 3424.0/3424.0/3937.0</p> <p>Queue Project AF1-124 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-124 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-124 may not have cost responsibility for this upgrade, Queue Project AF1-124 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-124 comes into service prior to completion of the upgrade, Queue Project AF1-124 will need an interim study</p> <p><b>Description :</b> PJM Network Upgrade n6539. Build new 500 kV Line from Rawlings to Morrisville Substation 110 miles.  <b>Type :</b> CON  <b>Total Cost :</b> \$400,000,000  <b>Time Estimate :</b> 60-72 Months</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AE2-007</td><td>111.51</td><td>6.15%</td><td>\$24,601,638</td></tr> <tr><td>AE2-031</td><td>50.74</td><td>2.80%</td><td>\$11,194,396</td></tr> <tr><td>AE2-033</td><td>44.27</td><td>2.44%</td><td>\$9,766,967</td></tr> <tr><td>AE2-051</td><td>46.09</td><td>2.54%</td><td>\$10,168,501</td></tr> <tr><td>AE2-094</td><td>103.22</td><td>5.69%</td><td>\$22,772,676</td></tr> <tr><td>AE2-122</td><td>258.98</td><td>14.28%</td><td>\$57,136,869</td></tr> <tr><td>AE2-123</td><td>258.98</td><td>14.28%</td><td>\$57,136,869</td></tr> <tr><td>AE2-124</td><td>258.90</td><td>14.28%</td><td>\$57,119,219</td></tr> <tr><td>AE2-147</td><td>46.83</td><td>2.58%</td><td>\$10,331,761</td></tr> <tr><td>AE2-156</td><td>32.48</td><td>1.79%</td><td>\$7,165,826</td></tr> <tr><td>AE2-270</td><td>49.68</td><td>2.74%</td><td>\$10,960,536</td></tr> <tr><td>AE2-313</td><td>290.09</td><td>16.00%</td><td>\$64,000,441</td></tr> <tr><td>AF1-123</td><td>130.64</td><td>7.21%</td><td>\$28,822,151</td></tr> <tr><td>AF1-124</td><td>130.64</td><td>7.21%</td><td>\$28,822,151</td></tr> </tbody> </table> <p>This upgrade will need to be tested during the Facilities Study phase to ensure it does not cause any additional violations.</p>	Queue	MW	Cost %	Cost \$	AE2-007	111.51	6.15%	\$24,601,638	AE2-031	50.74	2.80%	\$11,194,396	AE2-033	44.27	2.44%	\$9,766,967	AE2-051	46.09	2.54%	\$10,168,501	AE2-094	103.22	5.69%	\$22,772,676	AE2-122	258.98	14.28%	\$57,136,869	AE2-123	258.98	14.28%	\$57,136,869	AE2-124	258.90	14.28%	\$57,119,219	AE2-147	46.83	2.58%	\$10,331,761	AE2-156	32.48	1.79%	\$7,165,826	AE2-270	49.68	2.74%	\$10,960,536	AE2-313	290.09	16.00%	\$64,000,441	AF1-123	130.64	7.21%	\$28,822,151	AF1-124	130.64	7.21%	\$28,822,151	\$400,420,000	\$28,822,151	b3020 n6063, n6157, n6539
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89977068	24	AD1-087 TAP 230.0 kV - 6SEEDGE HILL 230.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Rebuild 16.71 miles of 230 kV Line 2068 from AD1-087 Tap to Sedge Hill with 2-795 ACSR.  <b>Type</b> : FAC  <b>Total Cost</b> : \$25,065,000  <b>Time Estimate</b> : 36-40 Months  <b>Ratings</b> : 1225.0/1225.0/1409.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr> <td>AE2-051</td> <td>2.48</td> <td>2.18%</td> <td>\$706,640</td> </tr> <tr> <td>AE2-094</td> <td>23.72</td> <td>20.86%</td> <td>\$6,758,667</td> </tr> <tr> <td>AE2-122</td> <td>11.13</td> <td>9.79%</td> <td>\$3,171,331</td> </tr> <tr> <td>AE2-123</td> <td>11.44</td> <td>10.06%</td> <td>\$3,259,661</td> </tr> <tr> <td>AE2-124</td> <td>10.39</td> <td>9.14%</td> <td>\$2,960,478</td> </tr> <tr> <td>AE2-313</td> <td>23.91</td> <td>21.03%</td> <td>\$6,812,805</td> </tr> <tr> <td>AF1-123</td> <td>10.46</td> <td>9.20%</td> <td>\$2,980,424</td> </tr> <tr> <td>AF1-124</td> <td>20.18</td> <td>17.75%</td> <td>\$5,749,996</td> </tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE2-051	2.48	2.18%	\$706,640	AE2-094	23.72	20.86%	\$6,758,667	AE2-122	11.13	9.79%	\$3,171,331	AE2-123	11.44	10.06%	\$3,259,661	AE2-124	10.39	9.14%	\$2,960,478	AE2-313	23.91	21.03%	\$6,812,805	AF1-123	10.46	9.20%	\$2,980,424	AF1-124	20.18	17.75%	\$5,749,996	\$25,065,000	\$5,749,996	n6514
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89976337	7	6FENTRES 230.0 kV - 6THRASHER 230.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Rebuild 5.86 miles of 230 kV Line 2128 from Fentress to Thrasher with 2-636 ACSR. Replace Line Lead at Fentress 230 kV.  <b>Type</b> : FAC  <b>Total Cost</b> : \$8,790,000  <b>Time Estimate</b> : 30-36 Months  <b>Ratings</b> : 1047.0/1047.0/1204.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr> <td>AF1-124</td> <td>35.2</td> <td>100.00%</td> <td>\$8,790,000</td> </tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AF1-124	35.2	100.00%	\$8,790,000	\$8,790,000	\$8,790,000	n6853																												
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42881193,4288 1324,42881323, 42881332,4288 1194	13	8CHCKAHM 500.0 kV - 8ELMONT 500.0 kV Ckt 1	<p><b>DVP</b> Project Id : n5464 Description : Replace wave trap at Chickahominy Substation. Type : FAC Total Cost : \$500,000 Time Estimate : 30-36 Months Ratings : 3424.0/3424.0/3937.0</p> <p>Queue Project AF1-124 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-124 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-124 may not have cost responsibility for this upgrade, Queue Project AF1-124 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-124 comes into service prior to completion of the upgrade, Queue Project AF1-124 will need an interim study</p> <p>Project Id : n6207 (dom-021) Description : Rebuild 3 miles of 230 kV Line 211 from Hopewell to Chesterfield with 2-636 ACSR. Type : FAC Total Cost : \$85,932,000 Time Estimate : 48-60 Months Ratings : 4453.0/4453.0/5121.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>Unknown</td><td>528.74</td><td>20.91%</td><td>\$17,971,342</td></tr> <tr><td>AE1-026</td><td>62.85</td><td>2.49%</td><td>\$2,136,208</td></tr> <tr><td>AE1-103</td><td>11.22</td><td>0.44%</td><td>\$381,357</td></tr> <tr><td>AE1-173</td><td>244.70</td><td>9.68%</td><td>\$8,317,107</td></tr> <tr><td>AE1-248</td><td>40.38</td><td>1.60%</td><td>\$1,372,476</td></tr> <tr><td>AE2-007</td><td>316.41</td><td>12.52%</td><td>\$10,754,458</td></tr> <tr><td>AE2-031</td><td>79.11</td><td>3.13%</td><td>\$2,688,869</td></tr> <tr><td>AE2-051</td><td>44.93</td><td>1.78%</td><td>\$1,527,126</td></tr> <tr><td>AE2-094</td><td>82.66</td><td>3.27%</td><td>\$2,809,530</td></tr> <tr><td>AE2-122</td><td>261.14</td><td>10.33%</td><td>\$8,875,886</td></tr> <tr><td>AE2-123</td><td>261.14</td><td>10.33%</td><td>\$8,875,886</td></tr> <tr><td>AE2-124</td><td>261.15</td><td>10.33%</td><td>\$8,876,226</td></tr> <tr><td>AE2-147</td><td>46.14</td><td>1.82%</td><td>\$1,568,252</td></tr> <tr><td>AE2-156</td><td>31.15</td><td>1.23%</td><td>\$1,058,757</td></tr> <tr><td>AE2-270</td><td>36.93</td><td>1.46%</td><td>\$1,255,214</td></tr> <tr><td>AE2-313</td><td>48.58</td><td>1.92%</td><td>\$1,651,185</td></tr> <tr><td>AF1-123</td><td>85.5</td><td>3.38%</td><td>\$2,906,059</td></tr> <tr><td>AF1-124</td><td>85.5</td><td>3.38%</td><td>\$2,906,059</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	Unknown	528.74	20.91%	\$17,971,342	AE1-026	62.85	2.49%	\$2,136,208	AE1-103	11.22	0.44%	\$381,357	AE1-173	244.70	9.68%	\$8,317,107	AE1-248	40.38	1.60%	\$1,372,476	AE2-007	316.41	12.52%	\$10,754,458	AE2-031	79.11	3.13%	\$2,688,869	AE2-051	44.93	1.78%	\$1,527,126	AE2-094	82.66	3.27%	\$2,809,530	AE2-122	261.14	10.33%	\$8,875,886	AE2-123	261.14	10.33%	\$8,875,886	AE2-124	261.15	10.33%	\$8,876,226	AE2-147	46.14	1.82%	\$1,568,252	AE2-156	31.15	1.23%	\$1,058,757	AE2-270	36.93	1.46%	\$1,255,214	AE2-313	48.58	1.92%	\$1,651,185	AF1-123	85.5	3.38%	\$2,906,059	AF1-124	85.5	3.38%	\$2,906,059	\$86,432,000	\$2,906,059	n5464, n6207
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42881344,4288 1352,42881343, 42881208,5309 7836	5	8MDLTHAN 500.0 kV - 8NO ANNA 500.0 kV Ckt 1	<p><b>DVP</b> Project Id : n6055 Description : Replace Wavetraps at Milothian and North Anna 500kV substations. Type : FAC Total Cost : \$300,000 Time Estimate : 16-18 Months Ratings : 3424.0/3424.0/3938.0</p> <p>Queue Project AF1-124 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-124 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-124 may not have cost responsibility for this upgrade, Queue Project AF1-124 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-124 comes into service prior to completion of the upgrade, Queue Project AF1-124 will need an interim study.</p> <p>Project Id : n5609 Description : Rebuild 41.13 miles of 500 kV Line 576 from Midlothian to North Anna with 3-1351.5 125C ACSR. Type : FAC Total Cost : \$127,503,000 Time Estimate : 48-60 Months Ratings : 4816.0/4816.0/5539.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AC2-141</td><td>77.46</td><td>2.83%</td><td>\$3,608,949</td></tr> <tr><td>AD1-025</td><td>41.93</td><td>1.53%</td><td>\$1,953,566</td></tr> <tr><td>AD1-076</td><td>137.77</td><td>5.03%</td><td>\$6,418,859</td></tr> <tr><td>AD1-151</td><td>41.9</td><td>1.53%</td><td>\$1,952,168</td></tr> <tr><td>AE1-026</td><td>67.94</td><td>2.48%</td><td>\$3,165,401</td></tr> <tr><td>AE1-068</td><td>169.18</td><td>6.18%</td><td>\$7,882,287</td></tr> <tr><td>AE1-069</td><td>135.34</td><td>4.95%</td><td>\$6,305,643</td></tr> <tr><td>AE1-072</td><td>47.387</td><td>1.73%</td><td>\$2,207,814</td></tr> <tr><td>AE1-173</td><td>274.68</td><td>10.04%</td><td>\$12,797,651</td></tr> <tr><td>AE1-248</td><td>44.9</td><td>1.64%</td><td>\$2,091,942</td></tr> <tr><td>AE2-007</td><td>308.19</td><td>11.26%</td><td>\$14,358,919</td></tr> <tr><td>AE2-031</td><td>99.14</td><td>3.62%</td><td>\$4,619,044</td></tr> <tr><td>AE2-033</td><td>44.23</td><td>1.62%</td><td>\$2,060,726</td></tr> <tr><td>AE2-051</td><td>52.79</td><td>1.93%</td><td>\$2,459,546</td></tr> <tr><td>AE2-094</td><td>103.32</td><td>3.78%</td><td>\$4,813,795</td></tr> <tr><td>AE2-122</td><td>254.67</td><td>9.31%</td><td>\$11,865,362</td></tr> <tr><td>AE2-123</td><td>254.67</td><td>9.31%</td><td>\$11,865,362</td></tr> <tr><td>AE2-124</td><td>254.69</td><td>9.31%</td><td>\$11,866,294</td></tr> <tr><td>AE2-147</td><td>46.24</td><td>1.69%</td><td>\$2,154,374</td></tr> <tr><td>AE2-156</td><td>28.76</td><td>1.05%</td><td>\$1,339,961</td></tr> <tr><td>AE2-270</td><td>40.32</td><td>1.47%</td><td>\$1,878,554</td></tr> <tr><td>AE2-313</td><td>60.53</td><td>2.21%</td><td>\$2,820,161</td></tr> <tr><td>AF1-123</td><td>75.3</td><td>2.75%</td><td>\$3,508,312</td></tr> <tr><td>AF1-124</td><td>75.3</td><td>2.75%</td><td>\$3,508,312</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AC2-141	77.46	2.83%	\$3,608,949	AD1-025	41.93	1.53%	\$1,953,566	AD1-076	137.77	5.03%	\$6,418,859	AD1-151	41.9	1.53%	\$1,952,168	AE1-026	67.94	2.48%	\$3,165,401	AE1-068	169.18	6.18%	\$7,882,287	AE1-069	135.34	4.95%	\$6,305,643	AE1-072	47.387	1.73%	\$2,207,814	AE1-173	274.68	10.04%	\$12,797,651	AE1-248	44.9	1.64%	\$2,091,942	AE2-007	308.19	11.26%	\$14,358,919	AE2-031	99.14	3.62%	\$4,619,044	AE2-033	44.23	1.62%	\$2,060,726	AE2-051	52.79	1.93%	\$2,459,546	AE2-094	103.32	3.78%	\$4,813,795	AE2-122	254.67	9.31%	\$11,865,362	AE2-123	254.67	9.31%	\$11,865,362	AE2-124	254.69	9.31%	\$11,866,294	AE2-147	46.24	1.69%	\$2,154,374	AE2-156	28.76	1.05%	\$1,339,961	AE2-270	40.32	1.47%	\$1,878,554	AE2-313	60.53	2.21%	\$2,820,161	AF1-123	75.3	2.75%	\$3,508,312	AF1-124	75.3	2.75%	\$3,508,312	\$127,803,000	\$3,508,312	n6055, n5609
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AE1-072	47.387	1.73%	\$2,207,814																																																																																																							
AE1-173	274.68	10.04%	\$12,797,651																																																																																																							
AE1-248	44.9	1.64%	\$2,091,942																																																																																																							
AE2-007	308.19	11.26%	\$14,358,919																																																																																																							
AE2-031	99.14	3.62%	\$4,619,044																																																																																																							
AE2-033	44.23	1.62%	\$2,060,726																																																																																																							
AE2-051	52.79	1.93%	\$2,459,546																																																																																																							
AE2-094	103.32	3.78%	\$4,813,795																																																																																																							
AE2-122	254.67	9.31%	\$11,865,362																																																																																																							
AE2-123	254.67	9.31%	\$11,865,362																																																																																																							
AE2-124	254.69	9.31%	\$11,866,294																																																																																																							
AE2-147	46.24	1.69%	\$2,154,374																																																																																																							
AE2-156	28.76	1.05%	\$1,339,961																																																																																																							
AE2-270	40.32	1.47%	\$1,878,554																																																																																																							
AE2-313	60.53	2.21%	\$2,820,161																																																																																																							
AF1-123	75.3	2.75%	\$3,508,312																																																																																																							
AF1-124	75.3	2.75%	\$3,508,312																																																																																																							



ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-124	Upgrade Number																								
89977023	1	6CHESTF B 230.0 kV - 6CHARCTY 230.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Rebuild 10.95 miles of 230 kV Line 2017 from Chesterfield to Charles City with 2-795 ACSR and replace wave trap at Chesterfield.  <b>Type</b> : FAC  <b>Total Cost</b> : \$16,625,000  <b>Time Estimate</b> : 30-36 Months  <b>Ratings</b> : 1225.0/1225.0/1409.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr> <td>AE2-156</td> <td>2.42</td> <td>3.25%</td> <td>\$539,744</td> </tr> <tr> <td>AE2-260</td> <td>19.48</td> <td>26.13%</td> <td>\$4,344,714</td> </tr> <tr> <td>AE2-270</td> <td>15.25</td> <td>20.46%</td> <td>\$3,401,278</td> </tr> <tr> <td>AE2-313</td> <td>20.14</td> <td>27.02%</td> <td>\$4,491,917</td> </tr> <tr> <td>AF1-124</td> <td>17.25</td> <td>23.14%</td> <td>\$3,847,347</td> </tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE2-156	2.42	3.25%	\$539,744	AE2-260	19.48	26.13%	\$4,344,714	AE2-270	15.25	20.46%	\$3,401,278	AE2-313	20.14	27.02%	\$4,491,917	AF1-124	17.25	23.14%	\$3,847,347	\$16,625,000	\$3,847,347	n6501
Queue	MW	Cost %	Cost \$																											
AE2-156	2.42	3.25%	\$539,744																											
AE2-260	19.48	26.13%	\$4,344,714																											
AE2-270	15.25	20.46%	\$3,401,278																											
AE2-313	20.14	27.02%	\$4,491,917																											
AF1-124	17.25	23.14%	\$3,847,347																											
71715132,7171 5131	9	6SKIFF CREEK 230.0 kV - 6KINGS M 230.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : PJM Baseline Upgrade b3057. Rebuild 6.1 miles of Waller-Skiffess Creek 230 kV Line (#2154) between Waller and Kings Mill to current standards with a minimum summer emergency rating of 1047 MVA utilizing single circuit steel structures. Remove this 6.1 mile section of Line #58 between Waller and Kings Mill. Rebuild the 1.6 miles of Line #2154 and #19 between Kings Mill and Skiffes Creek to current standards with a minimum summer emergency rating of 1047 MVA at 230 kV for Line #2154 and 261 MVA at 115 kV for Line #19, utilizing double circuit steel structures. The baseline project has a projected in-service date of 12/30/2024.  <b>Type</b> : FAC  <b>Ratings</b> : 1047.0/1047.0/1204.0</p> <p>Note 1: Although Queue Project AF1-124 may not have cost responsibility for this upgrade, Queue Project AF1-124 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-124 comes into service prior to completion of the upgrade, Queue Project AF1-124 will need an interim study.</p>	\$0	\$0	b3057																								
71715177,7171 5178	12	6KINGS M 230.0 kV - 6PENNIMAN 230.0 kV Ckt 1																												
71715218,7171 5217	11	6PENNIMAN 230.0 kV - 6WALR209 230.0 kV Ckt 1																												

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-124	Upgrade Number																																																																				
42881203,42881390,42881393,42881204	4	8CARSON 500.0 kV - 8MDLTHAN 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Rebuild 37.41 miles of 500 kV Line 563 from Carson to Midlothian with 3-1351.5 125C ACSR..  <b>Type</b> : FAC  <b>Total Cost</b> : \$115,971,000  <b>Time Estimate</b> : 48-60 Months  <b>Ratings</b> : 4816.0/4816.0/5539.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AE1-068</td><td>78.16</td><td>3.30%</td><td>\$3,832,439</td></tr> <tr><td>AE1-069</td><td>148.28</td><td>6.27%</td><td>\$7,270,651</td></tr> <tr><td>AE1-072</td><td>45.84</td><td>1.94%</td><td>\$2,247,684</td></tr> <tr><td>AE1-173</td><td>292.3</td><td>12.36%</td><td>\$14,332,420</td></tr> <tr><td>AE2-007</td><td>297.76</td><td>12.59%</td><td>\$14,600,142</td></tr> <tr><td>AE2-031</td><td>108.56</td><td>4.59%</td><td>\$5,323,050</td></tr> <tr><td>AE2-051</td><td>57.57</td><td>2.43%</td><td>\$2,822,844</td></tr> <tr><td>AE2-094</td><td>113.6</td><td>4.80%</td><td>\$5,570,178</td></tr> <tr><td>AE2-122</td><td>246.83</td><td>10.44%</td><td>\$12,102,878</td></tr> <tr><td>AE2-123</td><td>246.83</td><td>10.44%</td><td>\$12,102,878</td></tr> <tr><td>AE2-124</td><td>246.99</td><td>10.44%</td><td>\$12,110,723</td></tr> <tr><td>AE2-147</td><td>44.67</td><td>1.89%</td><td>\$2,190,315</td></tr> <tr><td>AE2-260</td><td>18.76</td><td>0.79%</td><td>\$919,864</td></tr> <tr><td>AE2-313</td><td>65.67</td><td>2.78%</td><td>\$3,220,014</td></tr> <tr><td>AF1-123</td><td>78.9</td><td>3.34%</td><td>\$3,868,724</td></tr> <tr><td>AF1-124</td><td>274.43</td><td>11.60%</td><td>\$13,456,196</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE1-068	78.16	3.30%	\$3,832,439	AE1-069	148.28	6.27%	\$7,270,651	AE1-072	45.84	1.94%	\$2,247,684	AE1-173	292.3	12.36%	\$14,332,420	AE2-007	297.76	12.59%	\$14,600,142	AE2-031	108.56	4.59%	\$5,323,050	AE2-051	57.57	2.43%	\$2,822,844	AE2-094	113.6	4.80%	\$5,570,178	AE2-122	246.83	10.44%	\$12,102,878	AE2-123	246.83	10.44%	\$12,102,878	AE2-124	246.99	10.44%	\$12,110,723	AE2-147	44.67	1.89%	\$2,190,315	AE2-260	18.76	0.79%	\$919,864	AE2-313	65.67	2.78%	\$3,220,014	AF1-123	78.9	3.34%	\$3,868,724	AF1-124	274.43	11.60%	\$13,456,196	\$115,971,000	\$13,456,196	n6172
Queue	MW	Cost %	Cost \$																																																																							
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AF1-124	274.43	11.60%	\$13,456,196																																																																							
42881213,42881421,42881216,42881420	16	8LADYSMITH 500.0 kV - 8CHANCE 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : PJM baseline upgrade b3021: Rebuild 500kV Line #581 Ladysmith to Chancellor - 15.2 miles long. The baseline project has a projected in-service date of 12/31/2023.  <b>Type</b> : FAC  <b>Ratings</b> : 4330.0/4330.0/4979.0</p> <p>Note 1: Although Queue Project AF1-124 may not have cost responsibility for this upgrade, Queue Project AF1-124 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-124 comes into service prior to completion of the upgrade, Queue Project AF1-124 will need an interim study.</p>	\$0	\$0	b3021																																																																				
42881335	23	AC1-221 TAP 230.0 kV - 6PERSON230 T 230.0 kV Ckt 1	<p><b>DVP</b>  The line rating at DVP portion of this tie line is 904MVA (normal), 904MVA (Emergency) and 1105 MVA (Load Dump). Therefore, the line limiting element is not overloaded on the DVP portion of this line.</p> <p><b>CPL</b>  An affected systems study will need to be completed with Duke/Progress to determine upgrades required on the Duke/Progress system.</p>	\$0	\$0	N/A																																																																				

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-124	Upgrade Number												
42881229,42881228,42881380,42881378	14	8CHANCE 500.0 kV - 8BRISTER 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : PJM baseline upgrade b3019: Rebuild 500kV Line #552 Bristers to Chancellor 21.6 miles long. The baseline project has a projected in-service date of 12/31/2023.  <b>Type</b> : FAC  <b>Ratings</b> : 4330.0/4330.0/4979.0</p> <p>Note 1: Although Queue Project AF1-124 may not have cost responsibility for this upgrade, Queue Project AF1-124 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-124 comes into service prior to completion of the upgrade, Queue Project AF1-124 will need an interim study.</p>	\$0	\$0	b3019												
42881522	6	8MORRSVL 500.0 kV - 8LOUDOUN 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : PJM baseline upgrade b3211: Rebuild the 1.3 mile section of 500 kV Line No.569 (Loudoun - Morrisville) with single-circuit 500 kV structures at the current 500 kV standard. This will increase the rating of the line to 3424 MVA. The baseline project has a projected in-service date of 12/31/2024.  <b>Type</b> : FAC</p> <p>Note 1: Although Queue Project AF1-124 may not have cost responsibility for this upgrade, Queue Project AF1-124 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-124 comes into service prior to completion of the upgrade, Queue Project AF1-124 will need an interim study.</p>	\$0	\$0	b3211												
89976421	8	6LANDSTN 230.0 kV - 6LYNHAVN 230.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Rebuild 5.88 miles of 230 kV Line 2026 from Landstown to Lynnhaven with 2-636 ACSR.  <b>Type</b> : FAC  <b>Total Cost</b> : \$14,700,000  <b>Time Estimate</b> : 30-36 Months  <b>Ratings</b> : 1047.0/1047.0/1204.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr> <td>AE2-124</td> <td>513.66</td> <td>90.47%</td> <td>\$13,298,582</td> </tr> <tr> <td>AF1-124</td> <td>54.13</td> <td>9.53%</td> <td>\$1,401,418</td> </tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE2-124	513.66	90.47%	\$13,298,582	AF1-124	54.13	9.53%	\$1,401,418	\$14,700,000	\$1,401,418	n6607
Queue	MW	Cost %	Cost \$															
AE2-124	513.66	90.47%	\$13,298,582															
AF1-124	54.13	9.53%	\$1,401,418															
71715359,71715358	2	6WALR209 230.0 kV - 6LIGH209 230.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : PJM Baseline Upgrade b3056: Partial Rebuild 230 kV Line #2113 Waller to Lightfoot. The baseline project has a projected in-service date of 12/30/2024.  <b>Type</b> : FAC  <b>Ratings</b> : 1047.0/1047.0/1204.0</p> <p>Note 1: Although Queue Project AF1-124 may not have cost responsibility for this upgrade, Queue Project AF1-124 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-124 comes into service prior to completion of the upgrade, Queue Project AF1-124 will need an interim study.</p>	\$0	\$0	b3056												

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-124	Upgrade Number
42881538	20	8OX 500.0 kV - 8CLIFTON 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Replace Wavetraps at Ox and Clifton 500 kV substations.  <b>Type</b> : FAC  <b>Total Cost</b> : \$300,000  <b>Time Estimate</b> : 16-18 Months  <b>Ratings</b> : 3424.0/3424.0/3938.0</p> <p>Queue Project AF1-124 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-124 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-124 may not have cost responsibility for this upgrade, Queue Project AF1-124 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-124 comes into service prior to completion of the upgrade, Queue Project AF1-124 will need an interim study</p>	\$300,000	\$0	n6161
42881199,4288 1198	21	8SURRY 500.0 kV - 8CHCKAHM 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Replace Terminal Equipment at Surry and Chickahominy Substations.  <b>Type</b> : FAC  <b>Total Cost</b> : \$4,000,000  <b>Time Estimate</b> : 16-18 Months  <b>Ratings</b> : 3424.0/3424.0/3938.0</p> <p>Queue Project AF1-124 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-124 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-124 may not have cost responsibility for this upgrade, Queue Project AF1-124 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-124 comes into service prior to completion of the upgrade, Queue Project AF1-124 will need an interim study</p>	\$4,000,000	\$0	n6324

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-124	Upgrade Number																																																																
42881218,42881219,42881434,42881433	22	8SPOTSYL 500.0 kV - 8MORRSVL 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Rebuild 18.75 miles of 500 kV Line 594 from Spotsylvania to Morrisville with 3-1351.5 113C ACSR.  <b>Type</b> : FAC  <b>Total Cost</b> : \$58,125,000  <b>Time Estimate</b> : 48-60 Months  <b>Ratings</b> : 4453.0/4453.0/5121.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AE1-069</td><td>11.49</td><td>1.35%</td><td>\$783,448</td></tr> <tr><td>AE1-173</td><td>178.09</td><td>20.89%</td><td>\$12,142,962</td></tr> <tr><td>AE1-206</td><td>62.76</td><td>7.36%</td><td>\$4,279,302</td></tr> <tr><td>AE2-007</td><td>210.87</td><td>24.74%</td><td>\$14,378,208</td></tr> <tr><td>AE2-031</td><td>38.03</td><td>4.46%</td><td>\$2,593,082</td></tr> <tr><td>AE2-034</td><td>9.99</td><td>1.17%</td><td>\$681,170</td></tr> <tr><td>AE2-094</td><td>45.55</td><td>5.34%</td><td>\$3,105,835</td></tr> <tr><td>AE2-122</td><td>34.55</td><td>4.05%</td><td>\$2,355,798</td></tr> <tr><td>AE2-123</td><td>35.51</td><td>4.17%</td><td>\$2,421,256</td></tr> <tr><td>AE2-124</td><td>32.28</td><td>3.79%</td><td>\$2,201,018</td></tr> <tr><td>AE2-250</td><td>8.73</td><td>1.02%</td><td>\$595,257</td></tr> <tr><td>AE2-270</td><td>32.60</td><td>3.82%</td><td>\$2,222,837</td></tr> <tr><td>AE2-313</td><td>41.13</td><td>4.82%</td><td>\$2,804,456</td></tr> <tr><td>AF1-123</td><td>55.44</td><td>6.50%</td><td>\$3,780,186</td></tr> <tr><td>AF1-124</td><td>55.44</td><td>6.50%</td><td>\$3,780,186</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE1-069	11.49	1.35%	\$783,448	AE1-173	178.09	20.89%	\$12,142,962	AE1-206	62.76	7.36%	\$4,279,302	AE2-007	210.87	24.74%	\$14,378,208	AE2-031	38.03	4.46%	\$2,593,082	AE2-034	9.99	1.17%	\$681,170	AE2-094	45.55	5.34%	\$3,105,835	AE2-122	34.55	4.05%	\$2,355,798	AE2-123	35.51	4.17%	\$2,421,256	AE2-124	32.28	3.79%	\$2,201,018	AE2-250	8.73	1.02%	\$595,257	AE2-270	32.60	3.82%	\$2,222,837	AE2-313	41.13	4.82%	\$2,804,456	AF1-123	55.44	6.50%	\$3,780,186	AF1-124	55.44	6.50%	\$3,780,186	\$58,125,000	\$3,780,186	n6160
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AF1-124	55.44	6.50%	\$3,780,186																																																																			
89977002	3	6SEEDGE HILL 230.0 kV - AC1-221 TAP 230.0 kV Ckt 1	<p><b>DVP</b>  No upgrade needed on Dominion system. Need coordination with Duke.</p> <p><b>CPL</b>  An affected systems study will need to be completed with Duke/Progress to determine upgrades required on the Duke/Progress system.</p>	\$0	\$0	N/A																																																																
42881234,42881468,42881469,42881233	18	8NO ANNA 500.0 kV - 8LADYSMITH 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Rebuild 14.53 miles of 500 kV Line 575 from North Anna to Ladysmith with 3-1351.5 113C ACSR.  <b>Type</b> : FAC  <b>Total Cost</b> : \$45,043,000  <b>Time Estimate</b> : 48-60 Months  <b>Ratings</b> : 4453.0/4453.0/5121.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AE2-031</td><td>34.63</td><td>6.23%</td><td>\$2,804,861</td></tr> <tr><td>AE2-094</td><td>41.5</td><td>7.46%</td><td>\$3,361,297</td></tr> <tr><td>AE2-122</td><td>115.02</td><td>20.68%</td><td>\$9,316,057</td></tr> <tr><td>AE2-123</td><td>115.02</td><td>20.68%</td><td>\$9,316,057</td></tr> <tr><td>AE2-124</td><td>115.08</td><td>20.69%</td><td>\$9,320,917</td></tr> <tr><td>AE2-313</td><td>62.52</td><td>11.24%</td><td>\$5,063,814</td></tr> <tr><td>AF1-123</td><td>34.98</td><td>6.29%</td><td>\$2,833,209</td></tr> <tr><td>AF1-124</td><td>37.37</td><td>6.72%</td><td>\$3,026,787</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE2-031	34.63	6.23%	\$2,804,861	AE2-094	41.5	7.46%	\$3,361,297	AE2-122	115.02	20.68%	\$9,316,057	AE2-123	115.02	20.68%	\$9,316,057	AE2-124	115.08	20.69%	\$9,320,917	AE2-313	62.52	11.24%	\$5,063,814	AF1-123	34.98	6.29%	\$2,833,209	AF1-124	37.37	6.72%	\$3,026,787	\$45,043,000	\$3,026,787	n6574																												
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ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-124	Upgrade Number																																																																								
42881255,4288 1256,42881500, 42881501	19	8NO ANNA 500.0 kV - 8SPOTSYL 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description :</b> Rebuild 14.02 miles of 500 kV Line 573 from North Anna to Spotsylvania with 3-1351.5 113C ACSR.  <b>Type :</b> FAC  <b>Total Cost :</b> \$43,462,000  <b>Time Estimate :</b> 48-60 Months  <b>Ratings :</b> 4453.0/4453.0/5121.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AE1-075</td><td>2.36</td><td>0.31%</td><td>\$134,351</td></tr> <tr><td>AE1-173</td><td>108.39</td><td>14.20%</td><td>\$6,170,471</td></tr> <tr><td>AE1-206</td><td>63.74</td><td>8.35%</td><td>\$3,628,617</td></tr> <tr><td>AE2-007</td><td>213.18</td><td>27.92%</td><td>\$12,136,000</td></tr> <tr><td>AE2-031</td><td>38.46</td><td>5.04%</td><td>\$2,189,467</td></tr> <tr><td>AE2-094</td><td>46.07</td><td>6.03%</td><td>\$2,622,692</td></tr> <tr><td>AE2-122</td><td>34.93</td><td>4.58%</td><td>\$1,988,510</td></tr> <tr><td>AE2-123</td><td>35.9</td><td>4.70%</td><td>\$2,043,730</td></tr> <tr><td>AE2-124</td><td>32.64</td><td>4.28%</td><td>\$1,858,144</td></tr> <tr><td>AE2-270</td><td>32.95</td><td>4.32%</td><td>\$1,875,791</td></tr> <tr><td>AE2-313</td><td>41.59</td><td>5.45%</td><td>\$2,367,653</td></tr> <tr><td>AF1-123</td><td>56.62</td><td>7.42%</td><td>\$3,223,287</td></tr> <tr><td>AF1-124</td><td>56.62</td><td>7.42%</td><td>\$3,223,287</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE1-075	2.36	0.31%	\$134,351	AE1-173	108.39	14.20%	\$6,170,471	AE1-206	63.74	8.35%	\$3,628,617	AE2-007	213.18	27.92%	\$12,136,000	AE2-031	38.46	5.04%	\$2,189,467	AE2-094	46.07	6.03%	\$2,622,692	AE2-122	34.93	4.58%	\$1,988,510	AE2-123	35.9	4.70%	\$2,043,730	AE2-124	32.64	4.28%	\$1,858,144	AE2-270	32.95	4.32%	\$1,875,791	AE2-313	41.59	5.45%	\$2,367,653	AF1-123	56.62	7.42%	\$3,223,287	AF1-124	56.62	7.42%	\$3,223,287	\$43,462,000	\$3,223,287	n6132																
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71895638	10	6CHESTF B 230.0 kV - 6BASIN 230.0 kV Ckt 1	<p><b>DVP</b>  <b>Description :</b> Rebuild 12.4 miles of 230 kV Line 259 from Chesterfield to Basin with 2-636 ACSR.  <b>Type :</b> FAC  <b>Total Cost :</b> \$31,000,000  <b>Time Estimate :</b> 30-36 Months  <b>Ratings :</b> 1047.0/1047.0/1204.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AE1-069</td><td>9.09</td><td>3.20%</td><td>\$991,415</td></tr> <tr><td>AE1-085</td><td>9.61</td><td>3.38%</td><td>\$1,048,130</td></tr> <tr><td>AE1-149</td><td>13.77</td><td>4.84%</td><td>\$1,501,847</td></tr> <tr><td>AE1-173</td><td>53.3</td><td>18.75%</td><td>\$5,813,250</td></tr> <tr><td>AE2-000B</td><td>10.26</td><td>3.61%</td><td>\$1,119,023</td></tr> <tr><td>AE2-027</td><td>12.15</td><td>4.27%</td><td>\$1,325,159</td></tr> <tr><td>AE2-031</td><td>21.17</td><td>7.45%</td><td>\$2,308,940</td></tr> <tr><td>AE2-033</td><td>17.96</td><td>6.32%</td><td>\$1,958,836</td></tr> <tr><td>AE2-051</td><td>5.71</td><td>2.01%</td><td>\$622,770</td></tr> <tr><td>AE2-094</td><td>22.19</td><td>7.81%</td><td>\$2,420,188</td></tr> <tr><td>AE2-157</td><td>11.22</td><td>3.95%</td><td>\$1,223,727</td></tr> <tr><td>AE2-250</td><td>9.6</td><td>3.38%</td><td>\$1,047,039</td></tr> <tr><td>AE2-260</td><td>20.47</td><td>7.20%</td><td>\$2,232,593</td></tr> <tr><td>AE2-270</td><td>14.89</td><td>5.24%</td><td>\$1,624,002</td></tr> <tr><td>AE2-313</td><td>22.88</td><td>8.05%</td><td>\$2,495,444</td></tr> <tr><td>AF1-123</td><td>14.98</td><td>5.27%</td><td>\$1,633,818</td></tr> <tr><td>AF1-124</td><td>14.98</td><td>5.27%</td><td>\$1,633,818</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE1-069	9.09	3.20%	\$991,415	AE1-085	9.61	3.38%	\$1,048,130	AE1-149	13.77	4.84%	\$1,501,847	AE1-173	53.3	18.75%	\$5,813,250	AE2-000B	10.26	3.61%	\$1,119,023	AE2-027	12.15	4.27%	\$1,325,159	AE2-031	21.17	7.45%	\$2,308,940	AE2-033	17.96	6.32%	\$1,958,836	AE2-051	5.71	2.01%	\$622,770	AE2-094	22.19	7.81%	\$2,420,188	AE2-157	11.22	3.95%	\$1,223,727	AE2-250	9.6	3.38%	\$1,047,039	AE2-260	20.47	7.20%	\$2,232,593	AE2-270	14.89	5.24%	\$1,624,002	AE2-313	22.88	8.05%	\$2,495,444	AF1-123	14.98	5.27%	\$1,633,818	AF1-124	14.98	5.27%	\$1,633,818	\$31,000,000	\$1,633,818	n6130
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<b>TOTAL COST</b>				<b>\$977,736,000</b>	<b>\$80,145,557</b>																																																																									

Note : For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates \$0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently \$0, your project may need this system reinforcement

## 12.6 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-124	Upgrade Number																																								
71714986	9	6HOPEWLL 230.0 kV - 6CHESTF B 230.0 kV Ckt 1	<b>n6500</b> <b>Description :</b> Rebuild 3 miles of 230 kV Line 211 from Hopewell to Chesterfield with 2-636 ACSR.  <b>Type :</b> FAC  <b>Total Cost :</b> \$7,500,000  <b>Time Estimate :</b> 30-36 Months  <b>Ratings :</b> 1047.0/1047.0/1204.0  <b>The cost allocation table is as follows:</b>	\$7,500,000	\$952,672	n6500																																								
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71714941, 71714943	3	6HOPEWLL 230.0 kV - 6CHESTF A 230.0 kV Ckt 1	<p>n6155: Rebuild 3 miles of 230 kV Line 228 from Hopewell to Chesterfield with 2-636 ACSR.</p> <p>Project Type : FAC</p> <p>Cost : \$7,500,000</p> <p>Time Estimate : 30-36 Months</p> <p>New Ratings: Rate A: 1047 MVA Rate B: 1047 MVA Rate C: 1204 MVA</p> <p>The cost allocation table is as follows:</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW contribution</th> <th>Percentage of Cost</th> <th>Cost (\$7,500,000)</th> </tr> </thead> <tbody> <tr><td>AC2-012</td><td>13.98</td><td>2.21%</td><td>\$166,021</td></tr> <tr><td>AD1-025</td><td>63.98</td><td>10.13%</td><td>\$759,800</td></tr> <tr><td>AD1-151</td><td>63.98</td><td>10.13%</td><td>\$759,800</td></tr> <tr><td>AD2-008</td><td>22.22</td><td>3.52%</td><td>\$263,875</td></tr> <tr><td>AE1-085</td><td>6.04</td><td>0.96%</td><td>\$71,705</td></tr> <tr><td>AE1-149</td><td>7.61</td><td>1.20%</td><td>\$90,373</td></tr> <tr><td>AE2-000B</td><td>6.26</td><td>0.99%</td><td>\$74,341</td></tr> <tr><td>AE2-007</td><td>84.62</td><td>13.40%</td><td>\$1,004,912</td></tr> <tr><td>AE2-033</td><td>8.06</td><td>1.28%</td><td>\$95,717</td></tr> <tr><td>AE2-122</td><td>56.77</td><td>8.99%</td><td>\$674,177</td></tr> <tr><td>AE2-123</td><td>56.77</td><td>8.99%</td><td>\$674,177</td></tr> <tr><td>AE2-124</td><td>56.36</td><td>8.92%</td><td>\$669,308</td></tr> <tr><td>AE2-156</td><td>7.57</td><td>1.20%</td><td>\$89,898</td></tr> <tr><td>AE2-250</td><td>5.18</td><td>0.82%</td><td>\$61,516</td></tr> <tr><td>AE2-260</td><td>6.42</td><td>1.02%</td><td>\$76,241</td></tr> <tr><td>AE2-270</td><td>56.04</td><td>8.87%</td><td>\$665,508</td></tr> <tr><td>AF1-115</td><td>14.17</td><td>2.24%</td><td>\$168,277</td></tr> <tr><td>AF1-123</td><td>47.76</td><td>7.56%</td><td>\$567,178</td></tr> <tr><td>AF1-124</td><td>47.76</td><td>7.56%</td><td>\$567,178</td></tr> </tbody> </table>	Queue	MW contribution	Percentage of Cost	Cost (\$7,500,000)	AC2-012	13.98	2.21%	\$166,021	AD1-025	63.98	10.13%	\$759,800	AD1-151	63.98	10.13%	\$759,800	AD2-008	22.22	3.52%	\$263,875	AE1-085	6.04	0.96%	\$71,705	AE1-149	7.61	1.20%	\$90,373	AE2-000B	6.26	0.99%	\$74,341	AE2-007	84.62	13.40%	\$1,004,912	AE2-033	8.06	1.28%	\$95,717	AE2-122	56.77	8.99%	\$674,177	AE2-123	56.77	8.99%	\$674,177	AE2-124	56.36	8.92%	\$669,308	AE2-156	7.57	1.20%	\$89,898	AE2-250	5.18	0.82%	\$61,516	AE2-260	6.42	1.02%	\$76,241	AE2-270	56.04	8.87%	\$665,508	AF1-115	14.17	2.24%	\$168,277	AF1-123	47.76	7.56%	\$567,178	AF1-124	47.76	7.56%	\$567,178	\$7,500,000	\$567,178	n6155
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AF1-124	47.76	7.56%	\$567,178																																																																																			



ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-124	Upgrade Number
15063758 6	6	3SUFFOLK 115.0 kV - 3OAKRI23 115.0 kV Ckt 1	<p><b>n6380:</b> Reconductor 2.5 miles of 115 kV Line 23 from Oakridge to Suffolk with 636 ACSR Project</p> <p>Type : FAC</p> <p>Cost : \$3.38 million</p> <p>Time Estimate : 30-36 months</p> <p>Ratings after the upgrade: 261/261/301 MVA</p> <p>AF1-124 does not presently receive cost allocation for n6380.</p> <p>Note 1: As changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-124 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-124 may not have cost responsibility for this upgrade, Queue Project AF1-124 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-124 comes into service prior to completion of the upgrade, Queue Project AF1-124 will need an interim study.</p>	\$3,380,000	\$0	n6380
42881556	10	3BTLEBRO 115.0 kV - 3ROCKYMT115T 115.0 kV Ckt 1	<p><b>DVP</b></p> <p>n6118: PJM Network Upgrade n6118: Upgrading the breaker leads at DVP's terminal will bring the rating to 239/239/239 MVA (Limited by terminal equipment at Rocky Mount)</p> <p>Dominion End Ratings: 438/478/581 MVA</p> <p>Project Type : FAC</p> <p>Cost : \$100,000</p> <p>Time Estimate : 30-36 Months</p> <p>New Ratings: Rate A: 239 MVA Rate B: 239 MVA Rate C: 239 MVA</p> <p>Queue Project AF1-124 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: As changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-124 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-124 may not have cost responsibility for this upgrade, Queue Project AF1-124 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-124 comes into service prior to completion of the upgrade, Queue Project AF1-124 will need an interim study.</p>	\$100,000	\$0	n6118

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-124	Upgrade Number
71715323	8	6PRGEORG 230.0 kV - 3PRGEORG 115.0 kV Ckt 1	<p>Description: Replace the existing Prince George 230/115 kV transformer.</p> <p>ISD: 12/31/20</p> <p>AF1-124 does not presently receive cost allocation for n5807.</p> <p>Note 1: As changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-124 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-124 may not have cost responsibility for this upgrade, Queue Project AF1-124 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-124 comes into service prior to completion of the upgrade, Queue Project AF1-124 will need an interim study.</p>	\$3,441,235	\$0	n5807
TOTAL COST				\$21,921,235	\$1,519,850	

Note : For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates \$0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently \$0, your project may need this system reinforcement completed to be deliverable to the PJM system. If your project comes into service prior to completion of the system reinforcement, an interim deliverability study for your project will be required.

### 12.7 Flow Gate Details

The following indices contain additional information about each facility presented in the body of the report. For each index, a description of the flowgate and its contingency was included for convenience. The intent of the indices is to provide more details on which projects/generators have contributions to the flowgate in question. All New Service Queue Requests, through the end of the Queue under study, that are contributors to a flowgate will be listed in the indices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the indices. Although this information is not used "as is" for cost allocation purposes, it can be used to gage the impact of other projects/generators. It should be noted the project/generator MW contributions presented in the body of the report are Full MW Impact contributions which are also noted in the indices column named "Full MW Impact", whereas the loading percentages reported in the body of the report, take into consideration the PJM Generator Deliverability Test rules such as commercial probability of each project as well as the ramping impact of "Adder" contributions. The MW Impact found and used in the analysis is shown in the indices column named "Gendeliv MW Impact".

### **13 Short Circuit Analysis**

No circuit breakers were identified as overdutied as part of this analysis.

### **14 Stability and Reactive Power**

To be determined in the Facilities Study Phase.

### **15 Affected Systems**

#### **15.1 Duke Energy Progress**

Potential constraints were identified by PJM on the following Dominion – Duke Energy/Progress (DEP) tie lines. Enter into an Affected System Facilities Study agreement with (DEP) to determine what, if any, reinforcements are required on their system. The following facilities were identified in this report:

- Person – AC1-221 Tap 230kV line
- Sedge Hill – AC1-221 Tap 230kV line
- Battleboro – Rocky Mt. 138kV line

11.6 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-125	Upgrade Number
42881963,42881967,42881744,42881745	16	8ELMONT 500.0 kV - 8LADYSMITH 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : PJM baseline upgrade b3020: Rebuild 500kV Line #574 Ladysmith to Elmont - 26.2 miles long. The baseline project has a projected in-service date of 12/31/2022.  <b>Type</b> : FAC  <b>Ratings</b> : 4330.0/4330.0/4979.0</p> <p>Note 1: Although Queue Project AF1-125 may not have cost responsibility for this upgrade, Queue Project AF1-125 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-125 comes into service prior to completion of the upgrade, Queue Project AF1-125 will need an interim study.</p> <p><b>DVP</b>  <b>Description</b> : PJM Network Upgrade n6063: Replace wave trap at both Ladysmith and Possum Point Substations for the Ladysmith – Possum Pt 500kV line #568. This will increase line rating by 12% to 2913 MVA. The network project had a projected in-service date of 10/01/2019.  <b>Type</b> : FAC  <b>Total Cost</b> : \$300,000  <b>Time Estimate</b> : 14-16 Months  <b>Ratings</b> : 2598.0/2857.0/3637.0</p>	See Next Page	See Next Page	b3020, n6063, n6157, n6539
42881728,42881729,42881885,42881888	18	8LADYSMITH 500.0 kV - 8POSSUM 500.0 kV Ckt 1	<p>Queue Project AF1-125 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-125 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-125 may not have cost responsibility for this upgrade, Queue Project AF1-125 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-125 comes into service prior to completion of the upgrade, Queue Project AF1-125 will need an interim study</p>	See Next Page	See Next Page	

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-125	Upgrade Number																																																																
42881963,42881967,42881744,42881745	16	8ELMONT 500.0 kV - 8LADYSMITH 500.0 kV Ckt 1	<p><b>DVP (cont'd)</b>  <b>Description :</b> PJM Network Upgrade n6157: Relay Change Outs (CT) at Ladysmith and Possum Pt 500 kV substations.  <b>Type :</b> FAC  <b>Total Cost :</b> \$120,000  <b>Time Estimate :</b> 6-12 Months  <b>Ratings :</b> 3424.0/3424.0/3937.0</p> <p>Queue Project AF1-125 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-125 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-125 may not have cost responsibility for this upgrade, Queue Project AF1-125 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-125 comes into service prior to completion of the upgrade, Queue Project AF1-125 will need an interim study</p>																																																																			
42881728,42881729,42881885,42881888	18	8LADYSMITH 500.0 kV - 8POSSUM 500.0 kV Ckt 1	<p><b>Description :</b> PJM Network Upgrade n6539. Build new 500 kV Line from Rawlings to Morrisville Substation 110 miles.  <b>Type :</b> CON  <b>Total Cost :</b> \$400,000,000  <b>Time Estimate :</b> 60-72 Months</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AE2-007</td><td>111.51</td><td>5.74%</td><td>\$22,948,104</td></tr> <tr><td>AE2-031</td><td>50.74</td><td>2.61%</td><td>\$10,441,994</td></tr> <tr><td>AE2-033</td><td>44.27</td><td>2.28%</td><td>\$9,110,506</td></tr> <tr><td>AE2-051</td><td>46.09</td><td>2.37%</td><td>\$9,485,052</td></tr> <tr><td>AE2-094</td><td>103.22</td><td>5.31%</td><td>\$21,242,070</td></tr> <tr><td>AE2-122</td><td>258.98</td><td>13.32%</td><td>\$53,296,565</td></tr> <tr><td>AE2-123</td><td>258.98</td><td>13.32%</td><td>\$53,296,565</td></tr> <tr><td>AE2-124</td><td>258.90</td><td>13.32%</td><td>\$53,280,101</td></tr> <tr><td>AE2-147</td><td>46.83</td><td>2.41%</td><td>\$9,637,339</td></tr> <tr><td>AE2-156</td><td>32.48</td><td>1.67%</td><td>\$6,684,193</td></tr> <tr><td>AE2-270</td><td>49.68</td><td>2.56%</td><td>\$10,223,853</td></tr> <tr><td>AE2-313</td><td>290.09</td><td>14.92%</td><td>\$59,698,820</td></tr> <tr><td>AF1-123</td><td>130.64</td><td>6.72%</td><td>\$26,884,946</td></tr> <tr><td>AF1-124</td><td>130.64</td><td>6.72%</td><td>\$26,884,946</td></tr> <tr><td>AF1-125</td><td>130.64</td><td>6.72%</td><td>\$26,884,946</td></tr> </tbody> </table> <p>This upgrade will need to be tested during the Facilities Study phase to ensure it does not cause any additional violations.</p>	Queue	MW	Cost %	Cost \$	AE2-007	111.51	5.74%	\$22,948,104	AE2-031	50.74	2.61%	\$10,441,994	AE2-033	44.27	2.28%	\$9,110,506	AE2-051	46.09	2.37%	\$9,485,052	AE2-094	103.22	5.31%	\$21,242,070	AE2-122	258.98	13.32%	\$53,296,565	AE2-123	258.98	13.32%	\$53,296,565	AE2-124	258.90	13.32%	\$53,280,101	AE2-147	46.83	2.41%	\$9,637,339	AE2-156	32.48	1.67%	\$6,684,193	AE2-270	49.68	2.56%	\$10,223,853	AE2-313	290.09	14.92%	\$59,698,820	AF1-123	130.64	6.72%	\$26,884,946	AF1-124	130.64	6.72%	\$26,884,946	AF1-125	130.64	6.72%	\$26,884,946	\$400,420,000	\$26,884,946	b3020 n6063, n6157, n6539
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89978922	26	AD1-087 TAP 230.0 kV - 6SEEDGE HILL 230.0 kV Ckt 1	<p><b>DVP</b>  <b>Description :</b> Rebuild 16.71 miles of 230 kV Line 2068 from AD1-087 Tap to Sedge Hill with 2-795 ACSR.  <b>Type :</b> FAC  <b>Total Cost :</b> \$25,065,000  <b>Time Estimate :</b> 36-40 Months  <b>Ratings :</b> 1225.0/1225.0/1409.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr> <td>AE2-051</td> <td>2.48</td> <td>1.85%</td> <td>\$600,134</td> </tr> <tr> <td>AE2-094</td> <td>23.72</td> <td>17.72%</td> <td>\$5,739,996</td> </tr> <tr> <td>AE2-122</td> <td>11.13</td> <td>8.31%</td> <td>\$2,693,345</td> </tr> <tr> <td>AE2-123</td> <td>11.44</td> <td>8.54%</td> <td>\$2,768,362</td> </tr> <tr> <td>AE2-124</td> <td>10.39</td> <td>7.76%</td> <td>\$2,514,273</td> </tr> <tr> <td>AE2-313</td> <td>23.91</td> <td>17.86%</td> <td>\$5,785,974</td> </tr> <tr> <td>AF1-123</td> <td>10.46</td> <td>7.81%</td> <td>\$2,531,212</td> </tr> <tr> <td>AF1-124</td> <td>20.18</td> <td>15.07%</td> <td>\$4,883,352</td> </tr> <tr> <td>AF1-125</td> <td>20.18</td> <td>15.07%</td> <td>\$4,883,352</td> </tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE2-051	2.48	1.85%	\$600,134	AE2-094	23.72	17.72%	\$5,739,996	AE2-122	11.13	8.31%	\$2,693,345	AE2-123	11.44	8.54%	\$2,768,362	AE2-124	10.39	7.76%	\$2,514,273	AE2-313	23.91	17.86%	\$5,785,974	AF1-123	10.46	7.81%	\$2,531,212	AF1-124	20.18	15.07%	\$4,883,352	AF1-125	20.18	15.07%	\$4,883,352	\$25,065,000	\$4,883,352	n6514
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89978191	10	6FENTRES 230.0 kV - 6THRASHER 230.0 kV Ckt 1	<p><b>DVP</b>  <b>Description :</b> Rebuild 5.86 miles of 230 kV Line 2128 from Fentress to Thrasher with 2-636 ACSR. Replace Line Lead at Fentress 230 kV.  <b>Type :</b> FAC  <b>Total Cost :</b> \$8,790,000  <b>Time Estimate :</b> 30-36 Months  <b>Ratings :</b> 1047.0/1047.0/1204.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr> <td>AF1-124</td> <td>35.2</td> <td>24.66%</td> <td>\$2,167,937</td> </tr> <tr> <td>AF1-125</td> <td>107.52</td> <td>75.34%</td> <td>\$6,622,063</td> </tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AF1-124	35.2	24.66%	\$2,167,937	AF1-125	107.52	75.34%	\$6,622,063	\$8,790,000	\$6,622,063	n6853																												
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42881803,42881674,42881812,42881673,42881804	14	8CHCKAHM 500.0 kV - 8ELMONT 500.0 kV Ckt 1	<p><b>DVP</b>  Project Id : n5464  Description : Replace wave trap at Chickahominy Substation.  Type : FAC  Total Cost : \$500,000  Time Estimate : 30-36 Months  Ratings : 3424.0/3424.0/3937.0</p> <p>Queue Project AF1-125 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-125 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-125 may not have cost responsibility for this upgrade, Queue Project AF1-125 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-125 comes into service prior to completion of the upgrade, Queue Project AF1-125 will need an interim study</p>																																																																																
			<p>Project Id : n6207 (dom-021)  Description : Rebuild 3 miles of 230 kV Line 211 from Hopewell to Chesterfield with 2-636 ACSR.  Type : FAC  Total Cost : \$85,932,000  Time Estimate : 48-60 Months  Ratings : 4453.0/4453.0/5121.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>Unknown</td><td>528.74</td><td>20.23%</td><td>\$17,383,466</td></tr> <tr><td>AE1-026</td><td>62.85</td><td>2.40%</td><td>\$2,066,329</td></tr> <tr><td>AE1-103</td><td>11.22</td><td>0.43%</td><td>\$368,882</td></tr> <tr><td>AE1-173</td><td>244.70</td><td>9.36%</td><td>\$8,045,039</td></tr> <tr><td>AE1-248</td><td>40.38</td><td>1.54%</td><td>\$1,327,579</td></tr> <tr><td>AE2-007</td><td>316.41</td><td>12.11%</td><td>\$10,402,660</td></tr> <tr><td>AE2-031</td><td>79.11</td><td>3.03%</td><td>\$2,600,912</td></tr> <tr><td>AE2-051</td><td>44.93</td><td>1.72%</td><td>\$1,477,170</td></tr> <tr><td>AE2-094</td><td>82.66</td><td>3.16%</td><td>\$2,717,625</td></tr> <tr><td>AE2-122</td><td>261.14</td><td>9.99%</td><td>\$8,585,540</td></tr> <tr><td>AE2-123</td><td>261.14</td><td>9.99%</td><td>\$8,585,540</td></tr> <tr><td>AE2-124</td><td>261.15</td><td>9.99%</td><td>\$8,585,868</td></tr> <tr><td>AE2-147</td><td>46.14</td><td>1.77%</td><td>\$1,516,952</td></tr> <tr><td>AE2-156</td><td>31.15</td><td>1.19%</td><td>\$1,024,123</td></tr> <tr><td>AE2-270</td><td>36.93</td><td>1.41%</td><td>\$1,214,153</td></tr> <tr><td>AE2-313</td><td>48.58</td><td>1.86%</td><td>\$1,597,172</td></tr> <tr><td>AF1-123</td><td>85.5</td><td>3.27%</td><td>\$2,810,997</td></tr> <tr><td>AF1-124</td><td>85.5</td><td>3.27%</td><td>\$2,810,997</td></tr> <tr><td>AF1-125</td><td>85.5</td><td>3.27%</td><td>\$2,810,997</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	Unknown	528.74	20.23%	\$17,383,466	AE1-026	62.85	2.40%	\$2,066,329	AE1-103	11.22	0.43%	\$368,882	AE1-173	244.70	9.36%	\$8,045,039	AE1-248	40.38	1.54%	\$1,327,579	AE2-007	316.41	12.11%	\$10,402,660	AE2-031	79.11	3.03%	\$2,600,912	AE2-051	44.93	1.72%	\$1,477,170	AE2-094	82.66	3.16%	\$2,717,625	AE2-122	261.14	9.99%	\$8,585,540	AE2-123	261.14	9.99%	\$8,585,540	AE2-124	261.15	9.99%	\$8,585,868	AE2-147	46.14	1.77%	\$1,516,952	AE2-156	31.15	1.19%	\$1,024,123	AE2-270	36.93	1.41%	\$1,214,153	AE2-313	48.58	1.86%	\$1,597,172	AF1-123	85.5	3.27%	\$2,810,997	AF1-124	85.5	3.27%	\$2,810,997	AF1-125	85.5	3.27%	\$2,810,997
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42881823,5309 8295,42881832, 42881824,4288 1688	19	8MDLTHAN 500.0 kV - 8NO ANNA 500.0 kV Ckt 1	<p><b>DVP</b> Project Id : n6055 Description : Replace Wavetraps at Milothian and North Anna 500kV substations. Type : FAC Total Cost : \$300,000 Time Estimate : 16-18 Months Ratings : 3424.0/3424.0/3938.0</p> <p>Queue Project AF1-125 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-125 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-125 may not have cost responsibility for this upgrade, Queue Project AF1-125 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-125 comes into service prior to completion of the upgrade, Queue Project AF1-125 will need an interim study.</p> <p>Project Id : n5609 (dom-023) Description : Rebuild 41.13 miles of 500 kV Line 576 from Midlothian to North Anna with 3-1351.5 125C ACSR. Type : FAC Total Cost : \$127,503,000 Time Estimate : 48-60 Months Ratings : 4816.0/4816.0/5539.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AC2-141</td><td>77.46</td><td>2.75%</td><td>\$3,512,306</td></tr> <tr><td>AD1-025</td><td>41.93</td><td>1.49%</td><td>\$1,901,252</td></tr> <tr><td>AD1-076</td><td>137.77</td><td>4.90%</td><td>\$6,246,971</td></tr> <tr><td>AD1-151</td><td>41.9</td><td>1.49%</td><td>\$1,899,892</td></tr> <tr><td>AE1-026</td><td>67.94</td><td>2.42%</td><td>\$3,080,636</td></tr> <tr><td>AE1-068</td><td>169.18</td><td>6.02%</td><td>\$7,671,209</td></tr> <tr><td>AE1-069</td><td>135.34</td><td>4.81%</td><td>\$6,136,786</td></tr> <tr><td>AE1-072</td><td>47.387</td><td>1.69%</td><td>\$2,148,691</td></tr> <tr><td>AE1-173</td><td>274.68</td><td>9.77%</td><td>\$12,454,946</td></tr> <tr><td>AE1-248</td><td>44.9</td><td>1.60%</td><td>\$2,035,922</td></tr> <tr><td>AE2-007</td><td>308.19</td><td>10.96%</td><td>\$13,974,406</td></tr> <tr><td>AE2-031</td><td>99.14</td><td>3.53%</td><td>\$4,495,352</td></tr> <tr><td>AE2-033</td><td>44.23</td><td>1.57%</td><td>\$2,005,542</td></tr> <tr><td>AE2-051</td><td>52.79</td><td>1.88%</td><td>\$2,393,682</td></tr> <tr><td>AE2-094</td><td>103.32</td><td>3.67%</td><td>\$4,684,888</td></tr> <tr><td>AE2-122</td><td>254.67</td><td>9.06%</td><td>\$11,547,623</td></tr> <tr><td>AE2-123</td><td>254.67</td><td>9.06%</td><td>\$11,547,623</td></tr> <tr><td>AE2-124</td><td>254.69</td><td>9.06%</td><td>\$11,548,530</td></tr> <tr><td>AE2-147</td><td>46.24</td><td>1.64%</td><td>\$2,096,682</td></tr> <tr><td>AE2-156</td><td>28.76</td><td>1.02%</td><td>\$1,304,078</td></tr> <tr><td>AE2-270</td><td>40.32</td><td>1.43%</td><td>\$1,828,249</td></tr> <tr><td>AE2-313</td><td>60.53</td><td>2.15%</td><td>\$2,744,641</td></tr> <tr><td>AF1-123</td><td>75.3</td><td>2.68%</td><td>\$3,414,364</td></tr> <tr><td>AF1-124</td><td>75.3</td><td>2.68%</td><td>\$3,414,364</td></tr> <tr><td>AF1-125</td><td>75.3</td><td>2.68%</td><td>\$3,414,364</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AC2-141	77.46	2.75%	\$3,512,306	AD1-025	41.93	1.49%	\$1,901,252	AD1-076	137.77	4.90%	\$6,246,971	AD1-151	41.9	1.49%	\$1,899,892	AE1-026	67.94	2.42%	\$3,080,636	AE1-068	169.18	6.02%	\$7,671,209	AE1-069	135.34	4.81%	\$6,136,786	AE1-072	47.387	1.69%	\$2,148,691	AE1-173	274.68	9.77%	\$12,454,946	AE1-248	44.9	1.60%	\$2,035,922	AE2-007	308.19	10.96%	\$13,974,406	AE2-031	99.14	3.53%	\$4,495,352	AE2-033	44.23	1.57%	\$2,005,542	AE2-051	52.79	1.88%	\$2,393,682	AE2-094	103.32	3.67%	\$4,684,888	AE2-122	254.67	9.06%	\$11,547,623	AE2-123	254.67	9.06%	\$11,547,623	AE2-124	254.69	9.06%	\$11,548,530	AE2-147	46.24	1.64%	\$2,096,682	AE2-156	28.76	1.02%	\$1,304,078	AE2-270	40.32	1.43%	\$1,828,249	AE2-313	60.53	2.15%	\$2,744,641	AF1-123	75.3	2.68%	\$3,414,364	AF1-124	75.3	2.68%	\$3,414,364	AF1-125	75.3	2.68%	\$3,414,364	\$127,803,000	\$3,414,364	n6055, n5609
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89978938	1	6CLOVER 230.0 kV - AD1-087 TAP 230.0 kV Ckt 1	<u>DVP</u> No violation. Dominion Side Ratings: [Rate A: 1046, Rate B: 1046, Rate C: 1203]	\$0	\$0	N/A																												
89978877	6	6CHESTF B 230.0 kV - 6CHARCTY 230.0 kV Ckt 1	<u>DVP</u> Description : Rebuild 10.95 miles of 230 kV Line 2017 from Chesterfield to Charles City with 2-795 ACSR and replace wave trap at Chesterfield. Type : FAC Total Cost : \$16,625,000 Time Estimate : 30-36 Months Ratings : 1225.0/1225.0/1409.0 <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr> <td>AE2-156</td> <td>2.42</td> <td>2.64%</td> <td>\$438,310</td> </tr> <tr> <td>AE2-260</td> <td>19.48</td> <td>21.22%</td> <td>\$3,528,217</td> </tr> <tr> <td>AE2-270</td> <td>15.25</td> <td>16.61%</td> <td>\$2,762,079</td> </tr> <tr> <td>AE2-313</td> <td>20.14</td> <td>21.94%</td> <td>\$3,647,756</td> </tr> <tr> <td>AF1-124</td> <td>17.25</td> <td>18.79%</td> <td>\$3,124,319</td> </tr> <tr> <td>AF1-125</td> <td>17.25</td> <td>18.79%</td> <td>\$3,124,319</td> </tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE2-156	2.42	2.64%	\$438,310	AE2-260	19.48	21.22%	\$3,528,217	AE2-270	15.25	16.61%	\$2,762,079	AE2-313	20.14	21.94%	\$3,647,756	AF1-124	17.25	18.79%	\$3,124,319	AF1-125	17.25	18.79%	\$3,124,319	\$16,625,000	\$3,124,319	n6501
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AF1-125	17.25	18.79%	\$3,124,319																															
71716338,7171 6337	4	6SKIFF CREEK 230.0 kV - 6KINGS M 230.0 kV Ckt 1	<u>DVP</u> Description : PJM Baseline Upgrade b3057. Rebuild 6.1 miles of Waller-Skiffess Creek 230 kV Line (#2154) between Waller and Kings Mill to current standards with a minimum summer emergency rating of 1047 MVA utilizing single circuit steel structures. Remove this 6.1 mile section of Line #58 between Waller and Kings Mill. Rebuild the 1.6 miles of Line #2154 and #19 between Kings Mill and Skiffes Creek to current standards with a minimum summer emergency rating of 1047 MVA at 230 kV for Line #2154 and 261 MVA at 115 kV for Line #19, utilizing double circuit steel structures. The baseline project has a projected in-service date of 12/30/2024. Type : FAC Ratings : 1047.0/1047.0/1204.0	\$0	\$0	b3057																												
71716383,7171 6384	8	6KINGS M 230.0 kV - 6PENNIMAN 230.0 kV Ckt 1																																
71716423,7171 6424	7	6PENNIMAN 230.0 kV - 6WALR209 230.0 kV Ckt 1	Note 1: Although Queue Project AF1-125 may not have cost responsibility for this upgrade, Queue Project AF1-125 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-125 comes into service prior to completion of the upgrade, Queue Project AF1-125 will need an interim study.																															

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42881870,42881684,42881683,42881873	13	8CARSON 500.0 kV - 8MDLTHAN 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Rebuild 37.41 miles of 500 kV Line 563 from Carson to Midlothian with 3-1351.5 125C ACSR.  <b>Type</b> : FAC  <b>Total Cost</b> : \$115,971,000  <b>Time Estimate</b> : 48-60 Months  <b>Ratings</b> : 4816.0/4816.0/5539.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AE1-068</td><td>78.16</td><td>2.96%</td><td>\$3,433,991</td></tr> <tr><td>AE1-069</td><td>148.28</td><td>5.62%</td><td>\$6,514,741</td></tr> <tr><td>AE1-072</td><td>45.84</td><td>1.74%</td><td>\$2,013,999</td></tr> <tr><td>AE1-173</td><td>292.3</td><td>11.07%</td><td>\$12,842,317</td></tr> <tr><td>AE2-007</td><td>297.76</td><td>11.28%</td><td>\$13,082,204</td></tr> <tr><td>AE2-031</td><td>108.56</td><td>4.11%</td><td>\$4,769,627</td></tr> <tr><td>AE2-051</td><td>57.57</td><td>2.18%</td><td>\$2,529,361</td></tr> <tr><td>AE2-094</td><td>113.6</td><td>4.30%</td><td>\$4,991,061</td></tr> <tr><td>AE2-122</td><td>246.83</td><td>9.35%</td><td>\$10,844,574</td></tr> <tr><td>AE2-123</td><td>246.83</td><td>9.35%</td><td>\$10,844,574</td></tr> <tr><td>AE2-124</td><td>246.99</td><td>9.36%</td><td>\$10,851,604</td></tr> <tr><td>AE2-147</td><td>44.67</td><td>1.69%</td><td>\$1,962,594</td></tr> <tr><td>AE2-260</td><td>18.76</td><td>0.71%</td><td>\$824,228</td></tr> <tr><td>AE2-313</td><td>65.67</td><td>2.49%</td><td>\$2,885,238</td></tr> <tr><td>AF1-123</td><td>78.9</td><td>2.99%</td><td>\$3,466,503</td></tr> <tr><td>AF1-124</td><td>274.43</td><td>10.40%</td><td>\$12,057,191</td></tr> <tr><td>AF1-125</td><td>274.43</td><td>10.40%</td><td>\$12,057,191</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE1-068	78.16	2.96%	\$3,433,991	AE1-069	148.28	5.62%	\$6,514,741	AE1-072	45.84	1.74%	\$2,013,999	AE1-173	292.3	11.07%	\$12,842,317	AE2-007	297.76	11.28%	\$13,082,204	AE2-031	108.56	4.11%	\$4,769,627	AE2-051	57.57	2.18%	\$2,529,361	AE2-094	113.6	4.30%	\$4,991,061	AE2-122	246.83	9.35%	\$10,844,574	AE2-123	246.83	9.35%	\$10,844,574	AE2-124	246.99	9.36%	\$10,851,604	AE2-147	44.67	1.69%	\$1,962,594	AE2-260	18.76	0.71%	\$824,228	AE2-313	65.67	2.49%	\$2,885,238	AF1-123	78.9	2.99%	\$3,466,503	AF1-124	274.43	10.40%	\$12,057,191	AF1-125	274.43	10.40%	\$12,057,191	\$115,971,000	\$12,057,191	n6172
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42881900,42881901,42881696,42881693	17	8LADYSMITH 500.0 kV - 8CHANCE 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : PJM baseline upgrade b3021: Rebuild 500kV Line #581 Ladysmith to Chancellor - 15.2 miles long. The baseline project has a projected in-service date of 12/31/2023.  <b>Type</b> : FAC  <b>Ratings</b> : 4330.0/4330.0/4979.0</p> <p>Note 1: Although Queue Project AF1-125 may not have cost responsibility for this upgrade, Queue Project AF1-125 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-125 comes into service prior to completion of the upgrade, Queue Project AF1-125 will need an interim study.</p>	\$0	\$0	b3021																																																																								
42881815	25	AC1-221 TAP 230.0 kV - 6PERSON230 T 230.0 kV Ckt 1	<p><b>DVP</b>  The line rating at DVP portion of this tie line is 904MVA (normal), 904MVA (Emergency) and 1105 MVA (Load Dump). Therefore, the line limiting element is not overloaded on the DVP portion of this line.</p> <p><b>CPL</b>  An affected systems study will need to be completed with Duke/Progress to determine upgrades required on the Duke/Progress system.</p>	\$0	\$0	N/A																																																																								

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-125	Upgrade Number																
42881858,42881860,42881708,42881709	15	8CHANCE 500.0 kV - 8BRISTER 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : PJM baseline upgrade b3019: Rebuild 500kV Line #552 Bristers to Chancellor 21.6 miles long. The baseline project has a projected in-service date of 12/31/2023.  <b>Type</b> : FAC  <b>Ratings</b> : 4330.0/4330.0/4979.0</p> <p>Note 1: Although Queue Project AF1-125 may not have cost responsibility for this upgrade, Queue Project AF1-125 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-125 comes into service prior to completion of the upgrade, Queue Project AF1-125 will need an interim study.</p>	\$0	\$0	b3019																
42882002	2	8MORRSVL 500.0 kV - 8LOUDOUN 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : PJM baseline upgrade b3211: Rebuild the 1.3 mile section of 500 kV Line No.569 (Loudoun - Morrisville) with single-circuit 500 kV structures at the current 500 kV standard. This will increase the rating of the line to 3424 MVA. The baseline project has a projected in-service date of 12/31/2024.  <b>Type</b> : FAC</p> <p>Note 1: Although Queue Project AF1-125 may not have cost responsibility for this upgrade, Queue Project AF1-125 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-125 comes into service prior to completion of the upgrade, Queue Project AF1-125 will need an interim study.</p>	\$0	\$0	b3211																
89978275	11	6LANDSTN 230.0 kV - 6LYNHAVN 230.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Rebuild 5.88 miles of 230 kV Line 2026 from Landstown to Lynnhaven with 2-636 ACSR.  <b>Type</b> : FAC  <b>Total Cost</b> : \$14,700,000  <b>Time Estimate</b> : 30-36 Months  <b>Ratings</b> : 1047.0/1047.0/1204.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr> <td>AE2-124</td> <td>513.66</td> <td>82.59%</td> <td>\$12,141,115</td> </tr> <tr> <td>AF1-124</td> <td>54.13</td> <td>8.70%</td> <td>\$1,279,443</td> </tr> <tr> <td>AF1-125</td> <td>54.13</td> <td>8.70%</td> <td>\$1,279,443</td> </tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE2-124	513.66	82.59%	\$12,141,115	AF1-124	54.13	8.70%	\$1,279,443	AF1-125	54.13	8.70%	\$1,279,443	\$14,700,000	\$1,279,443	n6607
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AE2-124	513.66	82.59%	\$12,141,115																			
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ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-125	Upgrade Number
71716565,71716564	9	6WALR209 230.0 kV - 6LIGH209 230.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : PJM Baseline Upgrade b3056: Partial Rebuild 230 kV Line #2113 Waller to Lightfoot. The baseline project has a projected in-service date of 12/30/2024.  <b>Type</b> : FAC  <b>Ratings</b> : 1047.0/1047.0/1204.0</p> <p>Note 1: Although Queue Project AF1-125 may not have cost responsibility for this upgrade, Queue Project AF1-125 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-125 comes into service prior to completion of the upgrade, Queue Project AF1-125 will need an interim study.</p>	\$0	\$0	b3056
42882018	22	8OX 500.0 kV - 8CLIFTON 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Replace Wavetraps at Ox and Clifton 500 kV substations.  <b>Type</b> : FAC  <b>Total Cost</b> : \$300,000  <b>Time Estimate</b> : 16-18 Months  <b>Ratings</b> : 3424.0/3424.0/3938.0</p> <p>Queue Project AF1-125 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-125 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-125 may not have cost responsibility for this upgrade, Queue Project AF1-125 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-125 comes into service prior to completion of the upgrade, Queue Project AF1-125 will need an interim study</p>	\$300,000	\$0	n6161

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-125	Upgrade Number																																																																				
42881678,42881679	23	8SURRY 500.0 kV - 8CHCKAHM 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Replace Terminal Equipment at Surry and Chickahominy Substations.  <b>Type</b> : FAC  <b>Total Cost</b> : \$4,000,000  <b>Time Estimate</b> : 16-18 Months  <b>Ratings</b> : 3424.0/3424.0/3938.0</p> <p>Queue Project AF1-125 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-125 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-125 may not have cost responsibility for this upgrade, Queue Project AF1-125 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-125 comes into service prior to completion of the upgrade, Queue Project AF1-125 will need an interim study</p>	\$4,000,000	\$0	n6324																																																																				
42881913,42881698,42881699,42881914	24	8SPOTSYL 500.0 kV - 8MORRSVL 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description</b> : Rebuild 18.75 miles of 500 kV Line 594 from Spotsylvania to Morrisville with 3-1351.5 113C ACSR.  <b>Type</b> : FAC  <b>Total Cost</b> : \$58,125,000  <b>Time Estimate</b> : 48-60 Months  <b>Ratings</b> : 4453.0/4453.0/5121.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AE1-069</td><td>11.49</td><td>1.27%</td><td>\$735,607</td></tr> <tr><td>AE1-173</td><td>178.09</td><td>19.62%</td><td>\$11,401,462</td></tr> <tr><td>AE1-206</td><td>62.76</td><td>6.91%</td><td>\$4,017,990</td></tr> <tr><td>AE2-007</td><td>210.87</td><td>23.23%</td><td>\$13,500,216</td></tr> <tr><td>AE2-031</td><td>38.03</td><td>4.19%</td><td>\$2,434,738</td></tr> <tr><td>AE2-034</td><td>9.99</td><td>1.10%</td><td>\$639,575</td></tr> <tr><td>AE2-094</td><td>45.55</td><td>5.02%</td><td>\$2,916,180</td></tr> <tr><td>AE2-122</td><td>34.55</td><td>3.81%</td><td>\$2,211,943</td></tr> <tr><td>AE2-123</td><td>35.51</td><td>3.91%</td><td>\$2,273,404</td></tr> <tr><td>AE2-124</td><td>32.28</td><td>3.56%</td><td>\$2,066,614</td></tr> <tr><td>AE2-250</td><td>8.73</td><td>0.96%</td><td>\$558,908</td></tr> <tr><td>AE2-270</td><td>32.60</td><td>3.59%</td><td>\$2,087,101</td></tr> <tr><td>AE2-313</td><td>41.13</td><td>4.53%</td><td>\$2,633,205</td></tr> <tr><td>AF1-123</td><td>55.44</td><td>6.11%</td><td>\$3,549,352</td></tr> <tr><td>AF1-124</td><td>55.44</td><td>6.11%</td><td>\$3,549,352</td></tr> <tr><td>AF1-125</td><td>55.44</td><td>6.11%</td><td>\$3,549,352</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE1-069	11.49	1.27%	\$735,607	AE1-173	178.09	19.62%	\$11,401,462	AE1-206	62.76	6.91%	\$4,017,990	AE2-007	210.87	23.23%	\$13,500,216	AE2-031	38.03	4.19%	\$2,434,738	AE2-034	9.99	1.10%	\$639,575	AE2-094	45.55	5.02%	\$2,916,180	AE2-122	34.55	3.81%	\$2,211,943	AE2-123	35.51	3.91%	\$2,273,404	AE2-124	32.28	3.56%	\$2,066,614	AE2-250	8.73	0.96%	\$558,908	AE2-270	32.60	3.59%	\$2,087,101	AE2-313	41.13	4.53%	\$2,633,205	AF1-123	55.44	6.11%	\$3,549,352	AF1-124	55.44	6.11%	\$3,549,352	AF1-125	55.44	6.11%	\$3,549,352	\$58,125,000	\$3,549,352	n6160
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89978856	12	6SEEDGE HILL 230.0 kV - AC1-221 TAP 230.0 kV Ckt 1	<p><b>DVP</b>  No upgrade needed on Dominion system. Need coordination with Duke.</p> <p><b>CPL</b>  An affected systems study will need to be completed with Duke/Progress to determine upgrades required on the Duke/Progress system.</p>	\$0	\$0	N/A																																																																				

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-125	Upgrade Number																																																												
42881713,42881948,42881714,42881949	20	8NO ANNA 500.0 kV - 8LADYSMITH 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description :</b> Rebuild 14.53 miles of 500 kV Line 575 from North Anna to Ladysmith with 3-1351.5 113C ACSR.  <b>Type :</b> FAC  <b>Total Cost :</b> \$45,043,000  <b>Time Estimate :</b> 48-60 Months  <b>Ratings :</b> 4453.0/4453.0/5121.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AE2-031</td><td>34.63</td><td>5.83%</td><td>\$2,628,248</td></tr> <tr><td>AE2-094</td><td>41.5</td><td>6.99%</td><td>\$3,149,648</td></tr> <tr><td>AE2-122</td><td>115.02</td><td>19.38%</td><td>\$8,729,458</td></tr> <tr><td>AE2-123</td><td>115.02</td><td>19.38%</td><td>\$8,729,458</td></tr> <tr><td>AE2-124</td><td>115.08</td><td>19.39%</td><td>\$8,734,011</td></tr> <tr><td>AE2-313</td><td>62.52</td><td>10.53%</td><td>\$4,744,963</td></tr> <tr><td>AF1-123</td><td>34.98</td><td>5.89%</td><td>\$2,654,812</td></tr> <tr><td>AF1-124</td><td>37.37</td><td>6.30%</td><td>\$2,836,201</td></tr> <tr><td>AF1-125</td><td>37.37</td><td>6.30%</td><td>\$2,836,201</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE2-031	34.63	5.83%	\$2,628,248	AE2-094	41.5	6.99%	\$3,149,648	AE2-122	115.02	19.38%	\$8,729,458	AE2-123	115.02	19.38%	\$8,729,458	AE2-124	115.08	19.39%	\$8,734,011	AE2-313	62.52	10.53%	\$4,744,963	AF1-123	34.98	5.89%	\$2,654,812	AF1-124	37.37	6.30%	\$2,836,201	AF1-125	37.37	6.30%	\$2,836,201	\$45,043,000	\$2,836,201	n6574																				
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89978253	3	AD1-033 TAP 230.0 kV - 6LANDSTN 230.0 kV Ckt 1	<p><b>DVP</b>  <b>Description :</b> Rebuild 8.2 miles of 230 kV Line 271 from Landstown to AD1-033 Tap with 2-636 ACSR.  <b>Type :</b> FAC  <b>Total Cost :</b> \$20,500,000  <b>Time Estimate :</b> 30-36 Months  <b>Ratings :</b> 1047.0/1047.0/1204.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AE2-124</td><td>513.66</td><td>86.83%</td><td>\$17,801,045</td></tr> <tr><td>AF1-125</td><td>77.88</td><td>13.17%</td><td>\$918,303</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE2-124	513.66	86.83%	\$17,801,045	AF1-125	77.88	13.17%	\$918,303	\$20,500,000	\$918,303	n6605																																																
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42881980,42881981,42881736,42881735	21	8NO ANNA 500.0 kV - 8SPOTSYL 500.0 kV Ckt 1	<p><b>DVP</b>  <b>Description :</b> Rebuild 14.02 miles of 500 kV Line 573 from North Anna to Spotsylvania with 3-1351.5 113C ACSR.  <b>Type :</b> FAC  <b>Total Cost :</b> \$43,462,000  <b>Time Estimate :</b> 48-60 Months  <b>Ratings :</b> 4453.0/4453.0/5121.0</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW</th> <th>Cost %</th> <th>Cost \$</th> </tr> </thead> <tbody> <tr><td>AE1-075</td><td>2.36</td><td>0.29%</td><td>\$125,075</td></tr> <tr><td>AE1-173</td><td>108.39</td><td>13.22%</td><td>\$5,744,444</td></tr> <tr><td>AE1-206</td><td>63.74</td><td>7.77%</td><td>\$3,378,087</td></tr> <tr><td>AE2-007</td><td>213.18</td><td>26.00%</td><td>\$11,298,095</td></tr> <tr><td>AE2-031</td><td>38.46</td><td>4.69%</td><td>\$2,038,300</td></tr> <tr><td>AE2-094</td><td>46.07</td><td>5.62%</td><td>\$2,441,614</td></tr> <tr><td>AE2-122</td><td>34.93</td><td>4.26%</td><td>\$1,851,217</td></tr> <tr><td>AE2-123</td><td>35.9</td><td>4.38%</td><td>\$1,902,625</td></tr> <tr><td>AE2-124</td><td>32.64</td><td>3.98%</td><td>\$1,729,852</td></tr> <tr><td>AE2-270</td><td>32.95</td><td>4.02%</td><td>\$1,746,281</td></tr> <tr><td>AE2-313</td><td>41.59</td><td>5.07%</td><td>\$2,204,183</td></tr> <tr><td>AF1-123</td><td>56.62</td><td>6.90%</td><td>\$3,000,742</td></tr> <tr><td>AF1-124</td><td>56.62</td><td>6.90%</td><td>\$3,000,742</td></tr> <tr><td>AF1-125</td><td>56.62</td><td>6.90%</td><td>\$3,000,742</td></tr> </tbody> </table>	Queue	MW	Cost %	Cost \$	AE1-075	2.36	0.29%	\$125,075	AE1-173	108.39	13.22%	\$5,744,444	AE1-206	63.74	7.77%	\$3,378,087	AE2-007	213.18	26.00%	\$11,298,095	AE2-031	38.46	4.69%	\$2,038,300	AE2-094	46.07	5.62%	\$2,441,614	AE2-122	34.93	4.26%	\$1,851,217	AE2-123	35.9	4.38%	\$1,902,625	AE2-124	32.64	3.98%	\$1,729,852	AE2-270	32.95	4.02%	\$1,746,281	AE2-313	41.59	5.07%	\$2,204,183	AF1-123	56.62	6.90%	\$3,000,742	AF1-124	56.62	6.90%	\$3,000,742	AF1-125	56.62	6.90%	\$3,000,742	\$43,462,000	\$3,000,742	n6132
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71897858	5	6CHESTF B 230.0 kV - 6BASIN 230.0 kV Ckt 1	<b>DVP</b> Description : Rebuild 12.4 miles of 230 kV Line 259 from Chesterfield to Basin with 2-636 ACSR. Type : FAC Total Cost : \$31,000,000 Time Estimate : 30-36 Months Ratings : 1047.0/1047.0/1204.0	\$31,000,000	\$1,552,020	n6130																																																																												
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AF1-125	14.98	5.01%	\$1,552,020																																																																															
<b>TOTAL COST</b>				<b>\$998,236,000</b>	<b>\$72,933,293</b>																																																																													

Note : For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates \$0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently \$0, your project may need this system reinforcement completed to be deliverable to the PJM system. If your project comes into service prior to completion of the system reinforcement, an interim deliverability study for your project will be required.

## 12.6 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-125	Upgrade Number																																												
71716564	4	6WALR209 230.0 kV - 6LIGH209 230.0 kV Ckt 1	Refer to AF1-125 summer peak load flow report for reinforcement.  PJM Baseline Upgrade b3056: Partial Rebuild 230 kV Line #2113 Waller to Lightfoot. The baseline project has a projected in-service date of 12/30/2024.	-	-	b3056																																												
71716192	9	6HOPEWLL 230.0 kV - 6CHESTF B 230.0 kV Ckt 1	<p><b>Description :</b> Rebuild 3 miles of 230 kV Line 211 from Hopewell to Chesterfield with 2-636 ACSR.</p> <p><b>Type :</b> FAC</p> <p><b>Total Cost :</b> \$7,500,000</p> <p><b>Time Estimate :</b> 30-36 Months</p> <p><b>Ratings :</b> 1047.0/1047.0/1204.0</p> <p>The cost allocation table is as follows:</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW contribution</th> <th>Percentage of Cost</th> <th>Cost (\$7,500,000)</th> </tr> </thead> <tbody> <tr> <td>AE2-007</td> <td>62.53</td> <td>14.30%</td> <td>\$1,072,360</td> </tr> <tr> <td>AE2-122</td> <td>56.77</td> <td>12.98%</td> <td>\$973,578</td> </tr> <tr> <td>AE2-123</td> <td>56.77</td> <td>12.98%</td> <td>\$973,578</td> </tr> <tr> <td>AE2-124</td> <td>56.36</td> <td>12.89%</td> <td>\$966,547</td> </tr> <tr> <td>AE2-156</td> <td>7.57</td> <td>1.73%</td> <td>\$129,822</td> </tr> <tr> <td>AE2-270</td> <td>36.26</td> <td>8.29%</td> <td>\$621,842</td> </tr> <tr> <td>AF1-115</td> <td>13.2</td> <td>3.02%</td> <td>\$226,374</td> </tr> <tr> <td>AF1-123</td> <td>49.29</td> <td>11.27%</td> <td>\$845,300</td> </tr> <tr> <td>AF1-124</td> <td>49.29</td> <td>11.27%</td> <td>\$845,300</td> </tr> <tr> <td>AF1-125</td> <td>49.29</td> <td>11.27%</td> <td>\$845,300</td> </tr> </tbody> </table>	Queue	MW contribution	Percentage of Cost	Cost (\$7,500,000)	AE2-007	62.53	14.30%	\$1,072,360	AE2-122	56.77	12.98%	\$973,578	AE2-123	56.77	12.98%	\$973,578	AE2-124	56.36	12.89%	\$966,547	AE2-156	7.57	1.73%	\$129,822	AE2-270	36.26	8.29%	\$621,842	AF1-115	13.2	3.02%	\$226,374	AF1-123	49.29	11.27%	\$845,300	AF1-124	49.29	11.27%	\$845,300	AF1-125	49.29	11.27%	\$845,300	\$7,500,000	\$845,300	n6500
Queue	MW contribution	Percentage of Cost	Cost (\$7,500,000)																																															
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71716383	3	6KINGS M 230.0 kV - 6PENNIMAN 230.0 kV Ckt 1	Refer to AF1-125 summer peak load flow report for reinforcement.  PJM Baseline Upgrade b3057. Rebuild 6.1 miles of Waller-Skiffess Creek 230 kV Line (#2154) between Waller and Kings Mill to current standards with a minimum summer emergency rating of 1047 MVA utilizing single circuit steel structures. Remove this 6.1 mile section of Line #58 between Waller and Kings Mill. Rebuild the 1.6 miles of Line #2154 and #19 between Kings Mill and Skiffes Creek to current standards with a minimum summer emergency rating of 1047 MVA at 230 kV for Line #2154 and 261 MVA at 115 kV for Line #19, utilizing double circuit steel structures. The baseline project has a projected in-service date of 12/30/2024.	-	-	b3057																																												



ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-125	Upgrade Number
71716423	2	6PENNIMAN 230.0 kV - 6WALR209 230.0 kV Ckt 1	<p>Refer to AF1-125 summer peak load flow report for reinforcement.</p> <p>PJM Baseline Upgrade b3057. Rebuild 6.1 miles of Waller-Skiffess Creek 230 kV Line (#2154) between Waller and Kings Mill to current standards with a minimum summer emergency rating of 1047 MVA utilizing single circuit steel structures. Remove this 6.1 mile section of Line #58 between Waller and Kings Mill. Rebuild the 1.6 miles of Line #2154 and #19 between Kings Mill and Skiffes Creek to current standards with a minimum summer emergency rating of 1047 MVA at 230 kV for Line #2154 and 261 MVA at 115 kV for Line #19, utilizing double circuit steel structures. The baseline project has a projected in-service date of 12/30/2024.</p>	-	--	b3057

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71716147,7 1716151,71 716149	7	6HOPEWLL 230.0 kV - 6CHESTF A 230.0 kV Ckt 1	<p>n6155: Rebuild 3 miles of 230 kV Line 228 from Hopewell to Chesterfield with 2-636 ACSR.</p> <p>Project Type : FAC</p> <p>Cost : \$7,500,000</p> <p>Time Estimate : 30-36 Months</p> <p>New Ratings: Rate A: 1047 MVA Rate B: 1047 MVA Rate C: 1204 MVA</p> <p>The cost allocation table is as follows:</p> <table border="1"> <thead> <tr> <th>Queue</th> <th>MW contribution</th> <th>Percentage of Cost</th> <th>Cost (\$7,500,000)</th> </tr> </thead> <tbody> <tr><td>AC2-012</td><td>13.98</td><td>2.06%</td><td>\$154,348</td></tr> <tr><td>AD1-025</td><td>63.98</td><td>9.42%</td><td>\$706,381</td></tr> <tr><td>AD1-151</td><td>63.98</td><td>9.42%</td><td>\$706,381</td></tr> <tr><td>AD2-008</td><td>22.22</td><td>3.27%</td><td>\$245,323</td></tr> <tr><td>AE1-085</td><td>6.04</td><td>0.89%</td><td>\$66,663</td></tr> <tr><td>AE1-149</td><td>7.61</td><td>1.12%</td><td>\$84,019</td></tr> <tr><td>AE2-000B</td><td>6.26</td><td>0.92%</td><td>\$69,114</td></tr> <tr><td>AE2-007</td><td>84.62</td><td>12.46%</td><td>\$934,260</td></tr> <tr><td>AE2-033</td><td>8.06</td><td>1.19%</td><td>\$88,988</td></tr> <tr><td>AE2-122</td><td>56.77</td><td>8.36%</td><td>\$626,778</td></tr> <tr><td>AE2-123</td><td>56.77</td><td>8.36%</td><td>\$626,778</td></tr> <tr><td>AE2-124</td><td>56.36</td><td>8.30%</td><td>\$622,251</td></tr> <tr><td>AE2-156</td><td>7.57</td><td>1.11%</td><td>\$83,578</td></tr> <tr><td>AE2-250</td><td>5.18</td><td>0.76%</td><td>\$57,191</td></tr> <tr><td>AE2-260</td><td>6.42</td><td>0.95%</td><td>\$70,881</td></tr> <tr><td>AE2-270</td><td>56.04</td><td>8.25%</td><td>\$618,718</td></tr> <tr><td>AF1-115</td><td>14.17</td><td>2.09%</td><td>\$156,446</td></tr> <tr><td>AF1-123</td><td>47.76</td><td>7.03%</td><td>\$527,301</td></tr> <tr><td>AF1-124</td><td>47.76</td><td>7.03%</td><td>\$527,301</td></tr> <tr><td>AF1-125</td><td>47.76</td><td>7.03%</td><td>\$527,301</td></tr> </tbody> </table>	Queue	MW contribution	Percentage of Cost	Cost (\$7,500,000)	AC2-012	13.98	2.06%	\$154,348	AD1-025	63.98	9.42%	\$706,381	AD1-151	63.98	9.42%	\$706,381	AD2-008	22.22	3.27%	\$245,323	AE1-085	6.04	0.89%	\$66,663	AE1-149	7.61	1.12%	\$84,019	AE2-000B	6.26	0.92%	\$69,114	AE2-007	84.62	12.46%	\$934,260	AE2-033	8.06	1.19%	\$88,988	AE2-122	56.77	8.36%	\$626,778	AE2-123	56.77	8.36%	\$626,778	AE2-124	56.36	8.30%	\$622,251	AE2-156	7.57	1.11%	\$83,578	AE2-250	5.18	0.76%	\$57,191	AE2-260	6.42	0.95%	\$70,881	AE2-270	56.04	8.25%	\$618,718	AF1-115	14.17	2.09%	\$156,446	AF1-123	47.76	7.03%	\$527,301	AF1-124	47.76	7.03%	\$527,301	AF1-125	47.76	7.03%	\$527,301	\$7,500,000	\$527,301	n6155
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ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-125	Upgrade Number
71716338,7 1716337	1	6SKIFF CREEK 230.0 kV - 6KINGS M 230.0 kV Ckt 1	<p>Refer to AF1-125 summer peak load flow report for reinforcement.</p> <p>PJM Baseline Upgrade b3057. Rebuild 6.1 miles of Waller-Skiffess Creek 230 kV Line (#2154) between Waller and Kings Mill to current standards with a minimum summer emergency rating of 1047 MVA utilizing single circuit steel structures. Remove this 6.1 mile section of Line #58 between Waller and Kings Mill. Rebuild the 1.6 miles of Line #2154 and #19 between Kings Mill and Skiffes Creek to current standards with a minimum summer emergency rating of 1047 MVA at 230 kV for Line #2154 and 261 MVA at 115 kV for Line #19, utilizing double circuit steel structures. The baseline project has a projected in-service date of 12/30/2024.</p>	-	-	b3057
150639041, 150639043	5	3SUFFOLK 115.0 kV - 3OAKRI23 115.0 kV Ckt 1	<p>n6380: Reconductor 2.5 miles of 115 kV Line 23 from Oakridge to Suffolk with 636 ACSR Project</p> <p>Type : FAC</p> <p>Cost : \$3.38 million</p> <p>Time Estimate : 30-36 months</p> <p>Ratings after the upgrade: 261/261/301 MVA</p> <p>AF1-125 does not presently receive cost allocation for n6380.</p> <p>Note 1: As changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-125 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-125 may not have cost responsibility for this upgrade, Queue Project AF1-125 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-125 comes into service prior to completion of the upgrade, Queue Project AF1-125 will need an interim study.</p>	\$3,380,000	\$0	n6380

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-125	Upgrade Number
42882036	10	3BTLEBRO 115.0 kV - 3ROCKYMT1 15T 115.0 kV Ckt 1	<p><u>DVP</u> n6118: PJM Network Upgrade n6118: Upgrading the breaker leads at DVP's terminal will bring the rating to 239/239/239 MVA (Limited by terminal equipment at Rocky Mount) Dominion End Ratings: 438/478/581 MVA</p> <p>Project Type : FAC</p> <p>Cost : \$100,000</p> <p>Time Estimate : 30-36 Months</p> <p>New Ratings: Rate A: 239 MVA Rate B: 239 MVA Rate C: 239 MVA</p> <p>Queue Project AF1-125 presently does not receive cost allocation for this upgrade.</p> <p>Note 1: As changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-125 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-125 may not have cost responsibility for this upgrade, Queue Project AF1-125 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-125 comes into service prior to completion of the upgrade, Queue Project AF1-125 will need an interim study.</p>	\$100,000	\$0	n6118
71716529	8	6PRGEORG 230.0 kV - 3PRGEORG 115.0 kV Ckt 1	<p>Description: Replace the existing Prince George 230/115 kV transformer.</p> <p>ISD: 12/31/20</p> <p>AF1-125 does not presently receive cost allocation for n5807.</p> <p>Note 1: As changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF1-125 could receive cost allocation.</p> <p>Note 2: Although Queue Project AF1-125 may not have cost responsibility for this upgrade, Queue Project AF1-125 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF1-125 comes into service prior to completion of the upgrade, Queue Project AF1-125 will need an interim study.</p>	\$3,441,235	\$0	N5807
<b>TOTAL COST</b>				<b>\$21,921,235</b>	<b>\$1,372,601</b>	

Note : For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates \$0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently \$0, your project may need this system reinforcement

### **13 Short Circuit Analysis**

No circuit breakers were identified as overdutied as part of this analysis.

### **14 Stability and Reactive Power**

To be determined in the Facilities Study Phase.

### **15 Affected Systems**

#### **15.1 Duke Energy Progress**

Potential constraints were identified by PJM on the following Dominion – Duke Energy/Progress (DEP) tie lines. Enter into an Affected System Facilities Study agreement with (DEP) to determine what, if any, reinforcements are required on their system. The following facilities were identified in this report:

- Person – AC1-221 Tap 230kV line
- Sedge Hill – AC1-221 Tap 230kV line
- Battleboro – Rocky Mt. 138kV line

## VII. RESPONSES TO COMMISSION ORDER DATED JULY 26, 2021

4. **Code § 56-585.1:11 C 3 exempts (i) Percentage of Income Payment Program eligible utility customers, (ii) advanced clean energy buyers, and (iii) qualifying large general service customers from any non-bypassable rate adjustment clause (“RAC”) approved for the OSW Project.**
- a. **When does Dominion expect to have such customers identified?**
  - b. **How will eligible customers achieve an exempt status? Will customers be required to request an exemption from Dominion?**
  - c. **How does Dominion expect the number of exempt customers to change over time? In Dominion’s view, are the charges non-bypassable only when the customer is actively in one of the exempt statutes? If so, explain how (and how frequently) Dominion will monitor the customer’s on-going exemption status.**
  - d. **Explain the measures Dominion will take to ensure these customers are not billed any OSW Project RAC and associated transmission and distribution costs. Also explain and quantify projected implications of the exemption on non-exempt customers.**
  - e. **Will the non-bypassable charge need to be modified any more frequently than annually due to changing numbers of exempt customers?**

(Addresses the additional information and analyses required by the Commission’s Order dated July 26, 2021)

Response:

- a) With respect to PIPP, the Company noted in case PUR-2020-00109 that collaboration with the Department of Housing and Community Development (“DHCD”) and the Department of Social Services (“DSS”) is ongoing and the Company remains committed to working with these agencies to implement the PIPP program. At this point, the best estimate for the PIPP implementation is July 1, 2023. On or before that time, it is expected that DSS will be in a position to notify the Company of PIPP-enrolled customers.

With respect to the advanced clean energy buyers (“ACBs”) and qualifying large general service customers (“LGCs”), 56-585.1:11 C 4 states (emphasis added) that

*“A Phase II utility shall petition the Commission for approval of a special contract with any advance clean energy buyer, or any special rate applicable to qualifying large general service customers, pursuant to 56-235.2, no later than 15 months prior to the projected commercial operation date of the facility, and all customer*

enrollments associated with such special contracts or rates *shall be completed prior to commercial operations of the facility.*”

Consistent with the statute, the Company anticipates that the identification and confirmation of ACBs and LGCs will take place between 15 months prior to Commercial Operation Date (“COD”) and COD. Given the projected schedule of the Project, the Company anticipates petitioning the Commission for such special contracts in mid-2025 or earlier.

- b) With respect to PIPP, DSS will be responsible for establishing PIPP eligibility and notify the Company of those customers that enroll in PIPP. As the Company receives the list of PIPP customers from DSS, it will have the ability through its new Customer Information Platform (“CIP”) billing system, when that becomes available, to exempt those same customers from Rider OSW. Customers will not need to request a separate exemption from the Company once their PIPP enrollment is established through DSS.

With respect to ACBs and LCGs, the customers would need to meet the respective demand requirements (greater than 100 MW for ACB and greater than 5 MW for LCG) and for ACBs certify that they have at least 200 MW of solar or wind energy supply under contract with a term of 10 years or more from facilities located within the Commonwealth by January 1, 2024. In addition, they would need to contract with the Company for their respective share of the Project. The special contract would need to be approved by the Commission.

- c) It is expected that DSS will provide updates to PIPP-enrolled customers on a rolling basis, perhaps as frequently as daily. As those updates are provided to the Company, those customers will be enrolled in PIPP and “unenrolled” in Rider OSW. Conversely, as customers are removed from the PIPP-enrolled list, charges for Rider OSW would commence.

With respect to ACBs and LCGs, all enrollments will need to be completed prior to COD, per 56-585.1:11 C 4. Therefore the Company does not anticipate any changes in ACB or LCG exempt status after COD.

- d) With respect to PIPP, the CIP will be programmed to automatically exempt PIPP-enrolled customers from Rider OSW. In layman’s terms, if the PIPP “box” is checked, then the Rider OSW “box” will automatically be unchecked and this will be programmed into the CIP, when it becomes available. Rider OSW revenues not collected from PIPP customers will be reallocated to other customers. At this time, the Company is unable to quantify the impact of this reallocation until further details on PIPP eligibility and enrollment takes place.

With respect to ACB and LGCs, those customers will be billed under their special contract instead of Rider OSW. 56-585.1:11 C 4 states that in approving any special contract, “the Commission shall determine that such special contract or rate is designed to hold nonparticipating customers harmless over its term in connection

with any petition for approval by the utility.” Therefore, customers will be held harmless to these provisions.

- e) The Company believes annual filings will continue to suffice. Any changes in exempt customers within the year will affect the revenues collected and thus the annual true-up.



## VII. RESPONSES TO COMMISSION ORDER DATED JULY 26, 2021

5. Code § 56-585.1:11 C 3 also requires that “[n]o electric cooperative customers of the utility shall be assigned, nor shall the utility collect from any such cooperative, any of the costs of such facilities, including electrical transmission or distribution facilities associated therewith for interconnection.”
- a. How will Dominion ensure that it does not collect from its electric cooperative customers the costs of the OSW Project?
  - b. How will Federal Energy Regulatory Commission jurisdictional transmission costs be allocated and recovered from non-exempt customers?
  - c. Are transmission and distribution upgrades throughout the electric grid necessitated by the interconnection of the OSW Project “facilities associated therewith” per Code § 56-585.1:11 C 3?
  - d. What measures (accounting or otherwise) will Dominion implement to separate OSW Project costs from those costs for which Dominion does bill its electric cooperative customers?

(Addresses the additional information and analyses required by the Commission’s Order dated July 26, 2021)

Response:

- a) Cooperatives will not pay Rider OSW, an A6 rider which includes the capital costs of the offshore wind generation costs, as well as the related electrical transmission and distribution facilities associated with the interconnection.
- b) Because the capital costs of the transmission assets are charged through the A6 Rider OSW, they will not be recovered through the FERC transmission formula rate.

Upon energization, the transmission lines from Harpers to Fentress will no longer be considered interconnection lines, but will become system transmission assets. These lines will benefit the larger PJM transmission system and therefore the ongoing O&M costs will be collected through the FERC formula rate. Cooperatives would be allocated their respective share of these costs, as they are not considered costs of the Project.

- c) Transmission and upgrade costs necessitated by the interconnection are considered “facilities associated therewith for interconnection.” However, as stated in response to part (b) above, once energized the lines from Harpers to Fentress will then become transmission system assets.

- d) Since all of the costs are contained in and recovered through the A6 Rider OSW, cooperatives are shielded from paying these costs.

**VII. RESPONSES TO COMMISSION ORDER DATED JULY 26, 2021**

**6. Pursuant to Code § 56-585.1:11 D, Dominion must, in constructing the OSW Project, develop and submit a plan (“Plan”) to the Commission for review. The Plan must include: (i) options for utilizing local workers; (ii) the economic development benefits of the [OSW Project] for the Commonwealth, including capital investments and job creation; (iii) consultation with the Commonwealth’s Chief Workforce Development Officer, the Chief Diversity, Equity, and Inclusion Officer, and the Virginia Economic Development Partnership on opportunities to advance the Commonwealth’s workforce and economic development goals, including furtherance of apprenticeship and other workforce training programs; and (iv) giving priority to the hiring, apprenticeship, and training of veterans, as that term is defined in [Code] § 2.2-2000.1, local workers, and workers from historically economically disadvantaged communities.”**

- a. Where in the OSW Project filing is this Plan located?**
- b. If the Plan is not part of the OSW Project filing, when and through what vehicle does Dominion anticipate submitting this Plan to the Commission?**
- c. Should the Commission find that the Plan is not in keeping with the full requirements of the law, what if any effect should such a finding have on the OSW Project filing?**

(Addresses the additional information and analyses required by the Commission’s Order dated July 26, 2021)

Response:

- a) The Company’s Economic Development Plan, which satisfies the requirements of this Code section, is included with this filing as Generation Appendix Attachment VI.A.
- b) Not applicable.
- c) The Company has submitted an Economic Development Plan that it believes meets the statutory requirements. If the Commission determines that the Plan does not meet the requirements, however, the Company will revise and resubmit the Plan accordingly.

**VII. RESPONSES TO COMMISSION ORDER DATED JULY 26, 2021**

- 7. As noted above, Code § 56-585.1:11 D requires Dominion to develop and submit a Plan to the Commission that includes the economic development benefits of the project for the Commonwealth.**
- a. Include all studies quantifying the economic development benefits of the OSW Project.**
  - b. Could a backlog in the PJM queue affect the economic development portion of the OSW Project? If so, quantify and describe such effects.**

(Addresses the additional information and analyses required by the Commission's Order dated July 26, 2021)

Response:

- a) See the Company's Economic Development Plan, submitted as Generation Appendix Attachment VI.A.
- b) A backlog in the PJM queue would not impact the economic development portion of the Project. See Generation Appendix section VII.3.b, above.

**VII. RESPONSES TO COMMISSION ORDER DATED JULY 26, 2021**

- 8. Provide all system modeling results and economic analyses to support the OSW Project consistent with modeling results normally provided in a CPCN application. Additionally, identify and quantify the social cost of carbon, as a net benefit or net cost, for the OSW Project.**

(Addresses the additional information and analyses required by the Commission's Order dated July 26, 2021)

**Response:** See Generation Appendix sections III.A (modeling results) and V.B (social cost of carbon), above.