

**REDACTED VERSION**

**SUNRISE WIND LLC**  
**SUNRISE WIND NEW YORK CABLE PROJECT**

**REVISED EXHIBIT E-4**  
**ENGINEERING JUSTIFICATION**

**PREPARED PURSUANT TO 16 NYCRR § 88.4**

*This page intentionally left blank.*

# Table of Contents

<b>EXHIBIT E-4: ENGINEERING JUSTIFICATION .....</b>	<b>E-4-1</b>
E-4.1 INTRODUCTION .....	E-4-1
E-4.2 RELATION TO EXISTING FACILITIES .....	E-4-2
E-4.3 BENEFITS WITH RESPECT TO RELIABILITY AND ECONOMY .....	E-4-2
E-4.4 COMPLETION DATE AND IMPLICATIONS.....	E-4-4
E-4.5 SYSTEM STUDIES .....	E-4-4

## LIST OF FIGURES

Figure E-4.2-1 Regional Transmission Map

Figure E-4.2-2 Onshore Converter Station and Point of Interconnection Location

Figure E-4.2-3 Conceptual Single Line Diagram of Onshore Interconnection Cable and the Existing Holbrook  
Substations

## Acronyms and Abbreviations

Applicant	Sunrise Wind LLC
AC	alternating current
ANSI	American National Standards Institute
CES	Clean Energy Standard
CFR	Code of Federal Regulations
CLCPA	Climate Leadership and Community Protection Act
DC	direct current
EM&CP	Environmental Management and Construction Plan
ft	feet
km	kilometer(s)
kV	kilovolt(s)
IEEE	Institute of Electrical and Electronics Engineers
LIPA	Long Island Power Authority
m	meter(s)
MHWL	mean high water line
mi	mile(s)
MMD	material modification determination
MW	megawatt(s)
NERC	North American Electric Reliability Corporation
NESC	National Electric Safety Code
NPCC	Northeast Power Coordinating Council, Inc.
NYCRR	New York Codes, Rules and Regulations
NYISO	New York Independent System Operator, Inc.
NYS	New York State
NYSERDA	New York State Energy Research and Development Authority

OC	Operating Committee
OCS	Outer Continental Shelf
OnCS–DC	Onshore Converter Station–Direct Current
OREC	Offshore Renewable Energy Certificate
OREC Agreement	Offshore Renewable Energy Certificate Agreement
Project	Sunrise Wind New York Cable Project
PSL	New York Public Service Law
QP	queue position
ROW	right-of-way
SRIS	System Reliability Impact Study
SRWEC	Sunrise Wind Export Cable
SRWEC–NYS	Sunrise Wind Export Cable–New York State
SRWF	Sunrise Wind Farm
TJB	transition joint bay
TPAS	Transmission Planning Advisory Subcommittee
US	United States
USACE	United States Army Corps of Engineers

## EXHIBIT E-4: ENGINEERING JUSTIFICATION

In accordance with New York Public Service Law (PSL) § 122 and 16 New York Codes, Rules and Regulations (NYCRR) § 88.4, this exhibit provides the engineering justification for the project, including a description of the reliability and economic benefits associated with the project, information about the project's proposed in-service date and the impact on the larger electric grid system if the project is not completed on time, and a summary of appropriate system studies.

### E-4.1 INTRODUCTION

Sunrise Wind LLC (Sunrise Wind or the Applicant), a 50/50 joint venture between Orsted North America Inc. (Orsted NA) and Eversource Investment LLC (Eversource), proposes to construct, operate, and maintain the Sunrise Wind New York Cable Project (the Project). Sunrise Wind executed a 25-year Offshore Wind Renewable Energy Certificate (OREC) contract related to the Sunrise Wind Farm (SRWF) and the Project with the New York State Energy Research and Development Authority (NYSERDA) in October 2019. The Project will deliver power from the SRWF, located in federal waters on the Outer Continental Shelf (OCS), to the existing electrical grid in New York (NYS). The Project includes offshore and onshore components within NYS that are subject to PSL Article VII review and will interconnect at the existing Holbrook Substation, which is owned and operated by the Long Island Power Authority (LIPA).

Specifically, power from the SRWF will be delivered to the existing mainland electric grid via distinct Project segments: the submarine segment of the export cable (SRWEC), which will be located in both federal and NYS waters (the NYS portion of the cable referred to as the SRWEC–NYS); the terrestrial underground segment of the transmission cable (Onshore Transmission Cable); the new Onshore Converter Station (OnCS–DC); and the underground segment of the interconnection cable (Onshore Interconnection Cable). The Onshore Transmission Cable, the OnCS–DC, and Onshore Interconnection Cable (collectively, the Onshore Facilities) are all located in the Town of Brookhaven, Suffolk County, New York.

The Project's components are generally defined into two categories:

- SRWEC–NYS
  - One direct current (DC) submarine export cable bundle (320 kilovolt [kV]) up to 6.2 miles (mi) (10 kilometers [km]) in length in NYS waters and up to 1,575 feet (ft) (480 meters [m]) located onshore (*i.e.*, above the Mean High Water Line [MHWL], as defined by the United States [US] Army Corps of Engineers [USACE] [33 Code of Federal Regulations (CFR 329)]) and underground, up to the transition joint bays (TJBs).

- Onshore Facilities
  - One DC underground transmission circuit (320 kV) (referred to as the Onshore Transmission Cable) up to 17.5 mi (28.2 km) in length within existing roadway right-of-way (ROW), TJBs, and concrete and/or direct buried joint bays and associated components;
  - One OnCS–DC that will transform the Project voltage to 138 kV alternating current (AC);
  - Two AC underground circuits (138 kV) (referred to as the Onshore Interconnection Cable) up to 1 mi (1.6 km) in length, which will connect the new OnCS–DC to the existing Holbrook Substation; and
  - Fiber optic cables co-located with both the Onshore Transmission Cable and Onshore Interconnection Cable.

## E-4.2 RELATION TO EXISTING FACILITIES

Power from the Project will be delivered to the electric grid via an OnCS–DC to be constructed in the Town of Brookhaven. Interconnection to the electric grid will occur at the existing Holbrook Substation also located in the Town of Brookhaven. Delivery of the power will require construction of a new OnCS–DC to support the Project’s interconnection to the existing electrical grid by transforming the Project voltage to 138 kV AC. The final configuration of these facilities will be developed as part of the New York Independent System Operator, Inc. (NYISO) interconnection process. A transmission map showing existing facilities and the interconnected network is shown in Figure E-4.2-1. A map showing the location of the OnCS–DC and the point of interconnection is shown in Figure E-4.2-2. A conceptual single-line showing the electrical diagram of the offshore and onshore facilities to the point of interconnection is shown in Figure E-4.2-3.

## E-4.3 BENEFITS WITH RESPECT TO RELIABILITY AND ECONOMY

The Project will provide clean, reliable offshore wind energy that will result in substantial economic and environmental benefits to NYS and increase the amount and availability of renewable energy to NYS, thereby creating the opportunity to displace electricity generated by fossil fuel-powered plants. NYS has adopted substantial renewable portfolio standards and clean energy targets to address issues associated with climate change, highlighting the current and future demand for this Project. As such, the Project will help the state achieve the aggressive clean energy goals set forth in NYS’s Clean Energy Standard (CES) and more recently, the Climate Leadership and Community Protection Act (CLCPA), which was signed in July 2019 and adopts the most ambitious and comprehensive climate and clean energy legislation in the country. The CLCPA sets forth an ambitious plan that sets the NYS’s goals of achieving 100 percent carbon-free electricity by 2040 and 70 percent of electricity from renewable sources by 2030, including a target of reaching 9,000 megawatts (MW) of offshore wind by 2035.

In response to the expressed need and demand and following a request for proposal, the Project executed a contract with the NYSDERDA for a 25-year OREC Agreement (OREC Agreement) in October 2019. Under the OREC Agreement, NYSDERDA will purchase ORECs generated by the operational Project and make them available for purchase by NYS load-serving entities. The Project is being developed to fulfill its obligations to NYS in accordance with its OREC Agreement. As specified in the OREC Agreement, the Project will generate electricity from an offshore wind farm located in a lease area for transmission and delivery to the Holbrook Substation.

Project facilities will be designed in accordance with the National Electric Safety Code (NESC), American National Standards Institute (ANSI)/ Institute of Electrical and Electronics Engineers (IEEE) Standards and NYISO requirements. The SRWEC–NYS will be buried below the seabed and the Onshore Transmission Cable will be buried below the existing roadway. This installation will increase reliability and minimize the risk of potential damage from natural and anthropogenic causes. Once the Project is installed, the Applicant will monitor the Project remotely on a continuous basis. A new control enclosure at the OnCS–DC will be equipped with control systems, as well as systems for local and remote control of the equipment. The Applicant will put in place an established and documented program for the maintenance of all equipment critical to reliable operation. Maintenance programs will conform to the equipment manufacturer’s recommendations. The Onshore Transmission Cable and Onshore Interconnection Cable will require little maintenance; these components are designed such that inspection and maintenance during operations occurs infrequently (typical maintenance cycle requires access to the vaults one time every five years) unless a fault or failure occurs. In the unlikely event of such a case, the Applicant would coordinate with public service entities in the Town of Brookhaven.

In addition, a reliability maintenance program will be implemented. Preventive maintenance will be performed on the OnCS–DC, Onshore Transmission Cable, and Onshore Interconnection Cable, and planned outages will be conducted in accordance with the North American Electric Reliability Corporation (NERC)/ Northeast Power Coordinating Council, Inc. (NPCC) Standard-TOP-003-1, and protective system maintenance will be performed in accordance with the NPCC Standard PRC-005-2. Equipment will be maintained in accordance with the interconnection agreement; maintenance will be completed by qualified personnel in accordance with applicable industry standards and good utility practices to provide maximum operating performance and reliability.

Vegetation will be managed to ensure safe operation of and access to the Onshore Transmission Cable and Onshore Interconnection Cable, as needed. Final details of monitoring and inspection protocols will be presented in the Project Environmental Management and Construction Plan (EM&CP).

Economic benefits of the Project are described in Exhibit 6: Economic Effects of Proposed Facility.



#### E-4.4 COMPLETION DATE AND IMPLICATIONS

The Applicant anticipates that construction of the Project will begin in 2023, and the Project will be commissioned and operational in 2025.

Delays in the permitting or construction could lead to a delay in the commercial in-service date, which will then delay the realization of the benefits of the Project, as described in Section E-4.3 above and in Exhibit 6: Economic Effects of Proposed Facility.

#### E-4.5 SYSTEM STUDIES

The Applicant submitted a request to NYISO to perform a System Reliability Impact Study (SRIS) and was subsequently assigned queue position #766 (QP 766) in the NYISO Transmission Interconnection Process. QP 766 was on the agenda to be presented to the NYISO's Transmission Planning Advisory Subcommittee (TPAS) on December 1, 2020 and approved by the NYISO's Operating Committee (OC) on December 10, 2020. A material modification determination (MMD) to QP 766 was submitted by the Applicant to confirm that the change in project design to DC does not materially change the Project system studies. This MMD was approved, and the NYISO acknowledged the change in Project design to DC was not a material change to QP 766. The results of the QP 766 modification study findings were reported at the February 2021 TPAS meeting.

The Applicant submitted a subsequent request to NYISO to study the Project at a total capacity of 924 MW, in accordance with the amount allowed by the OREC Agreement (880 MW + 5 percent). This interconnection request was assigned a queue position of #987 (QP 987). The SRIS for QP 987 was presented to TPAS on March 1, 2021 and approved by the OC on March 11, 2021. Copies of the referenced SRISs, OC approvals and modification study finding summary are provided under separate cover.

\*\*\*

**CONFIDENTIAL CEII INFORMATION REDACTED**

**CONTAINS CONFIDENTIAL CEII INFORMATION**

**CONFIDENTIAL CEII INFORMATION REDACTED**

**CONTAINS CONFIDENTIAL CEII INFORMATION**

**CONFIDENTIAL CEII INFORMATION REDACTED**

**CONTAINS CONFIDENTIAL CEII INFORMATION**