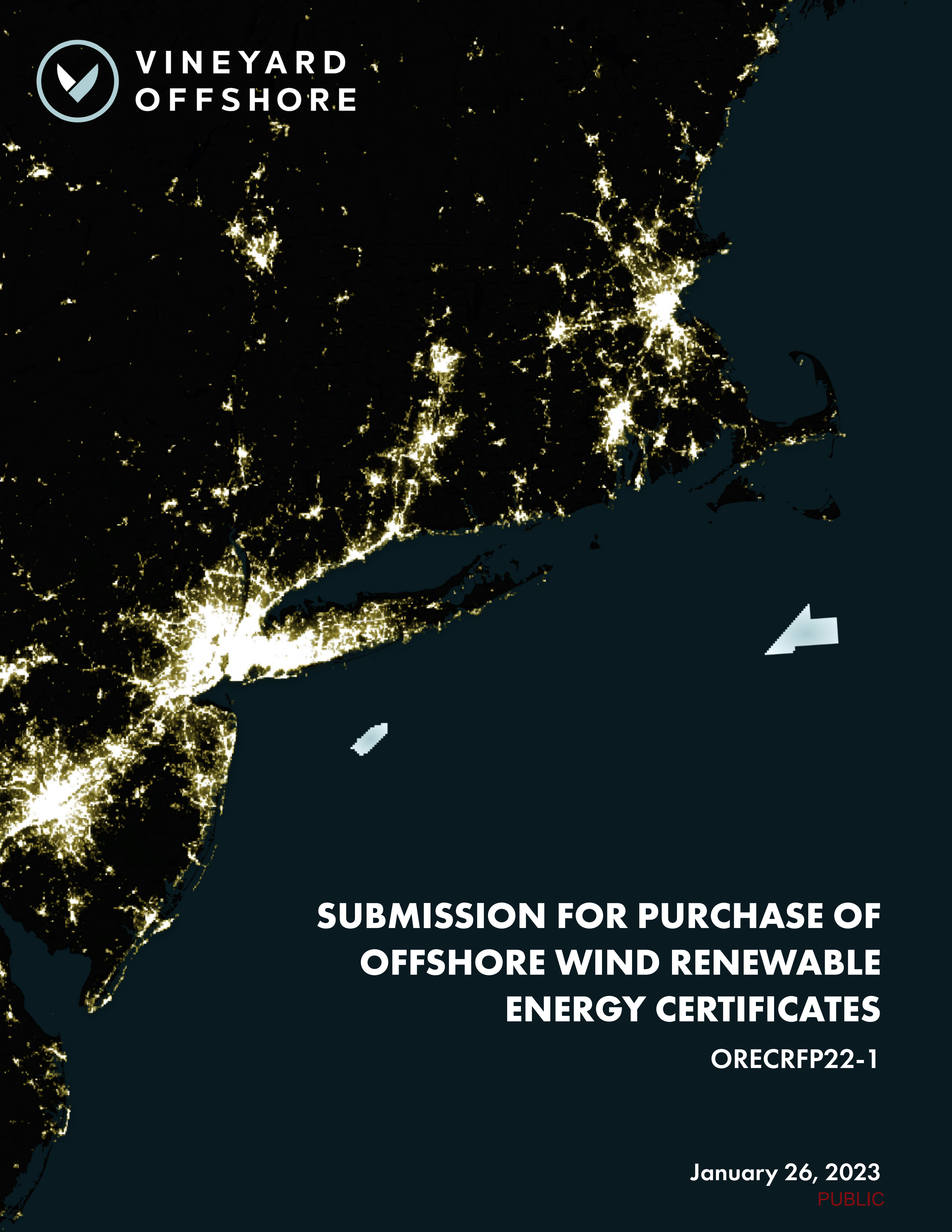

VINEYARD OFFSHORE

SUBMISSION FOR PURCHASE OF OFFSHORE WIND RENEWABLE ENERGY CERTIFICATES

ORECRFP22-1

January 26, 2023

PUBLIC

4.0 Proposal Narrative

Response to New York State Energy Research and Development Authority Request for Proposals ORECRFP22-1

VINEYARD OFFSHORE

PUBLIC

PROPOSALS FOR PURCHASE OF OFFSHORE WIND RENEWABLE ENERGY CERTIFICATES ORECRFP22-1

Prepared for

The New York State Energy Research and Development Authority

January 26, 2023

Submitted by

VINEYARD OFFSHORE

75 Arlington Street, 10th Floor
Boston, MA 02116

Certain information in this Submission is non-public, proprietary, commercial, and/or financial information and has been redacted from the version of this Submission marked "PUBLIC." Vineyard Offshore has submitted a confidential version of this Submission, marked "CONFIDENTIAL", which includes redacted information, and which should be treated as a non-public record that is exempt from disclosure under New York State law and as set forth in the ORECRFP22-1 Request for Proposals issued July 27, 2022, and revised on November 4, 2022, and December 23, 2022.

CONFIDENTIALITY STATEMENT

As contemplated under Sections 6.2.2 and 8.1 of the Request for Proposals ORECRFP22-1 issued July 27,2022 and as further described in the Attachment 1—Statement and Request for Confidential Treatment included with Vineyard Offshore's cover letter dated January 26, 2023 (the "Cover Letter"), certain information in this document or electronic file and the appendices listed below, each of which forms a part of this proposal, is non-public, confidential and proprietary information including commercial and financial information and trade secrets (as further defined in the Cover Letter, "Confidential Information"). Vineyard Offshore intends for all such Confidential Information to remain confidential and be treated as such by NYSERDA and the Scoring Committee. Under the New York Public Officers Law, Article 6, the New York State Freedom of Information Law and NYSERDA's implementing regulations under 21 NYCRR Part 501, the Confidential Information contained in this proposal is not a public record and is exempt from public records requests. Confidential Information has been redacted from this Submission and/or is clearly marked "CONFIDENTIAL."

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SECTION 1
EXECUTIVE SUMMARY

Vineyard Offshore is proud to present Excelsior Wind (EW), Liberty Wind North (LW-N), and Liberty Wind South (LW-S; herein the "Projects") in response to the New York State Research and Development Authority's (NYSERDA's) third competitive offshore wind solicitation (ORECRFP22-1). [redacted]

[redacted]

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1.1 SUBMISSION OVERVIEW

[redacted]

[redacted]

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[redacted]

[redacted]

1.2 SUPPLY CHAIN INVESTMENT PLAN

[redacted]

Table 1-3 Summary of Vineyard Offshore SCIP Initiatives

SCIP Facility	Funding Recipient	NYSERDA Funding Request (USD'000)	Total Facility Investment (USD'000)	Total Facility-related Direct Expenditures (USD'000)	Total Facility-related Jobs (FTE Job-Years)
Blade Manufacturing	LM Wind Power (GE)	[redacted]	[redacted]	[redacted]	[redacted]
Nacelle Assembly	GE	[redacted]	[redacted]	[redacted]	[redacted]
Cable Manufacturing	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[redacted]

1.3 PROJECT BENEFITS

[redacted]

1.3.1 Emission Reductions

[redacted]

[redacted]

OWF	Annual Energy Generation, GWh	Percent of Long Island and NYC's annual electricity demand, %	Number of homes powered	CO_2e emission reductions, million metric tpy	Avoided social costs, $M per year
[redacted]					
[redacted]					
[redacted]					

1.4 DISADVANTAGED COMMUNITY COMMITMENTS

[redacted]

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[redacted]

[redacted]

Vineyard Offshore is the wholly owned US offshore wind development team of Copenhagen Infrastructure Partners P/S (CIP), a fund management company focused on energy infrastructure including offshore wind, onshore wind, solar photovoltaic, biomass and energy-from-waste, transmission and distribution, reserve capacity and storage, and other energy assets like Power-to-X. [redacted]

CIP was established in 2012 by senior executives from the energy sector and today, CIP is a global leader, market pioneer, and among the largest fund managers globally within renewable energy. The company currently manages 10 funds and has approximately $20 billion (€19 billion) under management. These funds have approximately 100 international institutional investors from Asia, Australia, Europe, Israel, North America, the United Kingdom (UK), and multi-lateral organizations.

CIP is active in offshore wind globally and currently has ownership or exclusive rights to approximately 50 GW of offshore wind projects in development, construction, or operation in North America, the UK, Denmark, Germany, Italy, Taiwan, South Korea, Japan, and Australia. The company brings significant financial strength and experience to the Projects, including successfully organizing project financing for several offshore wind and HVDC transmission projects of similar scope and scale as those included in this Submission.

[redacted]

[redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]

[redacted]

[redacted]

SECTION 3
PROPOSER QUALIFICATIONS

3.1 BUSINESS ENTITY STRUCTURE

Vineyard Offshore LLC (Vineyard Offshore) was launched in April 2022 and is exclusively focused on the rapidly expanding United States (US) offshore wind market. [redacted]

Vineyard Offshore is CIP's dedicated offshore wind development team in the US, leading the development and commercialization of CIP's US offshore wind projects. [redacted]

[redacted]

Board of Directors

[redacted]

PUBLIC

[redacted]

Officers

Vineyard Offshore is led by Chief Executive Officer (CEO) Lars Pedersen. Until recently, Lars was the CEO of Vineyard Wind. Klaus Skoust Møeller, Senior Vice President at Vineyard Offshore, assumed the Vineyard Wind CEO role in February 2022. Additional members of the leadership team include Chief Development Officer (CDO) Rachel Pachter, Chief Commercial Officer (CCO) Ben Koffel, and General Counsel and Corporate Secretary Jennifer Simon Lento.

[redacted]

3.2 ORGANIZATIONAL CHART

Vineyard Offshore is leading the development of the 544 and 522 Lease Areas. Combined with CIP's 50% ownership of the Vineyard Wind 1 project, Vineyard Offshore has the potential to develop approximately 5 gigawatts (GW) of clean, renewable, and cost-effective energy on the US East Coast.

Vineyard Mid-Atlantic LLC

The lease agreement for the 544 Lease Area is held by Vineyard Mid-Atlantic LLC, a Delaware limited liability company. [redacted]

[redacted]

Vineyard Northeast LLC

The lease agreement for the 522 Lease Area is held by Vineyard Northeast LLC, a Delaware limited liability company. [redacted]

[redacted]

3.3 JOINT VENTURES

[redacted]

3.4 PROJECT EXPERIENCE

3.4.1 Vineyard Offshore

Vineyard Offshore brings industry-leading experience to every phase of the offshore wind project development process, from conception and design to permitting, financing, and construction. Our team of US and European industry experts has a long track record of developing offshore and onshore wind projects around the globe.

The company was established by the same team that founded Vineyard Wind LLC, which is building the Vineyard Wind 1 project. Vineyard Wind 1 is the first, and only, commercial-scale offshore wind project in the US to obtain permitting approval at the federal and state levels, conclude procurement and contracting for all major contract packages, finalize interconnection agreements, achieve financial close (FC), and begin construction. Our knowledge of what is required to develop, permit, finance, and construct offshore wind projects in the US is unparalleled.

Vineyard Offshore develops offshore wind projects in the US that CIP owns and funds. CIP is a fund management company focused on energy infrastructure including offshore wind, onshore wind, solar photovoltaic, biomass and energy from waste, transmission and distribution, reserve capacity and storage, and other energy assets like Power-to-X.

3.4.2 Copenhagen Infrastructure Partners

CIP was established in 2012 by senior executives from the energy sector with *PensionDanmark* (one of the largest labor market pension funds in Denmark and one of the most experienced institutional investors in renewable energy) as the founding investor. Today, CIP is a global leader, market pioneer, and among the largest fund managers globally within renewable energy. CIP currently manages 10 funds and has approximately $20 billion (€19 billion) under management (see Table 3-2). The funds represent different investment strategies with the four "flagship funds," indicated in bold, focusing on energy infrastructure projects in Organization for Economic Co-operation and Development (i.e., OECD) countries. Additional information about CIP's experience is provided below and in Attachment 3-3.

Table 3-2 CIP Funds

Fund Name	Fund Size	Established
Copenhagen Infrastructure I K/S	~€1 billion	2012
CI Artemis I K/S	€400 million	2014
Copenhagen Infrastructure II K/S	€2 billion	2014
Copenhagen Infrastructure III K/S	€3.5 billion	2017
Copenhagen Infrastructure New Markets Fund I K/S	$1 billion	2019
CI Artemis II K/S	~€300 million	2020
Copenhagen Infrastructure IV K/S	€7 billion	2020
Copenhagen Infrastructure Energy Transition Fund I K/S	€800 million	2021
CI GCF I	€1 billion (target)	2021
CI Advanced Bioenergy Fund I	€1 billion (target)	2022

CIP has a team of approximately 400 professionals across 30 nationalities, and offices in Copenhagen (headquarters), Hamburg, London, Melbourne, New York, Singapore, Seoul, Tokyo, and Utrecht, along with 14 project offices in the company's main markets. Project office locations are selected to secure a local presence in key markets. Advantages of this strategy include being close to local authorities, governmental bodies, and other stakeholders; developing local networks; access to hiring local employees; understanding the culture and local business environment; and ready access to project sites and local project teams.

CIP takes a proactive and hands-on approach to investing and managing assets and focuses on building and maintaining an execution platform with a local presence to support active involvement in investments and assets during all phases of the investment and asset lifecycle. [redacted]

[redacted]

3.4.2.1 CIP Partner Group

CIP is controlled and majority-owned by four Senior Partners with a proven track record in the energy industry (see Figure 3-4). Prior to establishing CIP, the Senior Partners worked closely together as a team for well over a decade and held senior positions at Ørsted (previously DONG Energy) where they were instrumental in establishing Ørsted as a merger between six Danish energy companies and responsible for establishing and elevating Ørsted's offshore wind business to the global market-leading position it retains today.

Figure 3-4 CIP's Senior Partners

CIP's Senior Partners

Jakob Baruël Poulsen
Managing Partner
20+ years of experience in the energy sector

Christina Grumstrup Sørensen
Senior Partner
18 years of experience in the energy sector

Torsten Lodberg Smed
Senior Partner
20 years of experience in the energy sector

Christian T. Skakkebæk
Senior Partner
20+ years of experience in the energy sector

Alongside the Senior Partners, CIP's Partner Group includes 24 Partners and 17 Associate Partners with many years of top management experience in the energy sector as well as hands-on experience within mergers and acquisitions, project delivery and financing, asset management, and fund management. Collectively, the partners have more than 300 years of experience within energy infrastructure investments and have executed more than 100 transactions, agreements, and investments with a combined value of almost $60 billion across a wide range of technologies including, but not limited to, offshore wind, onshore wind, hydropower, coal, gas, biomass, transmission, distribution, gas storage, and oil storage.

3.4.2.2 Offshore Wind Experience

CIP is active in offshore wind globally and currently has ownership or exclusive rights to approximately 50 GW of offshore wind projects in development, construction, or operation in North America, the United Kingdom (UK), Germany, Italy, Taiwan, South Korea, Japan, and Australia (see Figure 3-5). CIP has pioneered the build-out of offshore wind in the US with Vineyard Wind 1. [redacted]

With its leading competencies and insight into offshore wind, CIP is widely considered to be a global leader and market pioneer, particularly within the offshore wind industry, and an early mover into new markets. [redacted]

[redacted]

[redacted]

[redacted]

3.4.2.3 High Voltage Direct Transmission Experience

CIP has significant experience with high voltage direct current (HVDC) transmission technology for offshore wind, which includes an ownership interest in 2.8 GW of fully operational offshore HVDC converter stations (BorWin1, BorWin2, HelWin2, and DolWin2) in the German North Sea. These assets were the first HVDC systems to connect offshore wind farms to the grid.

CIP was also involved in financing the construction of the 900 MW DolWin3 Offshore Wind Farm Connection (DolWin3), an offshore HVDC transmission platform that exports power from two offshore wind farms in the southwestern part of the German North Sea. The platform is located 31 miles offshore and the grid connection runs another 50 miles onshore to a converter station located at Dörpen West. DolWin3 was constructed and is operated by the Dutch transmission system operator, TenneT.

[redacted]

[redacted]

3.4.4 Project Sponsor Portfolio

A list of offshore wind, onshore wind, and transmission projects that CIP has successfully developed or that are currently in development or under construction is provided in Attachment 3-4. [redacted]

3.5 MANAGEMENT CHART

The Vineyard Offshore team is comprised of highly qualified individuals with decades of experience in the US and global offshore wind markets. Many members of the team supported the development of Vineyard Wind 1 and remain involved in that project as it moves through the construction phase. The experience gained developing and constructing the nation's first commercial-scale offshore wind project has been and will continue to be leveraged by Vineyard Offshore to ensure the success of the Projects.

[redacted]

[redacted]

3.5.1 Senior Management Team Experience

Lars Thaaning Pedersen, CEO of Vineyard Offshore and Co-founder of Copenhagen Offshore Partners.

Lars previously served as CEO of Vineyard Wind. He also co-founded Copenhagen Offshore Partners, a leading offshore wind development and construction management company working exclusively with CIP, in 2015. Copenhagen Offshore Partners is currently involved in the development of more than 6,000 MW of offshore wind projects in the US, Canada, Taiwan, and Australia. Lars has been working in the energy sector since 2004 and with offshore wind since 2008. Prior to joining Vineyard Wind in 2016, he held executive positions at Ørsted and has been involved in almost 30 offshore wind projects across three continents, including managing six offshore wind joint ventures. Lars has significant experience in the development, construction, and operation of offshore wind projects and has been instrumental in bringing new WTG technology to the market, such as the Siemens 3.6 MW-120 in 2009 and the 6 MW Siemens Direct Drive WTG in 2012. He also headed the development of the in-house Operations and Maintenance and Asset Management business units while at Ørsted. Lars holds a master's degree in Mechanical Engineering from the Technical University of Denmark.

Klaus Skoust Møller, Senior Vice President of Vineyard Offshore.

Klaus is currently serving as the CEO of Vineyard Wind. He has over 15 years of experience in offshore wind, including a successful track record of leading the development and construction of over 3 GW of large-scale offshore wind projects across four continents, including serving as Program Director for the Zhong Neng (Taiwan), and UK offshore wind projects including Race Bank, Burbo Bank Extension, and Gunfleet Sands 3. Klaus holds a Graduate Diploma in Business Administration from Copenhagen Business School (Denmark), as well as a Master of Law from Aarhus University (Denmark), and a Higher Commercial Examination Program Degree (HHX) from Randers Business School (Denmark).

Rachel Pachter, CDO of Vineyard Offshore.

Rachel also currently serves as the CDO for Vineyard Wind and was previously Vineyard Wind's Vice President of Permitting (2016 – 2019). She has more than 20 years of experience in offshore wind development, particularly in permitting and regulatory compliance, environmental and site investigation, and federal, state, and local regulations. In addition to overseeing permitting efforts for Vineyard Wind 1, she has developed geophysical, geotechnical, and avian surveys and conducted community outreach and public relations. To date, Rachel is the only person to successfully manage and complete permitting of not one, but two commercial-scale offshore wind projects located in US federal waters (Cape Wind and Vineyard Wind 1). Rachel advised and planned all environmental and permitting aspects of development for Vineyard Wind 1 and managed the first phase of offshore geophysical and geotechnical site investigations for that project. Previously, Rachel was the Permitting and Environmental Manager at Energy Management Inc./Cape Wind Associates, where she worked for nearly 14 years. Rachel has a bachelor's degree in Geology, Cum Laude, from the University of Alaska at Fairbanks and received the Geology and Geophysics Award for outstanding scholastic achievement.

Ben Koffel, CCO of Vineyard Offshore.

As Chief Commercial Officer, Ben oversees business development, partnerships, and strategic procurement. He has more than a decade of experience in onshore renewables development and investment banking. As a developer at Enel Green Power (Enel), Ben previously worked on more than 3 GW of wind, solar and hydropower developments in North America and Colombia, across all phases of the project lifecycle, from site origination and land acquisition, permitting, interconnection, pre-construction planning, and offtake structuring, to shepherding projects through Final Investment Decision. In addition to greenfield development, he also established and managed several successful co-development partnerships with developers across North America and pioneered the development of the Colombian onshore renewables market for Enel. As an investment banker, Ben was involved in approximately $2 billion of successful structured finance transactions in the renewables and transportation sectors in North and South America, including greenfield debt and equity raising, mergers and acquisitions, and strategic divestments. He has a master's degree in Regional Planning and a bachelor's degree in Anthropology, both from Cornell University.

Jennifer Simon Lento, General Counsel and Corporate Secretary of Vineyard Offshore.

Jennifer is currently serving as the General Counsel and Corporate Secretary of Vineyard Wind. She also led the $2.3 billion debt financing process for the Vineyard Wind 1 project, which achieved FC in 2021 and is currently leading the project's efforts to secure tax equity financing. Jennifer has been practicing law in the renewable energy and environmental sectors for more than 17 years. After 10 years with the renewable energy and environmental practice groups of several large and mid-sized law firms in Boston, southern New Jersey, and Philadelphia, Jennifer most recently served as counsel for a private equity fund focused on the acquisition, development, and financing of distributed solar energy facilities. Jennifer received her Juris Doctor degree at the Rutgers School of Law and holds a bachelor's degree in Liberal Arts from Sarah Lawrence College.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

3.6 RESPONSIBLE ENTITIES

Vineyard Offshore has extensive contacts and access to the firms required to satisfy the financing, environmental assessment, operation, engineering, transmission, and legal counsel requirements of the Projects.

[redacted]

[redacted]

3.7 NYISO MARKET EXPERIENCE

[redacted]

[redacted]

3.8 PENDING LITIGATION

3.8.1 Vineyard Offshore

Vineyard Offshore is not a named party in any pending (current or in the past three years) litigation or disputes related to projects planned, developed, owned, or managed in the US, or related to any energy product sale agreement.

[redacted]

[redacted]

[redacted]

3.8.3 Affiliate Vineyard Wind 1 LLC

[redacted]

[redacted]

[redacted]

[redacted]

3.8.4 Parent Companies

[redacted]

3.9 MATERIAL LITIGATION

[redacted]

3.10 PROPOSER'S CONFIRMATION

Vineyard Offshore confirms that Proposer, and the directors, employees, and agents of Proposer and any parent company of Proposer are not currently under investigation by any governmental agency and have not in the last four years been convicted or found liable for any act prohibited by State or Federal law in any jurisdiction involving conspiracy, collusion, or other impropriety with respect to offering on any contract or have been the subject of any debarment action.

SECTION 4
PROJECT DESCRIPTION AND SITE CONTROL

4.1 SITE PLANS

Vineyard Offshore is proposing to install up to two of three Offshore Wind Generation Facilities (OWFs) – Excelsior Wind (EW) in Lease Area OCS-A 0544 (the "544 Lease Area") and Liberty Wind North (LW-N), and Liberty Wind South (LW-S) in Lease Area OCS-A 0522 (the "522 Lease Area"). [redacted]

[redacted]

[redacted]

4.1.1 Excelsior Wind

[redacted]

[redacted]

4.1.2 Liberty Wind North and South

[redacted]

[redacted]

4.2 OFFSHORE WIND GENERATION FACILITY SITES

[redacted]

4.2.1 Lease Area OCS-A 0544

Lease Area OCS-A 0544 is the Bureau of Ocean Energy Management (BOEM) lease area held by Vineyard Mid-Atlantic LLC. This New York Bight lease area is approximately 43,056 acres in size and approximately 24 and 41 miles, respectively, from New York's and New Jersey's nearest shorelines. The 544 Lease Area abuts Lease Area OCS-A 0512, where the Empire Wind 1 and 2 projects will be installed, along its western edge, and has water depths between 134.5 and 148 feet.

[redacted]

[redacted]

4.2.2 Lease Area OCS-A 0522

Lease Area OCS-A 0522 is the BOEM lease area held by Vineyard Northeast LLC. The 522 Lease Area is approximately 132,370 acres in size and is located 29 miles south of Nantucket, Massachusetts, and 78 miles southeast of New York's nearest shoreline (Montauk Point on Long Island). It is one of nine lease areas in the Massachusetts Wind Energy Area (MA WEA) and Rhode Island/Massachusetts Wind Energy Area (RI/MA WEA) and abuts Mayflower Wind's Lease Area OCS-A 0521 along its northwestern edge. The 522 Lease Area has water depths between 118 and 177 feet.

[redacted]

4.2.3 Offshore Wind Generation Facility Layouts

4.2.3.1 Excelsior Wind

[redacted]

[redacted]

4.2.3.2 Liberty Wind North and Liberty Wind South

[redacted]

[redacted]

4.2.4 Offshore Wind Generation Facility Site Rights

Vineyard Offshore has site control for the 544 and 522 Lease Areas through lease agreements executed with BOEM by our affiliates:

- **544 Lease Area:** Vineyard Mid-Atlantic LLC has a valid lease for the 544 Lease Area for the purpose of offshore wind energy generation on the Outer Continental Shelf. A copy of the executed lease agreement for the 544 Lease Area is included as Attachment 4-4.[1]
- **522 Lease Area:** Vineyard Northeast LLC has a valid lease for the 522 Lease Area for the purpose of offshore wind energy generation on the Outer Continental Shelf. A copy of the executed lease agreement for the 522 Lease Area is included as Attachment 4-5.

[redacted]

[redacted]

4.3 OFFSHORE EXPORT CABLE CORRIDORS

The Projects' offshore export cables will be installed within a defined OECC, which connects the ESP to the onshore export cables at the landfall site. [redacted]

[redacted]

[redacted]

[redacted]

The Projects' final OECCs will be selected after further evaluation, G&G surveys, and additional consultation with agencies and stakeholders.

4.3.1 Offshore Export Cable Corridor Rights

4.3.1.1 Federal Waters

Per U.S.C. § 585.200(b), Vineyard Mid-Atlantic LLC and Vineyard Northeast LLC are entitled to one or more easements in which to locate the Projects' offshore export cables in federal waters to enable grid connection for offshore wind projects located in the 544 and 522 Lease Areas. These easements will be issued upon COP approval and will be recorded as an addendum to the lease agreements.

4.3.1.2 New York State Waters

For the portion of the OECCs located in New York State waters, an Easement to Use State Lands Underwater will be secured from the New York State Office of General Services (NYSOGS) before installing the offshore export cables in New York State waters. An application for an Easement to Use State Lands Underwater will be filed with the NYSOGS once the final offshore export cable alignments in state waters have been identified and approved by the New York Public Service Commission and US Army Corps of Engineers (USACE); see Section 10.

4.4 LANDFALL SITES AND ONSHORE EXPORT CABLE ROUTES

[redacted]

[redacted]

[redacted]

[redacted]

4.4.2 Onshore Export Cable Routes

The onshore export cable route selection process was guided by several factors, including potential environmental impacts, constructability, and cost. Attempts were made to minimize overall route length and to avoid geologic and navigational constraints as well as environmentally sensitive areas. [redacted]

[redacted]

4.4.2.1 Preferred Onshore Export Cable Routes

[redacted]

4.4.2.2 Onshore Export Cable Route Rights

[redacted]

4.5 ONSHORE SUBSTATION SITES

4.5.1 Onshore Substation Site Investigation and Selection

[redacted]

[redacted]

[redacted]

4.6 DELIVERY POINTS

[redacted]

4.6.1 Delivery Points Rights

Delivery Point rights will be acquired through the interconnection process initiated through a Large Generating Facility Interconnection application filed with the New York Independent System Operator by Vineyard Offshore, which is currently being studied under the queue positions as summarized in Section 8. The rights and point of ownership change will be formalized through an interconnection agreement following the completion of the interconnection studies (i.e., System Reliability Impact Study and Class Year Study).

4.7 ACQUISITION OF ADDITIONAL RIGHTS

Key real property rights have already been acquired for the Projects, and Vineyard Offshore has a process underway to obtain the remaining rights. Table 4-3 provides an overview of the status of the real property rights required to construct and operate the project configurations.

Table 4-3 Status of Acquisition of Additional Rights

Property Right Required	Status	Remarks	Timeframe
Offshore Wind Generation Facility Sites			
Ability to install Project components in the 544 Lease Area	Secured	A lease agreement for the 544 Lease Area has been executed with BOEM (see Attachment 4-4).	N/A
Ability to install Project components in the 522 Lease Area	Secured	A lease agreement for the 522 Lease Area has been executed with BOEM (see Attachment 4-5).	N/A

Property Right Required	Status	Remarks	Timeframe
		Offshore Export Cable Corridors	
Portion Located in Federal Waters	Secured	Right to install and locate the offshore export cables in federal waters is included in the lease agreements executed with BOEM per U.S.C. § 585.200(b).	Easements granted following COP approval
[redacted]	[redacted]	[redacted]	[redacted]
		Onshore Interconnection Routes	
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
		[redacted]	
[redacted]	[redacted]	[redacted]	[redacted]

SECTION 5
ENERGY RESOURCE ASSESSMENT AND PLAN

5.1 OFFSHORE WIND GENERATION FACILITY SITES

Vineyard Offshore is proposing to install up to three Offshore Wind Generation Facilities (OWFs) – Excelsior Wind (EW) in Lease Area OCS-A 0544 (the "544 Lease Area"), and Liberty Wind North (LW-N) and Liberty Wind South (LW-S) in Lease Area OCS-A 0522 (the "522 Lease Area"). [redacted]

[redacted]

5.1.1 544 Lease Area

The 544 Lease Area is approximately 43,056 acres in size and is located in the open Atlantic Ocean approximately 24 and 41 miles, respectively, from New York's and New Jersey's nearest shorelines. The 544 Lease Area is south of Long Island in the New York Bight region and abuts Lease Area OCS-A 0512 (where the Empire Wind 1 and 2 projects will be installed) along its western edge.

[redacted]

5.1.1.1 Excelsior Wind Layout

[redacted]

5.1.2 522 Lease Area

The 522 Lease Area is approximately 132,370 acres in size and is located in the open Atlantic Ocean approximately 29 miles south of Nantucket, Massachusetts and 78 miles southeast of New York's nearest shoreline (Montauk Point on Long Island). The 522 Lease Area is one of nine lease areas in the Massachusetts Wind Energy Area (MA WEA) and Rhode Island/Massachusetts Wind Energy Area (RI/MA WEA) and abuts Mayflower Wind's Lease Area OCS-A 0521 along its northwestern edge. [redacted]

5.1.2.1 Liberty Wind North and Liberty Wind South Layouts

[redacted]

5.2 WIND DATA

[redacted]

5.2.1 544 Lease Area

[redacted]

Figure 5-1 illustrates the measurement locations of the wind datasets utilized in the assessments included herein as well as the study locations of the extensive wind assessments and production estimates carried out for previous site characterization campaigns. The wind datasets are summarized in Table 5-1. [redacted]

[redacted]

[redacted]

5.2.2 522 Lease Area

[redacted]

[redacted]

The primary data sources and methods used in the wind resource and energy production estimates are the following:

[redacted]

Additional datasets used for overall wind resource and energy production estimates include:

[redacted]

[redacted]

5.3 DATA COLLECTION SUMMARY

Information on the data collection points referenced above, including their proximity to the relevant OWF site, is provided in Table 5-1 and Table 5-2.

[redacted]

[redacted]

5.4 WIND RESOURCE ASSESSMENT

[redacted]

5.4.1 Methodology

[redacted]

5.4.2 Summary of Results

5.4.2.1 544 Lease Area

[redacted]

[redacted]

5.4.2.2 Liberty Wind North and Liberty Wind South

[redacted]

5.5 NET ENERGY PRODUCTION

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

5.6 POWER CURVE

[redacted]

[redacted]

SECTION 6
OPERATIONAL PARAMETERS

6.1 OUTAGE REQUIREMENTS

Vineyard Offshore is proposing to install up to two Offshore Wind Generation Facilities (OWFs) – Excelsior Wind, Liberty Wind North, and Liberty Wind South. [redacted]

Maintenance outage requirements for the major OWFs and onshore components are provided in Table 6-1. [redacted]

[redacted] The New York Independent System Operator (NYISO) will be informed of planned maintenance campaigns well in advance to minimize the impacts of any outages.

[redacted]

To avoid unscheduled maintenance and ensure high production reliability, select project components will be designed with Condition Monitoring Systems (CMS) so potential faults can be addressed before unexpected failures occur.

The preventive maintenance measures described in this section will reduce the need for corrective intervention and support the Projects' enhanced operation.

[redacted]

6.1.1 Major Project Components

6.1.1.1 Wind Turbine Generators

[redacted]

6.1.1.2 Inter-array Cables and Offshore Export Cables

[redacted]

6.1.2 Preventive Maintenance

Preventive maintenance will reduce the need for corrective intervention, and remote monitoring is a key element of preventive maintenance as it allows continuous assessment of the technical state of a project without having to send technicians offshore. The Projects will be monitored around-the-clock from an onshore control room, and real-time data from condition monitoring sensors will be continuously analyzed to enable Vineyard Offshore to predict potential failures and respond quickly to minimize any impact on production. Data gathered by remote monitoring will also allow technicians to improve maintenance plans and identify potential future problems when conducting WTG maintenance. If an alarm is raised in the remote monitoring system, the technical team will be notified immediately; based on the type of notice, either a remote or an on-site intervention can be planned.

The primary systems available for monitoring offshore wind projects remotely are:

- **Condition Monitoring System:** CMS measures vibration and acceleration in specific WTG components, typically the main hub bearing, blades, main shaft, gearbox (if applicable), generator, and tower. The vibrations and accelerations are measured and sent to a centralized computer system, and when defined levels are exceeded, an alarm is issued. If necessary, the WTG will automatically initiate a forced shutdown until the root cause has been identified and mitigating actions have been completed.

- **Supervisory Control and Data Acquisition:** Supervisory Control and Data Acquisition (SCADA) is a computer system that gathers and analyzes real-time data. The system connects individual WTGs, substations, and meteorological stations to a central computer and gathers information such as temperature, pressure, and positions. Gathered data are continuously analyzed by trained technicians to establish monitoring routines and evaluate project components for early indications of wear and tear or potential breakdown. If a breakdown occurs, SCADA data can be analyzed to identify its root cause.
- **Cable Condition Monitoring:** Cable CMSs allow offshore cables to be continuously monitored. These systems can detect and locate areas of potential damage, which can be early indicators of potential damage and other anomalous conditions.

The above remote monitoring systems will be used for the Projects and managed by local experts from an operation and maintenance facility or in shared monitoring centers located in the US.

6.1.3 Operational Experience

Vineyard Offshore will leverage lessons learned operating Vineyard Wind 1, which is on track to begin commercial operation in 2024. We will also have the benefit of experience gained operating Copenhagen Infrastructure Partners' (CIP's) offshore wind projects to further support the successful and reliable operation of the Projects. Additional information about Vineyard Offshore's and CIP's offshore wind experience is provided in Section 3.

6.2 OPERATING CONSTRAINTS AND RESTRICTIONS

The Projects' operating constraints are largely determined by the technical parameters of the OWFs and transmission system components. Importantly, offshore WTGs and associated structures are designed to withstand the harsh offshore climate to ensure a long operational life. [redacted]

6.2.1 Weather-Related Conditions

Operational constraints for the WTGs are dictated by temperature and wind speed in addition to sea states for safe vessel transfers. These operational constraints have been accounted for in the WTG availability calculation.

6.2.1.1 Temperature

[redacted]

[redacted]

6.2.1.2 Wind Speed

[redacted]

6.2.1.3 Sea States

[redacted]

SECTION 7
BUSINESS ENTITY AND FINANCING PLAN

7.1 BUSINESS ENTITY STRUCTURE

As described in Section 3, Vineyard Offshore LLC (Vineyard Offshore) is leading the development of two lease areas, Lease Area OCS-A 544 (the "544 Lease Area") and Lease Area OCS-A 522 (the "522 Lease Area") on behalf of Copenhagen Infrastructure Partners P/S (CIP) and Highland Group Holdings Limited (Highland). [redacted]

[redacted]

7.2 FINANCING PLAN

Financing the development and construction of the Projects is expected to follow the plan summarized herein and further described in 4.2 Financing Plan.

Project Financing

[redacted] In September 2021, CIP and its joint venture partner, partner, Avangrid Renewables, arranged approximately $2.3 billion for the financing of Vineyard Wind 1 from a group of nine domestic and international banks. This historic achievement led to Vineyard Wind 1 being named the Global ESG Deal of the Year by Project Finance International, in addition to numerous other project finance rewards.

The financing effort was led by Vineyard Offshore's General Counsel, Jennifer Simon Lento. Vineyard Wind 1 also includes debt commitments from Bank of America, J.P. Morgan, BBVA, NatWest, Santander Bank N.A. (Santander), Crédit Agricole, Natixis, BNP Paribas, and MUFG Bank. The project's financial advisor and lead counsel were Santander and Norton Rose Fulbright, respectively. [redacted]

[redacted]

Financial Structure

[redacted]

Debt and Equity Financing

[redacted]

Fixed and Index OREC Pricing

[redacted]

Estimated Construction Costs

[redacted]

[redacted]

Projected Capital Structure

[redacted]

Agreements

[redacted]

7.3 INFLATION

[redacted]

7.4 FEDERAL TAX CREDITS

[redacted]

7.5 FINANCING EXPERIENCE AND RESOURCES

[redacted]

SECTION 8
INTERCONNECTION AND DELIVERABILITY PLAN

8.1 OVERVIEW

Vineyard Offshore is proposing to install up to two of three Offshore Wind Generation Facilities (OWFs) – Excelsior Wind (EW) in Lease Area OCS-A 0544 (the “544 Lease Area”) and Liberty Wind North (LW-N), and Liberty Wind South (LW-S) in Lease Area OCS-A 0522 (the “522 Lease Area”). [redacted]

[redacted]

[redacted]

8.2 INTERCONNECTION REQUESTS

[redacted]

8.3 COST ESTIMATES

[redacted]

[redacted]

[redacted]

8.4 MESHED READY REQUIREMENTS

[redacted]

SECTION 9
FOSSIL FUEL REPURPOSING PROPOSAL

[redacted]

[redacted]

[redacted]

SECTION 10
ENVIRONMENTAL ASSESSMENT AND PERMIT ACQUISITION PLAN

10.1 OVERVIEW

The Environmental Assessment and Permitting Acquisition Plan (the "EAPAP") described in this section summarizes the environmental assessments and required permits for all three proposed Offshore Wind Generation Facilities (OWFs)–Excelsior Wind (EW), Liberty Wind North (LW-N), and Liberty Wind South (LW-S) [redacted] Excelsior Wind will be installed in Lease Area OCS-A 0544 (the "544 Lease Area"). Liberty Wind North and LW-S will be installed in Lease Area OCS-A 0522 (the "522 Lease Area"). [redacted]

[redacted]

10.2 PERMITTING TEAM

Vineyard Offshore continues to lead the rapidly growing United States (US) offshore wind sector using the experience gained permitting multiple, coincident offshore wind projects. Having worked closely with Bureau of Ocean Energy Management (BOEM) staff and other federal agencies since 2017, we have the experience, knowledge, and resources needed to support successful federal permitting and review processes. [redacted] Vineyard Offshore brings the same industry-leading approach to the tasks required to assess and permit the Projects.

[redacted]

[redacted]

10.3 PERMITTING PLAN

[redacted]

10.3.1 Federal Permits and Approvals

[redacted]

[redacted]

Table 10-1 lists the anticipated federal permits, approvals, and consultations required for the Projects and their current status.

[redacted]

[redacted]

10.3.1.1 Federal Permitting Process

Bureau of Ocean Energy Management

BOEM is the lead federal agency for the Projects. The agency has jurisdiction under the Outer Continental Shelf Lands Act to issue leases, easements, and rights-of-way for the development of renewable energy on the OCS. BOEM authorizes development on the OCS through its review and approval of a project's SAP and COP. As described herein, BOEM coordinates and consults with numerous other federal agencies as part of its review, but several separate authorizations from other federal agencies are also needed for the Project.

[redacted]

In reviewing the COPs, BOEM must comply with its obligations under the NEPA, NHPA, the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the MBTA, the Clean Air Act (CAA), the Marine Mammal Protection Act (MMPA), and the ESA. Thus, BOEM coordinates and consults with numerous other federal agencies, including the NMFS, the USFWS, the Environmental Protection Agency (EPA), and the US Coast Guard (USCG) during the review process. BOEM also coordinates with states under the Coastal Zone Management Act (CZMA) to ensure that a project is consistent with state-level coastal zone management plans. BOEM will also conduct government-to-government consultations with federally recognized tribes that may be affected by a project. Finally, BOEM also consults with the US Department of Defense (DoD) Siting Clearinghouse during its review of projects.

US Army Corps of Engineers

Section 10 of the Rivers and Harbors Act of 1899 prohibits the unauthorized obstruction or alteration of any navigable water of the US. A Section 10 permit from the US Army Corps of Engineers (USACE) is needed for the installation of the wind turbine generators (WTGs), electrical service platforms (ESPs), and their associated foundations, the placement of scour protection and cable protection (if/where needed), and the installation of offshore cables.

Section 404 of the CWA requires a permit before dredged or fill material can be discharged into waters of the US (within the three-nautical-mile [NM] limit for state territorial waters). A Section 404 permit from the USACE is needed for the installation of offshore export cables and the discharge of dredged materials from localized sand wave dredging. Similar to BOEM, the USACE must comply with its obligations under NEPA, NHPA, MSA, MBTA, and ESA. However, to avoid duplication of effort, the USACE is a cooperating agency with BOEM through the NEPA process.

Section 408 of the Rivers and Harbors Act of 1899 requires USACE review when a project may affect a federal civil works project. Because it is anticipated that offshore export cable crossings may be located near or cross a federal navigation channel as part of one or more of the Projects, a Section 408 review is expected to be necessary.

Environmental Protection Agency

An OCS Air Permit is required for certain emissions from vessels and equipment used during offshore construction and operation of the Projects. The EPA is expected to coordinate with BOEM to satisfy its obligations under the ESA and other relevant statutes.

National Marine Fisheries Service

Authorization under the MMPA is necessary for activities that may affect (by harassment, injury, or mortality) marine mammals, including both survey and construction activities. Vineyard Offshore has received an IHA for G&G survey activities in the 544 and 522 Lease Areas when there is the risk of harassment, injury, or mortality due to potential vessel interaction or operation of geophysical survey equipment. The most recent IHA was issued in July 2022 and is valid for one year, with the ability to renew. Marine mammals may be affected by potential noise impacts associated with pile driving, additional geophysical survey work, and other noise-generating activities and are at risk of interaction with transiting vessels. Because these activities will occur over multiple years, a Letter of Authorization (LOA) is the recommended form of approval. An LOA involves a rulemaking process and is valid for five years.

Federal Aviation Administration

The Federal Aviation Administration (FAA) requires public notice of the proposed construction of a structure that is more than 200 feet above ground level or within certain distances of airports. Vineyard Offshore will file Notices of Proposed Construction or Alteration for the temporary use or movement of any structures within territorial airspace that exceed 200 feet or any obstruction standard contained in 14 CFR Part 77 during the Projects' construction, including within ports and at construction staging areas. Though the Projects' WTGs are outside of the FAA's jurisdiction (which extends 12 NM from the US coastline), Vineyard Offshore will also consult with the DoD's Siting Clearinghouse with respect to military air traffic.

Coastal Zone Management

The CZMA gives states the authority to review federal actions that affect their coastal uses and/or resources to ensure that such actions are consistent with a state's federally approved coastal zone management program and policies. The New York State Department of State

(NYSDOS) Coastal Management Program is responsible for implementing the federal consistency review process for New York and will have consistency review authority over applicable portions of the offshore export cables. NYSDOS is seeking the addition of new geographic location descriptions that, if approved by the National Oceanic and Atmospheric Administration (NOAA), would include expanded areas subject to federal consistency review. The NYSDOS is a statutory party to the Article VII proceeding. Activities in New Jersey waters would similarly be subject to review by the New Jersey Department of Environmental Protection (NJDEP) Coastal Management Program.

Additional Review/Authorizations

Additional reviews and authorizations may be required for the Projects, such as PATON permits from the USCG.

10.3.2 New York State and Local Permits and Approvals

At the state level, the Projects will be permitted through a process administered by the NYSPSC pursuant to Article VII of the New York State Public Service Law (PSL), which establishes a review process for the consideration of any application to construct and operate a "major utility transmission facility." [redacted]

A summary of the anticipated New York State permits and approvals required for the Projects and their current status is provided in Table 10-2. [redacted]

Table 10-2 Anticipated New York State Permits and Approvals

Agency/Regulatory Authority	Permit/Approval	Status
[redacted]	[redacted]	[redacted]
[redacted]		
[redacted]	[redacted]	
[redacted]		

New York Article VII Review

The NYSPSC approves applications filed under Article VII, with the New York State Department of Public Service (NYSDPS) staff functioning as technical staff for the NYSPSC. Article VII requires the submission of detailed reviews of environmental impacts and public needs related to the siting, design, construction, and operation of all aspects of a proposed transmission facility and appurtenant facilities located within state, county, and local jurisdictions. The process also requires the issuance of a Certificate of Environmental Compatibility and Public Need (an "Article VII Certificate"), as well as approval of an Environmental Management & Construction Plan (EM&CP) before the construction of a proposed transmission facility is allowed to commence.

Through the Article VII process, the applicant(s) provides all affected stakeholders, including landowners, state agencies, and the municipalities in which project components will be located, with notice of the various aspects of the project as well as the right to become a party to the Article VII proceeding.

The Article VII process is comprised of the following key aspects:

- Identifying the agencies, programs, and stakeholders that will be affected by a project;
- Collaborating with state agencies, including the New York State Department of Environmental Conservation (NYSDEC); NYSDOS Coastal Management Program (in relation to the federal consistency review); New York State Office of Parks, Recreation and Historic Preservation; New York State Department of Economic Development; New York State Department of Agriculture and Markets; New York State Department of Transportation; and Empire State Development (Optional);
- Coordinating agency involvement with the proceedings, conditions, or required mitigation that would have otherwise been placed on individual permits obviating the need for separate permit applications to most other state or local agencies. For example, the NYSDEC is a statutory party to the Article VII process, and separate permits (e.g., Freshwater Wetlands Permits and Protection of Waters Permits) are not required;
- Preparing a comprehensive EM&CP to comply with permit conditions;
- Delegating authority to the NYSPSC to issue a 401 Water Quality Certification in conjunction with the Article VII Certificate; and
- Issuing a Public Involvement Plan, which the NYSPSC considers to be integral to the process, although it is not required by statute.

Other New York State Permits

State permits that are addressed through the Article VII Certificate include:

- State Environmental Quality Review Act;
- Tidal Wetlands Permit;
- Freshwater Wetlands Permit;
- Coastal Erosion Management Permit;
- Protection of Waters Permit-Excavation or Placement of Fill in Navigable Water and Their Adjacent and Contiguous Wetlands Permit;

- State Lands Permit;
- State Coastal Zone Consistency Review; and
- National and New York State Historic Preservation Act review (note that BOEM administers the federal Section 106 process).

Numerous state reviews that may be required in select locations/jurisdictions are also incorporated into the Article VII process, including, but not limited to, local harbor management plan and flood policy review, state-listed protected species regulatory review, and New York State air quality regulatory program compliance.

Offshore Wind Project Permitting Review

[redacted]

Other Easements and Rights

[redacted]

Regional/Local Permits and Approvals

[redacted]

[redacted]

Table 10-3 lists the expected regional and local reviews and permits required for the Projects.

Table 10-3 Anticipated Regional/Local Reviews and Permits

Agency/Regulatory Authority	Permit/Approval	Status
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]		

[redacted]

10.3.3 New Jersey Permits and Approvals

[redacted]

[redacted]

10.4 PERMITTING TIMELINE

Vineyard Offshore has planned and designed robust and prudent schedules that ensure on-time project delivery of the Projects. [redacted]

[redacted]

10.4.1 Federal Permitting Timeline

Bureau of Ocean Energy Management

[redacted]

US Army Corps of Engineers

[redacted]

Environmental Protection Agency

[redacted]

National Marine Fisheries Service

[redacted]

Federal Aviation Administration and US Coast Guard

[redacted]

10.4.2 State and Local Permitting Timelines

New York Public Service Commission Article VII Certificate

[redacted]

State and County/Local Permits

[redacted]

10.5 SAP AND COP STATUS

[redacted]

[redacted]

SECTION 11
ENGINEERING AND TECHNOLOGY

11.1 PRELIMINARY ENGINEERING PLAN

Vineyard Offshore is proposing to install up to two of three Offshore Wind Generation Facilities (OWFs) – Excelsior Wind (EW) in Lease Area OCS-A0544 (the "544 Lease Area") and Liberty Wind North (LW-N) and Liberty Wind South (LW-S) in Lease Area OCS-A 0522 (the "522 Lease Area"). [redacted]

The Projects utilize high-performance equipment components with established track records in the offshore wind sector. [redacted]

11.1.1 Foundation Type, Offer Capacity, and Transmission Technology

[redacted]

11.1.2 Primary Components

The Projects will generate and reliably deliver cost-effective electricity to New York. [redacted]

[redacted]

11.1.2.1 Wind Turbine Generators

A WTG consists of a tower, a nacelle, and a three-bladed rotor connected at the hub. [redacted] The nacelle and rotor hub are located on top of the WTG tower. The nacelle contains a driveshaft and gearbox or direct-drive system (depending on WTG type), as well as the electrical generator, electric motors to yaw and pitch the WTG, and workspace. The nacelle also contains a full array of instrumentation, controls, fire protection systems and other safety equipment, ventilation and cooling, and ancillary equipment. Wind sensors mounted on top of the nacelle are used to control the yaw and pitch system. The yaw system turns the nacelle into the wind to maximize power production and out of the wind to maintain the WTG's safety in high winds. The blade pitch controllers adjust the angle of the blades to optimize power production while mitigating loads under the prevailing conditions.

[redacted] Nighttime WTG aviation obstruction lighting systems controlled by an Aircraft Detection Lighting System (ADLS) or similar system will also be installed, subject to BOEM approval, which complies with Federal Aviation Administration (FAA) and/or BOEM requirements.

[redacted]

[redacted]

11.1.2.2 Foundations

The Projects will use either monopiles or jackets as the support structures for the WTGs. Monopiles may be used with or without a transition piece (TP). Jackets may be connected to the seabed either through piled pin piles or suction bucket technology. [redacted] The final technology selections will be made after detailed assessments of the seabed and other load conditions have been completed during the detailed engineering design phase and will depend on supply chain and market conditions and transport and installation considerations. [redacted]

11.1.2.2.1 Monopile Foundation Concept

A monopile is a single, hollow cylinder fabricated from steel that is driven into the seabed. A TP may be mounted on top of the monopile to facilitate the connection between the top of the monopile and the WTG tower. An alternative design, commonly called "TP-less," can have the top of the monopile directly connected to the WTG tower without utilizing a TP. [redacted]

[redacted]

[redacted]

Beyond the primary structural components described above, the monopile foundation also includes the following: inter-array cable hang-off supports, corrosion protection systems (both internally and externally), a boat landing for accessing each WTG, a Davit crane(s) to lift tools and parts from the service vessel, marine navigation aids (e.g., identification marking and lights), external and internal platforms (scaffolding), and various electrical components. Scour protection may be installed around each WTG foundation to protect the foundations from scour development.

11.1.2.2.2 Jacket Foundation Concept

The jacket design concept consists of a three- or four-legged support structure with an integrated TP. [redacted]

Beyond the structural components described above, a jacket foundation also contains secondary structures, such as boat landings, cable tubes, a tower flange for mounting the WTG, internal and external platforms, and various types of electrical equipment needed during installation and operation. A jacket is also equipped with a corrosion protection system designed in accordance with relevant standards. The jacket foundation concept WTGs is illustrated in Figure 11-4.

[redacted]

11.1.2.3 Transmission Technology

11.1.2.3.1 Inter-Array Cables

Inter-array cables will transmit electricity from the WTGs to the ESP. [redacted]

11.1.2.3.2 Electrical Service Platform

The ESP is comprised of two primary support structures: the topside, which houses the electrical components, and the foundation substructure, which supports the topside and is mainly below water and is secured to the seabed (see Figure 11-5). The ESP topside includes components such as transformers, gas-insulated switchgear (GIS) and circuit breakers, modular multilevel converters and braking choppers, reactors, and protection equipment.

[redacted]

[redacted] In addition, the ESP will contain several additional components, such as a supervisory control and data acquisition system, heating, ventilation, and air conditioning, a fire safety system, hydraulic platform crane(s), electrical hoist crane(s), a closed-circuit television system, a communication system (including antenna), safety kits, aviation and navigational marking and lighting, a pollution prevention system, export and inter-array cable hang-off supports, corrosion protection systems, and more.

[redacted]

[redacted]

11.1.2.3.3 Offshore Export Cables

Offshore export cables will be installed within offshore export cable corridors that will transmit electricity from the ESP to a landfall site in New York. [redacted]

11.1.2.3.3.1 HVDC Technology

[redacted] Each power cable is expected to contain a single aluminum or copper conductor that is encapsulated in cross-linked polyethylene (XLPE) insulation, water-blocking layer(s), a metallic sheath, a core jacket, and a protective armor layer. The armor layer, which will likely consist of steel armor wires that are wrapped in polypropylene yarn, protects the cable from over-bending and damage during installation as well as minor impacts during its operational life. The cable bundle will likely include distributed temperature sensing (DTS), distributed acoustic sensing (DAS), online partial discharge (OLPD) monitoring, and/or a similar monitoring system to continuously monitor the status of the cables and detect anomalous conditions, such as insufficient cable depth or possible cable damage. [redacted]

[redacted]

[redacted]

11.1.2.3.4 Onshore Export Cables

[redacted]

11.1.2.4 Onshore Converter Station

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

11.1.5 Primary Component Contract Status

[redacted]

[redacted]

[redacted]

11.1.6 Primary Component Vendors

[redacted]

[redacted]

[redacted]

11.1.7 Equipment Track Record

The operational track record for equipment under consideration for the Projects is described below.

11.1.7.1 Wind Turbine Generators

[redacted]

[redacted]

11.1.7.2 Foundations

Monopiles and TPs are well-known and proven technologies used across numerous offshore wind projects worldwide. The first monopile projects were installed at the Lely offshore wind project in the Netherlands in 1994. The Blyth Offshore Windfarm (England), which began operation in 2000, and the Horns Rev 1 project (Denmark), which began operation in 2002, represented some of the first large-scale commercial deployments of the technology. Since then, more than 4,250 monopiles have been deployed in the offshore wind industry. Copenhagen Infrastructure Partners (CIP) also has extensive experience with monopiles, including monopiles with dimensions comparable to those required for the Projects. Vineyard Wind 1 will have monopiles installed in 2023 with offshore activities expected to begin in the summer of 2023. Monopile technology is well-established and bankable/financeable. All known projects in federal lease areas with water depths at or less than approximately 164 ft are proposing to use monopiles.

11.1.7.3 Inter-array Cables

[redacted]

11.1.7.4 Electrical Service Platforms

[redacted]

11.1.7.5 Offshore and Onshore Export Cables

[redacted]

[redacted]

11.1.7.6 Onshore Converter Station

[redacted]

[redacted]

11.1.8 Climate-Related Physical Risks Across Components

[redacted]

11.1.9 Design Considerations for Climate Adaptation and Resiliency

[redacted]

[redacted] As is evident by the flooding, wind damage, and sustained loss of power encountered following Tropical Storm Isaias in August of 2020, all current and future infrastructure projects must account for severe weather events of this magnitude multiple times a year. The Projects' design will be certified, according to the standards above, by an independent and accredited third party as was done for Vineyard Wind 1. Experience from certifying the design of that project will be incorporated into the design and certification process for the Projects.

While the Projects' design standards and methods are the same as for other modern offshore wind projects, the environmental conditions for the specific site (e.g., sea-level rise, severity, and frequencies of hurricanes and nor'easters, etc.) need to be assessed using information relevant to the site. In this respect, site-specific studies of environmental conditions will be performed and supplemented by a careful review of reliable public information relevant to the site. For example, the local water level change (which is the sum of vertical land movement and sea-level rise) is found using reports for the area by the National Oceanic and Atmospheric Administration, local-global positioning system measurements of vertical movement, the most recent reports by the Intergovernmental Panel on Climate Change, as well as other sources.

[redacted]

Regarding offshore technology selection, the WTGs, the ESP, and their foundations are designed to withstand the harsh conditions encountered on the Outer Continental Shelf. [redacted]

The selection of a foundation concept is one of the most crucial decisions made in project design with regard to offshore structure resiliency. Both the monopile and jacket concepts have proven track records of stability in the challenging conditions of the North Sea and, more recently, climate and soil conditions in Asia. As such, implementation of these concepts, along with the inclusion of sufficient foundation design margin to allow for wind and wave forces in excess of the current record-setting storms, is currently seen as the lowest-risk solution to designing and operating a reliable offshore wind project given the increasing frequency of severe weather events.

11.1.10 Responsible Disposal and Recycling

As is typical of a utility-grade generation and transmission infrastructure project, the Projects' offshore facilities are expected to have a physical life expectancy of at least 30 years. Following the completion of the operations phase, each Project will be decommissioned. [redacted]

While the currently envisioned decommissioning process is the reverse of installation, the decommissioning process will ultimately utilize the latest technological and logistical developments in the offshore wind industry, as the overall industry approach is expected to evolve over the coming decades. [redacted]

[redacted]

11.1.11 Equipment Procurement Strategy for Manufacturers Not Yet Selected

Vineyard Offshore has leveraged its experience in developing and completing the procurement process for Vineyard Wind 1 to identify cost-effective opportunities to use and support the offshore wind supply chain that is emerging along the Atlantic coast and in New York State in particular.

[redacted]

[redacted]

[redacted]

11.2 LIGHTING CONTROLS

The proposed marine navigation and aviation lighting scheme would reduce lighting-related visual impacts and minimize risk to avian species and other wildlife to the greatest extent possible. The scheme is largely based on the one developed for Vineyard Wind 1 as well as FAA Advisory Circular 70/7460-1M, the recommendations contained in US Coast Guard (USCG) District 1 Local Notice to Mariner (LNM) 33/20, and International Association of Lighthouse Authorities (IALA) Guidance for the Marking of Manmade Offshore Structures (IALA Recommendation O-139, edition 2, 2013). The final, approved lighting scheme for the OWFs will be determined through the federal permitting process, in consultation with BOEM, FAA, and the USCG, and will follow applicable guidance in effect at the time of construction.

11.2.1 Construction Phase Lighting Controls

During the construction phase, lighting controls will be in place for the WTGs, ESPs, and onshore staging areas. All lighting controls will be installed in accordance with federal standards. Lighting may be required on installation vessels over a certain height. All Project-related vessels, equipment, and appurtenances will display the required navigation lighting.

[redacted]

[redacted]

11.2.2 Operations Phase Lighting Controls

During the operation phase, the OWFs will be equipped with aviation and marine navigation lighting controls.

11.2.2.1 Aviation Lighting and Aircraft Detection Lighting System

[redacted]

Vineyard Offshore will utilize an ADLS or similar system, subject to BOEM approval, which will dramatically reduce the total amount of light produced by the Projects' aviation lights during the operations phase. [redacted]

[redacted]

3 USCG's PATON guidance for offshore wind energy structures in First District-area waters is regularly updated as part of District 1 LNMs.

11.2.2.2 Marine Navigation Lighting

Each WTG and ESP will be permitted as a PATON and marine navigation lights are expected to be installed in accordance with USCG's *ME, NH, MA, RI, CT, NY, NJ-Atlantic Ocean-Offshore Structure PATON Marking Guidance*. [redacted]

SECTION 12
PROJECT SCHEDULE

12.1 PROJECT SCHEDULES AND CRITICAL PATHS

Vineyard Offshore is proposing to install up to two of three Offshore Wind Generation Facilities (OWFs) – Excelsior Wind (EW) in Lease Area OCS-A 0544 (the "544 Lease Area") and Liberty Wind North (LW-N) and Liberty Wind South (LW-S) in Lease Area OCS-A 0522 (the "522 Lease Area"). [redacted]

[redacted]

[redacted]

[redacted]

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[redacted]

[redacted]

12.2 PERMISSIBLE CONSTRUCTION WINDOWS

[redacted]

[redacted]

As appropriate, Vineyard Offshore will incorporate schedule constraints in the final construction phase schedules developed for the Projects.

12.3 CRITICAL PATH ANALYSIS

[redacted]

[redacted]

[redacted]

[redacted]

SECTION 13
CONSTRUCTION AND LOGISTICS

13.1 MAJOR DEVELOPMENT PACKAGES AND EQUIPMENT

The Projects consist of the following six main work packages:

- Foundations
- Electrical service platform (ESP)
- Offshore export cables
- Inter-array cables
- Wind turbine generators (WTGs)
- Onshore works

The projected sequence of major tasks for these work packages is depicted on the Project schedules, which are provided in Section 12.

In developing the Project schedules, Vineyard Offshore conducted a detailed logistical analysis for multiple installation scenarios for each Project. Among other things, this analysis examined various vessel spreads and the potential use of different harbors, including their operational and load-out capabilities. [redacted] These results provide Vineyard Offshore with unique insights and support the development of an ambitious and robust logistical concept and construction plan.

The transport and installation vessel spread terminologies used throughout this section are defined in Table 13-1.

Table 13-1 Installation Vessels and Technologies

Description	Terminology
Feeder Vessels	
Transportation from United States (US) load-out harbors to the Offshore Wind Generation Facility (OWF) sites using Jones Act compliant vessels; oceangoing tugs are required for long distances	▪ Jack-up feeder vessels ▪ Tugs ▪ Articulated tug barges (ATBs) ▪ Barges
Transport Barges	
Transportation from manufacturer's fabrication facilities to the OWF sites or a port for staging using non-US-flagged vessels (i.e., not Jones Act compliant); oceangoing tugs are required for long distances	▪ Tugs ▪ Barges ▪ ATBs
Heavy Lift Vessels (HLVs)	
Expected installation vessel for foundations and the ESP	▪ Dynamic positioning (DP) or anchored HLVs with cranes
WTG Installation Vessels	
Expected installation vessel for WTGs	▪ Jack-up wind turbine installation vessels with cranes
Heavy Transport Vessels (HTVs)	
General transport vessel for foundations, ESP, WTGs, cables, and other equipment; for transportation from manufacturer site to the OWF sites or staging port	▪ Semi-submersible HTVs ▪ HTVs with cranes (lower capacity than HLVs) ▪ Transportation vessels (without craneage capability)
Cable Installation Vessels	
Cable laying vessels and cable transport vessels are large vessels that contain specialized cable spools for transport and payout of cable during installation	▪ Cable laying vessels ▪ Cable transport vessels
Specialized Support Vessels	
Various vessels specifically designed to support offshore wind construction and operation, crew lodging and transportation, and/or general port and offshore logistics	▪ Fall pipe vessels ▪ Offshore support vessels ▪ Noise mitigation support vessels ▪ Crew transfer vessel (CTV) ▪ Service operation vessel (SOV) ▪ Anchor handling tug supply (AHTS) vessel ▪ Dredging vessel ▪ Walk-to-work vessels ▪ Accommodation vessels ▪ Safety vessels

An overview of the major tasks associated with Project deployment, including the specialized equipment required to complete each of the work packages, is provided in Table 13-2.

Table 13-2 Major Tasks and Specialized Equipment for Deployment

Major Task	Specialized Equipment
Work Package: Foundations	
Scour protection transport and installation Foundation transport Foundation installation	▪ Scour protection (i.e., rock material) ▪ Fall pipe vessel or other specialized scour protection installation vessel ▪ Remotely operated vehicles (ROVs) ▪ Mud mats (if needed) ▪ Feeder vessels, transport barges, and/or HTVs ▪ HLV(s) ▪ Hydraulic hammer(s), pile gripper/piling frame, pile upending and lifting tool(s) ▪ Vibratory hammer and drilling equipment (if required) ▪ Suction bucket pumps (if required) ▪ Grouting material and equipment (if needed) ▪ Noise mitigation support vessels ▪ Noise mitigation system(s) ▪ Protected Species Observer (PSO) team including vessel(s) ▪ Passive acoustic monitoring (PAM) system and vessel ▪ CTVs and helicopter ▪ Safety vessel ▪ Survey equipment
Work Package: Electrical Service Platform	
ESP transport ESP installation ESP offshore commissioning	▪ Feeder vessels, transport barges, and/or HTVs ▪ HLV(s) ▪ Hydraulic hammer, pile gripper/piling frame, pile upending and lifting tool(s) ▪ Vibratory hammer and drilling equipment (if required) ▪ Grouting material and equipment (if needed) ▪ Noise mitigation support vessels ▪ Noise mitigation system(s) ▪ PSO team including vessel(s) ▪ PAM system and vessel ▪ Accommodation vessel (either floating or jack-up vessel) ▪ CTVs and helicopter ▪ Survey equipment ▪ Generators (if required)

Major Task	Specialized Equipment
Work Package: Offshore Export Cables	
Pre-lay surveys and pre-lay grapnel run Cable transport, installation (laying and burial), and jointing Landfall site installation Cable pull-in (into the ESP) Termination and commissioning works	▪ Cable transport vessel(s) (if required) ▪ Survey vessel and equipment ▪ Pre-lay grapnel run vessel and grapnel train ▪ Jack-up vessel and AHTS vessels (if required) ▪ Boulder clearance vessel (if required) ▪ Installation buoys ▪ Cable laying vessel ▪ Cable support vessel (incl. ROVs) ▪ Burial tool(s) (jet plow, jet trenchers, mechanical plow, etc.) ▪ Dredging vessel (if required) ▪ Cable entry protection system ▪ CTVs ▪ Cable protection placement vessels (if required) ▪ Cable protection (if required) ▪ Temporary and permanent hang-offs ▪ Messenger wires and cable pulling heads ▪ Safety vessels
Work Package: Inter-array Cables	
Cable transport Pre-lay surveys and pre-lay grapnel run Cable installation (laying and burial) Cable pull-in (into the WTG foundations and ESP) Termination and commissioning works	▪ Feeder vessels (if required) ▪ Cable transport vessel(s) (if required) ▪ Survey vessel and equipment ▪ Pre-lay grapnel run vessel and grapnel train ▪ AHTS (if required) ▪ Installation buoys ▪ Cable laying vessel ▪ Cable support vessel (incl. ROVs) ▪ Burial tool (jet plow, jet trenchers, mechanical plow, etc.) ▪ Cable entry protection system ▪ CTVs and/or walk-to-work vessels ▪ Cable protection placement vessels (if required) ▪ Cable protection (if required) ▪ Temporary and permanent hang-offs ▪ Messenger wires and cable pulling heads ▪ Winches and generators (if required) ▪ Safety vessels

Major Task	Specialized Equipment
Work Package: WTGs	
WTG transportation to the pre-assembly harbor Harbor logistics and pre-assembly WTG transportation and installation at the site WTG commissioning	▪ Transport barges and/or HTVs ▪ Mobile harbor quayside cranes ▪ Harbor and offshore tugs (if required) ▪ Jack-up installation vessel ▪ Feeder vessels ▪ Climbing crane (if used) ▪ Lifting equipment, frames, and racks ▪ CTVs and helicopter ▪ Walk-to-work vessel, SOV, or accommodation vessel ▪ Generators (if required)
Work Package: Onshore Works	
[redacted]	[redacted]

13.2 RESPONSIBLE PARTIES AND ROLES, AND CONTRACT STATUS

13.2.1 Responsible Parties and Roles

Table 13-3 provides a list of the potential parties involved in the deployment of the Projects along with their scope of responsibility for each of the work packages. This list represents the Tier 1 suppliers with whom Vineyard Offshore has been in direct dialogue and is indicative and non-exhaustive. We have also engaged Tier 2 suppliers (such as harbor owners, crane companies, supply, and transport vessel owners) and plan additional engagement to identify opportunities for local businesses. We will work with our Tier 1 suppliers to advance that work. Tier 2 suppliers are not included in the table below.

Table 13-3 Parties Potentially Involved in Project Deployment

Work Package/ Deployment Activity	Scope of Responsibility (Major Tasks)	Potential Suppliers	
Foundations/ Foundation installation	[redacted]	[redacted]	[redacted]
ESPs/ ESP installation and commissioning	▪ ESP transport ▪ ESP installation ▪ ESP offshore commissioning	[redacted]	[redacted]
Offshore export cables/ Offshore export cable installation and commissioning	[redacted]	[redacted]	[redacted]
Inter-array cables/ Inter-array cable installation and commissioning	[redacted]	[redacted]	[redacted]
WTGs/ Supply of installation vessel spread	[redacted]	[redacted]	[redacted]

Work Package/ Deployment Activity	Scope of Responsibility (Major Tasks)	Potential Suppliers	
Onshore works/ Onshore civil works and substation construction	[redacted]	[redacted]	[redacted]

13.2.2 Contractual Agreements

[redacted] Equipment for the Projects will be ordered in accordance with the procurement process described in Section 11 and the schedules outlined in Section 12.

13.3 MARINE TERMINALS

Constructing an offshore wind project in a timely and cost-effective manner requires the availability of specialized facilities and vessels to stage, assemble, and deploy various project components. To determine the best available options, Vineyard Offshore conducted a logistical analysis of different installation solutions, including harbor facilities and vessels. This analysis is summarized in Section 13.2. [redacted]

[redacted]

[redacted]

[redacted]

Staging, Assembly, and Deployment	Ports	Lease Agreement Holder
	[redacted]	
[redacted]	[redacted]	[redacted]
	[redacted]	
[redacted]	[redacted]	
	[redacted]	
[redacted]	[redacted]	[redacted]
	[redacted]	
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

Staging, Assembly, and Deployment	Ports	Lease Agreement Holder
Operation and Maintenance		
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

[redacted] Additional information is provided below and in Section 19.

PUBLIC

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

13.4 STAGING AND DEPLOYMENT

The following subsection provides an overview of the approach for staging and deployment of major components for each of the Projects' six main work packages.

13.4.1 Foundations

[redacted]

[redacted]

- [redacted]
- [redacted]

[redacted]

13.4.1.1 Scour Protection Installation

[redacted]

[redacted]

[redacted]

Table 13-5 Scour Protection Transport and Installation

Scour Protection Transport and Installation Steps	
[redacted]	[redacted]

13.4.1.2 Foundation Transportation

[redacted]

[redacted]

[redacted]

Foundation Transport and Harbor Logistics Steps	
Monopile and Transition Piece Transport	
[redacted]	[redacted]
[redacted]	[redacted]

13.4.1.3 Foundation Installation

[redacted] describes the installation of monopiles with transition pieces, piled jackets, and suction bucket jackets.

[redacted]

Foundation Installation Steps	
Monopile and Transition Piece Installation	
[redacted]	[redacted]
[redacted]	[redacted]
Piled Jacket Installation	
[redacted]	[redacted]

Foundation Installation Steps	
	[redacted]
Suction Bucket Jacket Installation	
[redacted]	[redacted]

Following the installation of the foundation, a corrosion protection system must be installed. One example involves connecting a cathodic protection system, including sacrificial anodes, current distribution cables, and other necessary equipment to the surface of the foundation to help reduce corrosion.

13.4.2 Electrical Service Platform

The ESP consists of two primary components: (1) the topside, which houses the electrical components; and (2) the foundation jacket substructure secured to the seabed with piles. This is a conventional offshore substation design. The deployment of the ESP will consist of the following main tasks:

- ESP transport and installation
- ESP offshore hook-up and commissioning

13.4.2.1 ESP Transport and Installation

[redacted] The specific steps required to transport and install the ESP foundation are similar to those described above for WTG foundations in [redacted]

To install the ESP topside, the installation vessel will position itself next to the foundation. The installation vessel's crane will then lift the topside from its deck or a separate transport vessel and place it on the foundation. The topside and the foundation will be connected using bolted connections and/or welding. ESP topside installation activities are enumerated in [redacted]

[redacted]

ESP Topside Installation Steps	
[redacted]	[redacted]

[redacted]

13.4.2.2 ESP Offshore Commissioning

After the ESP is installed, offshore commissioning will commence. ESP commissioning, which entails conducting tests of the electrical infrastructure and safety systems on the ESP prior to commercial operations, may last several months. The steps for commissioning are indicated below in Table 13-9. During the commissioning period, a vessel may be positioned adjacent to the ESP to provide accommodations for workers performing commissioning activities. A similar "onshore" commissioning of the ESP occurs as part of the final manufacturing process for the topside and is conducted at the factory prior to ESP transport.

[redacted]

ESP Offshore Commissioning Steps	
[redacted]	[redacted]

ESP Offshore Commissioning Steps	
	[redacted]

13.4.3 Offshore Export Cables

Offshore export cable installation consists of the following main steps:

- Route clearance (e.g., boulder relocation), pre-lay grapnel run, and pre-lay surveys
- Cable transportation, installation, and jointing
- Landfall site installation
- Cable pull-in into the ESP
- Cable termination and commissioning works

13.4.3.1 Route Clearance, Pre-lay Grapnel Run, and Pre-Lay Surveys

Any large boulders along the final offshore export cable alignments may need to be relocated prior to cable installation, facilitating installation without any obstructions to the burial tool and ensuring sufficient burial. Boulder relocation is expected to be accomplished either by means of a grab tool suspended from a vessel's crane that lifts individual boulders clear of the route or by using a plow-like tool that is towed along the route to push boulders aside (this may occur during the cable installation process). Boulders will be shifted perpendicular to the cable route; no boulders will be removed from the site.

The planned cable alignments will be prepared with a pre-lay grapnel run. The pre-lay grapnel run involves a vessel towing a grapnel train over the cable route to find and recover debris crossing the cable route. This will be performed in advance of the cable deployment to minimize the risk of any debris on the seabed hindering cable installation. A pre-lay survey will be carried out shortly before cable installation to confirm that the cable route is free of obstructions and to verify seabed conditions.

13.4.3.2 Cable Transportation, Installation, and Jointing

[redacted]

To install each cable, the cable laying vessel will move along the cable alignment using anchors or DP while likely simultaneously laying and burying the cable. The offshore export cables can be installed from the shore toward the OWF sites or in the opposite direction.

The offshore export cables have a target burial depth of 5 to 8 ft below the seafloor. Based on currently available technologies, the majority of the offshore export cables are expected to be installed using jetting techniques (e.g., jet plow or jet trenching) or mechanical plow. Additional specialty techniques, such as mechanical trenching or precision installation by diver or ROV, may be used to maximize the likelihood of achieving sufficient burial depth (such as in areas of coarser or more consolidated sediment, rocky bottom, or other difficult conditions). The cable installer will determine the actual offshore export cable installation method(s).

Based on site-specific environmental conditions, Vineyard Offshore will prioritize the least environmentally impactful cable installation alternative(s) that is/are practical for each segment of cable installation.

During installation, the burial tool will grade-out of the seabed near jointing locations and at the ESP. Where the offshore export cables approach the ESP foundation, the cables will likely be protected by a cable entry protection system intended to reduce fatigue and mechanical loads as the cables transition above the seabed and into the foundation.

[redacted]

[redacted]

13.4.3.3 Landfall Site Installation

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Harbor Landfall

[redacted]

[redacted]

13.4.3.4 Cable Pull-In into the ESP

As the cable laying vessel approaches the ESP, it will stop at a calculated distance and the cable will be cut and sealed. To commence cable pull-in into the ESP, an ROV will be lowered to the seabed to recover a pre-installed messenger wire from the base of the foundation and connect it to the pull-in head of the cable. Using the messenger wire, a winch on the ESP will then begin to pull the cable up through the foundation into the ESP topside. As pull-in progresses, the cable laying vessel will move toward the ESP and the cable will be lowered to the seabed. Once the cable is on the seabed, the pull-in will continue from the ESP-mounted winch until the cable reaches the hang-off point where a dedicated team will install the temporary hang-off.

13.4.3.5 Cable Termination and Commissioning

[redacted]

13.4.4 Inter-array Cables

[redacted] Inter-array cable installation consists of the following main steps:

- Pre-lay surveys and pre-lay grapnel run
- Cable transportation and installation
- Cable pull-in into the foundations and ESP
- Cable termination and commissioning

13.4.4.1 Pre-Lay Surveys and Pre-lay Grapnel Run

The planned cable alignments will be prepared with a pre-lay grapnel run. The pre-lay grapnel run involves a vessel towing a grapnel train over the cable alignments to find and recover debris crossing the cable route. A pre-lay survey will be carried out shortly before cable installation to confirm that the cable alignments are free of obstructions and verify seabed conditions.

13.4.4.2 Cable Transportation and Installation

The inter-array cables will be transported directly from their fabrication facility to the OWF sites on the cable laying vessel or on a separate transport vessel. Upon arrival, the first end of an inter-array cable will be pulled into a WTG or ESP foundation using winches installed on the foundation.

With the required cable length pulled-in, the cable laying vessel will move in the direction of the next foundation, surface laying the cable along the planned route. The departure angle of the cable will be constantly monitored along with the laid cable length as it leaves the vessel. These measures ensure the cable is not laid with too much tension (which would prevent it from sinking during burial) and help ensure that the cable's maximum bending radius is not compromised. As the installation vessel approaches the next foundation, the remaining length required to carry out the second-end pull-in will be calculated, and the cable will be cut.

Cable burial operations will then be performed by the cable laying vessel or a separate dedicated burial vessel (this is referred to as "post-lay burial") likely using a jetting technique.

13.4.4.3 Cable Pull-In into the Foundations and ESP

Messenger wires will be used to pull the inter-array cables into the foundations. Messenger wires can be pre-installed in foundations onshore or installed offshore depending on the final strategy or specific foundations selected. In the case of monopiles, messenger wires would likely be installed directly offshore. Before the inter-array cables are pulled in, the preparation teams will install the pull-in rigging equipment and winch on the ESP and WTG foundations.

The messenger wire will be recovered by the cable laying vessel using an ROV. Once the messenger wire is on the vessel, it will be connected to the cable pull-in head. After connection of the messenger wire to the cable rigging, the preparation team will increase tension on the wire using the winch and the cable laying vessel will simultaneously pay out the cable. The pull-in will continue until the cable is in the right position in the foundation, where it will be secured at the temporary hang-off point.

The cables will likely be installed with a cable entry protection system to ensure cable integrity. Additional cable protection may be placed over the cable entry protection system to secure it in place and limit the movement of the cable. An ROV will carry out a final visual inspection of the cable entry protection system and cable and ensure that there are no issues with the scour protection surrounding the foundation.

13.4.4.4 Cable Termination and Commissioning

After the inter-array cable is secured on the temporary hang-off, the termination team will strip the cables to expose the power cores and fiber optics. The permanent hang-off will then be installed. The power cores will be routed inside the WTG foundation or ESP and terminated at a dedicated junction box/T-connector. The fiber optic cables will be connected to the fiber optic patch box. Ground wires will be connected to the dedicated ground points. Once termination is completed, the inter-array cables will be fully tested and commissioned to confirm they can be energized safely.

13.4.5 Wind Turbine Generators

WTG staging and deployment are expected to consist of the following major tasks:

- WTG transportation to the pre-assembly harbor
- Harbor logistics and pre-assembly
- WTG transportation and installation at the OWF site
- WTG commissioning

13.4.5.1 WTG Transport to Pre-Assembly Harbor

The WTG consists of three major components: the tower sections, the nacelle, and three blades. Each component will be prepared at a fabrication facility and shipped to the pre-assembly harbor.

At the pre-assembly harbor, a sufficient stock of components will be accumulated prior to WTG installation to maintain a steady pace of installation activities. WTG components may be transported from their manufacturing sites to the pre-assembly harbor on multi-purpose HTVs or transport barges.

[redacted]

WTG transport will proceed according to the steps outlined in [redacted].

[redacted]

WTG Transport Steps
1. Load WTG components onto an HTV or transport barge with the vessel's crane (if equipped) or dockside crawler crane at the manufacturer's port of export. 2. Transport WTG components from the manufacturer's port of export to the pre-assembly harbor. 3. Offload WTG components at the pre-assembly harbor with the vessel's crane (if equipped) or dockside crawler crane. 4. The transport vessel returns to the manufacturer's port of export. Steps are repeated until all WTG components have been transported to the pre-assembly harbor.

13.4.5.2 Harbor Logistics and Pre-Assembly

The main activities at the pre-assembly harbor will be moving WTG components from transport vessels to storage and back onto feeder vessels or a WTIV for transport to the OWF sites for installation. When the nacelles, blades, and tower sections arrive at the port, the handling steps listed in Table 13-11 will occur. [redacted]

[redacted]

WTG Pre-Assembly Harbor Logistics Steps	
[redacted]	[redacted]

WTG Pre-Assembly Harbor Logistics Steps	
	[redacted]
[redacted]	[redacted]

13.4.5.3 WTG Installation

[redacted]

[redacted]

[redacted] but their effectiveness at this task is still being proven and may be an issue in high winds.

The WTG installation process is further described in Table 13-12.

[redacted]

WTG Installation Steps	
[redacted]	[redacted]

WTG Installation Steps	
	[redacted]
[redacted]	[redacted]

13.4.5.4 *WTG Commissioning*

WTG installation will be followed by commissioning, where the WTGs are prepared for operation and energized. Commissioning involves conducting tests of the electrical infrastructure and the WTG before responsibility is passed on to the O&M teams for the duration of the WTG's service life. The WTG commissioning phase will happen in parallel with the WTG installation phase.

13.4.6 Onshore Works

Onshore works consist of the following major tasks:

- Construction of high voltage alternating current (HVAC) onshore substation
- Construction of high voltage direct current (HVDC) onshore converter station
- Landfall site and duct bank civil works
- Cable supply and installation works

13.4.6.1 Onshore Substation Construction

Construction of the onshore substation will be completed in four primary stages: (1) site preparation; (2) assembly of foundations and primary structures; (3) equipment installation; and (4) site restoration. Site preparation involves the placement of erosion controls and excavation work. The assembly stage involves constructing the foundations and structural facilities. The third stage involves the installation and erection of electrical equipment. Site restoration, the final stage, includes cleanup, landscaping, and site stabilization.

[redacted]

[redacted]

[redacted]

HVDC

[redacted] Vineyard Offshore will construct an onshore converter station to house terminal equipment for the HVDC export cables. The facility will convert direct current (DC) generated at the OWF sites to AC to interconnect with the electric grid. Construction of the onshore converter station is planned to occur in parallel with the onshore duct bank and cable installation. [redacted]

[redacted] As a preliminary concept, a conventional steel frame building will be constructed to enclose a large portion of the HVDC voltage source converter components. The AC interface yard and power transformers, cooling fans, and the phase reactor cooling enclosure will be immediately outside the building. A security fence and gates will be installed to enclose the onshore converter station.

13.4.6.2 Landfall Site Activities

[redacted]

[redacted]

13.4.6.3 Horizontal Directional Drilling

[redacted]

13.4.6.4 Civil Duct Bank Works

[redacted] Installation methods include: (1) conventional cut-and-cover of concrete-encased conduit (i.e., installed within a duct bank); (2) concrete capped; and (3) conventional cut-and-cover of the HVAC or HVDC onshore export cable (i.e., direct buried with flowable fill/backfill). The onshore export cable route is described in Section 4.

The choice of installation method will depend on location, mechanical loading considerations, safety factors, environmental impacts, and other applicable requirements. For example, HDD will be used, where practicable, to avoid direct impacts and potential disruption of open trenching in wetland areas, recreation areas, and roadway/railway crossings. In areas where the option to use HDD is not available, excavation will be performed with standard earthmoving machinery, including excavators and backhoes, and will be performed in accordance with applicable standards, such as New York State Department of Transportation (NYSDOT) highway work permit conditions. Any excess soil or soil unsuitable for use as backfill will be transported off-site in accordance with applicable regulations.

Duct banks, which are underground reinforced concrete containers used for laying electric utility lines, will be used to limit the length and time that trenches will be open, for public safety reasons. This is especially important along public roadways, walkways, bike paths, etc. Duct banks will be utilized when the cable is installed under roads, in parking lots, or in the roadway shoulders per the requirements of the NYSDOT. The use of duct banks provides mechanical protection for the cable from vehicle loading. Furthermore, the use of duct banks allows for easier access and less environmental disturbance in the event that a cable repair is necessary post-installation.

In roadway sections, saw cutting and removal of the existing pavement is required before excavation. [redacted] Native materials will be transported offsite, and a fluidized thermal material will be used to backfill the remainder of the trench based on NYSDOT specifications and requirements. In areas outside the roadway, native fill may be used to backfill over the concrete-encased conduit in place of the fluidized thermal backfill material.

In limited, select areas along the onshore export cable route, where open trenches and splice pits can be safely managed and future mechanical loading is not of concern, the onshore export cable may be direct buried. The trench excavation shall be approximately eight feet wide at grade, with a 1:1 slope (the slope and width of excavation may vary due to geotechnical conditions and the terrain along the route). Speed shoring may be used in areas with unstable soil conditions. [redacted]

13.4.6.5 Cable Supply and Installation Works

The cables will be cross-linked polyethylene insulated cables. It is anticipated that the onshore cables will be transported to the site by truck in order to reduce the need for a large staging area for cable laydown. The cable will be installed between manholes at splice vault locations; one reel containing the cable length will be positioned at one manhole and the pulling vehicle with a winch will be at the manhole on the other end of the corresponding duct bank length. Once cables are installed between the vaults, the cables will be spliced together. The supplier will test and commission the cables following cable installation and termination.

13.5 VESSEL TYPES AND RESPECTIVE USES, AND COASTWISE LAW

An overview of expected vessels, including the number, type, size, and anticipated uses on the Projects for each offshore package is provided in Table 13-13. The list is indicative and non-exhaustive.

[redacted]

Vessel Type	Role	Approx. Size	Vessel Class Examples
Package: Foundations			
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

Vessel Type	Role	Approx. Size	Vessel Class Examples
[redacted]	[redacted]	[redacted]	[redacted]
Package: Electrical Service Platform			
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
Package: Offshore Export Cables			
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

Vessel Type	Role	Approx. Size	Vessel Class Examples
Package: Inter-Array Cables			
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
Package: Wind Turbine Generators			
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]		[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

Vessel Type	Role	Approx. Size	Vessel Class Examples
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

13.5.1 The Coastwise Laws

This section provides specific information on how the Projects' deployment strategy will conform to the requirements of the Merchant Marine Act of 1920 (Jones Act) and the Passenger Vessel Services Act (PVSA; 46 U.S.C. § 55103). In September 2020, the US House of Representatives passed the Expanding Access to Sustainable Energy Act of 2019, which further affirms the currently understood position that foreign-flagged vessels cannot transport merchandise for offshore wind projects between ports and highlights that US Customs and Border Protection will enforce these regulations during offshore wind project construction. Congress' recent amendments to Section 4(a) of the Outer Continental Shelf Lands Act contained in the National Defense Authorization Act for Fiscal Year 2021 also cleared up any ambiguity and affirmed that US laws (including the Jones Act) governing offshore energy apply equally to the offshore wind industry.

The following details the relevant parts of the Jones Act, PVSA, and related court rulings:

[redacted]

[redacted]

[redacted]

Table 13-14 summarizes Vineyard Offshore's approach to compliance with the Jones Act.

[redacted]

Installation Activity	Description
Foundation installation	[redacted]

Installation Activity	Description
	[redacted]
ESP Installation	[redacted]
Cable Installation	[redacted]
WTG Installation	[redacted]
Personnel Transport	[redacted]

SECTION 14
FISHERIES MITIGATION PLAN

14.1 FISHERIES MITIGATION PLAN SUMMARY

The Vineyard Offshore team has over a decade of experience working with commercial and recreational fishermen, vessel owners, fishing advocacy organizations, shore support services, and fisheries research institutions—first as Vineyard Wind and now as Vineyard Offshore. We have a demonstrated ability to forge productive working relationships with fishermen and are committed to developing, constructing, operating, and decommissioning well-sited offshore wind projects with minimal fisheries impacts. To do so, we employ project siting and design measures that are aimed at avoiding potential impacts from the outset. Where impacts are unavoidable, we work collaboratively with agencies, fishermen, and other stakeholders to identify appropriate and practicable solutions to minimize and mitigate potential impacts.

Vineyard Offshore believes that the offshore wind and fishing industries can successfully co-exist in the marine environment, and we will continue the work started with Vineyard Wind 1 to build bridges between the two sectors. We will also continue to fund research, share data, participate in regional science initiatives, and expand our prior efforts to use fishermen and/or fishing vessels to support offshore site assessment and data-gathering activities.

[redacted]

14.2 COMMUNICATIONS AND COLLABORATION

14.2.1 Stakeholder Identification

Vineyard Offshore has a dedicated team focused on identifying, engaging, and collaborating with fishermen and other fisheries stakeholders relevant to our projects. Our fisheries communication efforts are led by Fisheries Manager (FM) Crista Bank, a fisheries biologist with deep knowledge of fishing practices as well as an extensive network of personal relationships with fishermen and fishery organizations in the region. Crista oversees Vineyard Offshore's efforts to build and maintain relations with the fishing industry and surrounding communities. This includes directing outreach, developing fisheries research programs, and identifying potential workforce opportunities for fishing industry involvement. She has spent the last four years laying the groundwork for these strategies as a Fisheries Liaison (FL) on the Vineyard Wind 1 project.

The fisheries team also includes an FL, Fisheries Representatives (FRs), and Onboard Fisheries Liaisons (OFLs). The FL is responsible for implementing our Fisheries Communication Plans (FCPs), which are described below, and serves as a communication conduit between Vineyard

Offshore and the fishing industry. The FL works with our Marine Liaison Officer to coordinate marine affairs and surveys and is supported by OFLs. As further described below, OFLs are experienced fishermen employed by Vineyard Offshore to assist survey vessel captains with communication and to document fishing gear in the area to help avoid interactions.

We also rely on a network of FRs to support our fisheries' communication and engagement efforts. FRs are individuals or organizations that represent a particular fishing community, organization, gear type, port, region, state, or sector(s). While Vineyard Offshore compensates FRs for their time and expenses, their duty is to the fishermen or organization that they represent. Notably, as Vineyard Wind, we were the first United States (US) offshore wind developer to engage an FR. Today, we have formal relations with several FRs who represent a variety of gear types and have home ports in Connecticut, Massachusetts, New York, and Rhode Island (see Figure 14-1). We are currently seeking additional FRs, with a focus on identifying FRs from New York.

Figure 14-1 Vineyard Offshore Fisheries Representatives

[redacted]

Vineyard Offshore is in regular contact with the relevant federal agencies (e.g., Bureau of Ocean Energy Management [BOEM], US Coast Guard [USCG], and National Marine Fisheries Service [NMFS]) and state agencies on environmental and fishery-related matters. We are also a member of, actively participate in, and/or attend meetings for the following technical working groups, advisory boards, councils, and commissions:

- Regional Wildlife Science Collaborate for Offshore Wind (RWSC)
- Responsible Offshore Science Alliance (ROSA)

- NYSERDA's Environmental Technical Working Group (E-TWG)
- NYSERDA's Fisheries Technical Working Group (F-TWG)
- International Council on Exploration of the Seas (member of Working Group on Offshore Wind Development and Fisheries)[1]
- Massachusetts Fisheries Working Group on Offshore Wind Energy
- Massachusetts Habitat Working Group on Offshore Wind Energy
- Mid-Atlantic Fishery Management Council
- New England Fishery Management Council

These groups allow us to identify stakeholders, better understand fisheries and fishermen's concerns, build relationships, and collaborate on research, education, and work opportunities. [redacted]

14.2.2 Stakeholder Communication

Our fisheries engagement prioritizes information sharing, soliciting feedback on the design and execution of our projects and programs, supporting an efficient and timely permitting process, and promoting safety on the water. These engagement efforts are guided by our FCPs, which facilitate effective and regular communication with fishermen and fisheries stakeholders throughout the life of the Projects (see Attachment 14-1). The FCPs align with the Vineyard Wind 1 FCP, which we first drafted in 2011 to improve communication with fishermen during that project and subsequently refined with over 10 years of input from fishermen. To ensure the communication protocols and tools remain relevant and effective, the FCPs are updated regularly in response to stakeholder input and to incorporate lessons learned.

When appropriate and weather permitting, our FM and FL hold "port hours" at ports in New Bedford, Massachusetts; Narragansett, Rhode Island; Stonington, Connecticut; and Montauk, New York. These events are typically held jointly with FLs from other offshore wind developers to provide information to fishing vessel crews who fish in or transit through multiple lease areas. [redacted]

Vineyard Offshore maintains a dedicated webpage for fishermen,[2] which includes the FCPs, fisheries science initiatives and data, charts, project details, and other relevant information. To notify fishermen about our activities offshore, we publish timely Offshore Wind Mariner Updates on our website that include pictures of the vessel(s) and equipment to be deployed,

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[1] In September 2022, our FM attended the International Council on Exploration of the Seas Annual Science Conference in Dublin, Ireland.

[2] See: https://www.vineyardoffshore.com/fishermen.

vessel contact information, a chart showing the location and approximate duration of vessel activity, and the OFLs' contact information. [redacted] In addition, we plan to adopt the WATERFRONT app that we developed in partnership with Ithaca Clean Energy for Vineyard Wind 1. The goal of this cell phone app is to provide a single, consolidated location for fishing vessel crews and mariners to connect with and view information from all the Massachusetts Wind Energy Area (MA WEA) and Rhode Island / Massachusetts Wind Energy Area (RI/MA WEA) leaseholders.

[redacted]

14.2.3 Vessel Communication

The FCPs outline communication protocols that are designed to help avoid interactions with fishing vessels and fishing gear and facilitate communication during site assessment activities (see Attachment 14-1). These protocols will be updated over time to ensure they remain effective and account for the need to coordinate with members of the F-TWG and consultations with New York State agencies.

[3] Going forward, as required by NYSERDA, we will formally designate at least two team members to serve as Vineyard Offshore's representatives in E-TWG for at least one-year terms.

[redacted]

[redacted]

14.3 MONITORING AND RESEARCH PRE-, DURING-, AND POST-CONSTRUCTION

14.3.1 Ecological Baseline Data and Pre-Construction Monitoring

Vineyard Offshore has conducted several years of surveys to establish baseline data on the spatial and temporal presence of fish, invertebrates, and their habitats in and around the 522 Lease Area. These include:

- **Demersal Trawl Surveys:** [redacted] The methodology for the trawl surveys closely emulates the Atlantic States Marine Fisheries Commission's Northeast Area Monitoring and Assessment Program (NEAMAP) nearshore trawl survey. This allows our data to be integrated with NEAMAP's annual spring and fall trawl surveys that have occurred regionally since 2006. Tow locations within the 522 Lease Area were selected using a spatially balanced sampling design. During each survey, ten tows were made to ensure adequate spatial coverage throughout the Lease Area.
- **Drop Camera Surveys:** [redacted] Samples were taken at 22 stations placed 3.5 miles apart following a grid design.
- **Benthic Habitat Surveys:** [redacted]

[5] A demersal otter trawl is a net that is towed behind a vessel along the seafloor expanded horizontally by a pair of otter boards or trawl doors. Trawls tend to be relatively indiscriminate in the fish and invertebrates they collect; hence, trawls are a general tool for assessing the biological communities along the seafloor and are widely used by institutions worldwide for ecological monitoring.

[6] Drop camera surveys are minimally invasive, image-based surveys that allow for practical data collection of the epibenthic community and substrate characteristics without causing a disturbance to the seafloor.

[redacted]

These surveys provide baseline data on species abundance, distribution, population structure, habitats, and community composition for impact assessments and comparison against post-construction monitoring data. The trawl and drop camera survey programs were developed in collaboration with the Massachusetts School for Marine Science and Technology (SMAST) and incorporate input from more than 75 commercial and recreational fishermen as well as academic and government resource agencies, including NMFS. These fisheries surveys in the 522 Lease Area followed the same protocols as the fisheries surveys conducted in Lease Area OCS-A 0501, thus contributing to the standardization of survey methods and data across lease areas. The surveys were performed with involvement from the fishing community, as SMAST scientists carried out the surveys onboard commercial fishing vessels. All data from the fisheries surveys are publicly available, with several completed reports already posted on our website at: https://www.vineyardoffshore.com/fishermen.

[redacted]

[redacted]

14.3.2 During- and Post-Construction Monitoring

Vineyard Offshore will conduct appropriate monitoring during construction and post-construction to assess and quantify potential changes that may be attributable to Project activities. The monitoring measures will be determined in collaboration with agencies and stakeholders through the Projects' permitting processes and will be informed by those put in place for other offshore wind projects. Our during- and post-construction surveys will be thoughtfully designed to align with established methods to enhance data compatibility and utility, wherever practicable.

[redacted] The Vineyard Wind 1 project is using a beyond BACI framework to assess trawl and drop camera data and a combination BACI-BAG approach to assess benthic habitat data, where sample stations are placed at regular distances from the impact source (either foundation/scour protection or export cable alignment) along impact monitoring transects.

[redacted]

14.3.3 Commercial and Recreational Fishing Impacts

[redacted]

14.3.3.1 Commercial Fisheries Assessment

[redacted]

[redacted]

[redacted]

14.3.3.2 Recreational Fisheries Assessment

[redacted]

[redacted]

14.3.4 Fisheries Data Transparency

The fisheries and benthic habitat surveys that we conduct will continue to generate a considerable amount of fisheries and ecological data that are currently, or will be, available to the public. Much of the data will be publicly available through the federal and state permitting processes as well as reports or academic publications that may come out of the survey or monitoring work.

We will continue working with agencies, stakeholders, and other offshore wind developers to find cost-effective and user-friendly ways to streamline and standardize available data across lease areas, particularly where there are gaps in extant databases. Where practicable, we will disseminate raw environmental data to the most appropriate database(s), such as those recommended in NYSERDA's (2021) *Wildlife Data Standardization and Sharing: Environmental Data Transparency for New York State Offshore Wind Energy*, as soon as feasible following internal quality assurance and quality control (QA/QC). However, as noted in the study, benthos, zooplankton, and fish data are poorly served by extant databases and should be housed and made available by the data originator (e.g., on a project website) until appropriate databases exist. Accordingly, we proactively publish our fisheries research on our website at: https://www.vineyardoffshore.com/fishermen.

In accordance with Section 2.2.8 of ORECRFP22-1, Vineyard Offshore will provide a Data Management and Availability Plan to NYSERDA detailing how Site and Environmental Data, including fisheries data, will be made available for use by third parties on an ongoing basis as soon as practicable after collection and QA/QC.

14.4 SUPPORTING OTHER RESEARCH

14.4.1 Data Sharing and Site Access

As described in Section 14.3, we have made or intend to make much of our fisheries and environmental data public. We will continue to coordinate with third-party scientists regarding the provision of data and site access, and we will review any requests on a case-by-case basis. For example, as described below, we worked with the New England Aquarium and INSPIRE Environmental to deploy acoustic receivers in the 522 Lease Area. We also deployed a buoy in the 522 Lease Area that is transmitting live weather/ocean data to a public website and is equipped with an acoustic receiver to track highly migratory fish species. We note that, except for temporary safety buffer zones established around work areas, third-party research vessels will be permitted to transit through and within the 522 and 544 Lease Areas.

In certain instances, Vineyard Offshore may impose restrictions on data provision or the deployment of research equipment (e.g., buoys, environmental sensors) within our lease areas, OECCs, and on our facilities to protect proprietary and/or competitively sensitive information, maintain site security, ensure safety, etc. All requests will be considered and discussed with the requestor and will not be unreasonably denied. Additional examples of our ongoing and previous efforts to share data and participate in regional data collection programs and studies are provided in Section 15.4.

14.4.2 Supporting Regional Studies and Funding Independent Research

Vineyard Offshore is firmly committed to supporting regional studies and other independent environmental research, particularly through our participation in regional monitoring organizations (see Section 14.2). [redacted]

In connection with Vineyard Wind 1, we recently provided funding to support a false albacore tagging study by the American Saltwater Guides Association and the New England Aquarium's Anderson Cabot Center for Ocean Life to gather key baseline information on this highly valued but poorly understood species. As noted in Section 14.3, we also previously partnered with the Anderson Cabot Center for Ocean Life to study highly migratory species presence across the MA WEA and RI/MA WEA. Building on the results of this study, INSPIRE Environmental in partnership with the New England Aquarium initiated a five-year acoustic tagging and tracking study of highly migratory species in the MA WEA and RI/MA WEA. Vineyard Offshore (along with other offshore wind developers) is supporting this study by deploying 12 acoustic receivers in the 522 Lease Area and funding tagging efforts.

[redacted]

[redacted]

14.5 SITE DESIGN CONSIDERATIONS

In siting offshore wind energy lease areas, BOEM undertook considerable effort to avoid and minimize the risk of environmental and fisheries impacts based on feedback from agencies and the public. During the Area Identification process for the MA WEA (which includes the 522 Lease Area), BOEM excluded OCS Lease Blocks east of the 70° longitude line to protect valuable fisheries resources, areas within 1 nautical mile (NM) of traffic separation schemes to address navigational concerns, and areas of biologically important habitat. In siting the New York Bight lease areas, BOEM deconflicted and reduced the initial area proposed for leasing by 72% in response to comments and input from ocean users, including the fishing industry, the USCG and navigation interests, NMFS, and the Department of Defense. For example, comments received regarding fishing activity and seafloor features resulted in no lease areas being offered within 2.5 NM of the Mid-Atlantic Scallop Access Area. Making siting choices associated with this process was the first step to avoid and minimize impacts to fisheries as well as other resources and habitats.

[redacted]

14.5.1 Proposed Site Design

[redacted]

[redacted]

Throughout the Projects' multi-year permitting phase, Vineyard Offshore will continue to consult with relevant agencies, fishermen, and other fisheries stakeholders regarding siting measures and design adjustments that could reduce potential impacts to fisheries. This includes the required consultations with New York State Agencies in accordance with Section 2.2.5 of ORECRFP22-1. Vineyard Offshore will also incorporate lessons learned from Vineyard Wind 1 and other offshore wind projects into the final design of the Projects. [redacted]

[redacted]

[redacted]

14.5.2 Site Design Flexibility

[redacted]

14.6 CONSTRUCTION AND OPERATION

[redacted] To enhance navigational safety, all WTGs and the ESPs will be maintained as Private Aids to Navigation (PATONs). Based on USCG's current *ME, NH, MA, RI, CT, NY, NJ-Atlantic Ocean-Offshore Structure PATON Marking Guidance*, we expect to implement a uniform system of marine navigation lighting and marking for every WTG and ESP that includes: (1) yellow flashing lights that are visible in all directions at a distance of 2 to 5 NM depending on the location of the structure within the Lease Area; and (2) alphanumeric identifiers as close to 10 ft high as possible that are visible from all directions. We also anticipate that the WTG's air draft restriction will be indicated on the foundation and/or WTG tower and that each foundation will be coated with high-visibility yellow paint (above sea level). During the construction phase, temporary marine navigation lighting and marking may need to be installed on the foundation structures as they are being constructed, depending on the timing and sequence of foundation installation.

[16] Vineyard Offshore intends to permit more WTG positions than the Projects would ultimately use.

[redacted]

Select WTG foundations are expected to include Mariner Radio Activated Sound Signals (MRASS) that can alert approaching vessels during low-visibility conditions when activated by mariners and fishermen. AIS will be used to mark the WTGs and ESPs (virtually or using physical transponders), which can be viewed by vessel operators on an electronic chart display and information system, radar overlay, or a minimum keyboard and display. Vineyard Offshore will work with the USCG and BOEM to determine the appropriate marine lighting, marking, and signaling scheme for the offshore facilities, including the number, location, and type of AIS transponders and MRASS. We will also coordinate with the USCG and NOAA to ensure that the location of the WTGs, ESPs, and as-built cable alignments (including the location of cable protection and cable crossings) are included on the nautical charts.

In addition to our fisheries team (see Section 14.2), Vineyard Offshore employs a Marine Liaison Officer who is responsible for safe marine operations and ensuring that we are a good neighbor while on the water. The Marine Liaison Officer is responsible for issuing Offshore Wind Mariner Updates and coordinates with the USCG to issue NTMs to notify recreational and commercial vessels of our planned offshore activities. [redacted] Our fisheries communication tools are further described in the FCPs included as Attachment 14-1.

[redacted]

[redacted] We use a standard gear loss/damage compensation form that is based on the form previously developed through coordination with FRs, FLs, and other developers for the Vineyard Wind 1 project.[18] [redacted]

[redacted]

14.7 CONSIDERATIONS FOR SUBSEA CABLES

Siting OECCs is an extremely complex endeavor that must consider and balance a multitude of technical, environmental, commercial, and logistical constraints. [redacted]

[18] See: https://www.vineyardwind.com/fisheries-documents

[redacted]

We will require our cable installation contractor(s) to prioritize the least environmentally impactful cable installation methods(s) and tool(s) that are practicable for each segment of cable and maximize the likelihood of achieving sufficient cable burial (to a depth that allows continued fishing over the cables). [redacted]

14.8 PROJECT DECOMMISSIONING

The Projects' decommissioning will occur approximately 30 years from now. Based on current regulations and our lease agreements with BOEM, Vineyard Offshore expects to consult with BOEM prior to that and submit Decommissioning Applications for review and approval. This process will include an opportunity for public comment and consultation with agencies (including relevant New York State agencies), fishermen, and fisheries stakeholders. Upon receipt of the necessary BOEM approvals and any other required permits, Vineyard Offshore would implement the approved Decommissioning Applications to remove offshore components.

[redacted]

14.9 (OPTIONAL) FISHERIES COMPENSATION PLAN

To the extent compensatory mitigation is deemed necessary as part of the Projects' permitting process, our objectives will be to: (1) create a fair, simple, and transparent data-driven program; (2) limit the administrative burden for all parties; (3) reduce potential gaming and fraud opportunities; and (4) resolve uncertainties and data limitations in fishermen's favor. [redacted]

[redacted]

[redacted] Most importantly, we learned that a claims-based process for compensatory mitigation on a project-by-project basis is largely unworkable for both fishermen and offshore wind developers. We expressed this concern to BOEM in an August 22, 2022, comment letter on BOEM's draft *Guidelines for Mitigating Impacts to Commercial and Recreational Fisheries on the Outer Continental Shelf Pursuant to 30 CFR Part 585*. Our comment letter as well as the American Clean Power Association's comment letter are provided in Attachment 14-3.

Based on our experience from Vineyard Wind 1, we believe that fisheries compensation is best addressed at a regional scale through non-governmental, third-party-administered funding mechanisms. We will continue to work closely with agencies, fishermen, other offshore wind developers, and fisheries stakeholders to establish a regional fisheries compensation fund administrator for offshore wind projects and would expect to utilize such a process for the Projects in the event it is available and aligns with the objectives outlined above.

14.10 ADDITIONAL CONSIDERATIONS

We will continue to evolve and adapt our approach to fisheries communication and mitigation to best meet the needs of the fishing industry. Vineyard Offshore is always thinking creatively to address concerns raised by the region's fishermen, lead by example, and work collaboratively with other offshore wind developers to implement measures that support the fishing community. By the time the Projects achieve commercial operation, we expect there will be a much greater understanding of how the offshore wind and fishing industries can work together given that several commercial-scale offshore wind projects, including Vineyard Wind 1, will have been constructed and will be operational. Experiences, lessons learned, and data gathered from the construction and operation of these projects will further inform Vineyard Offshore's efforts to minimize the Projects' potential impacts on fisheries and the fishing community.

In the meantime, we will continue working with fishermen, federal and state regulators, NYSERDA, F-TWG, ROSA, and other fisheries stakeholders to better understand the potential social and economic impacts from offshore wind on fishing communities; fund independent research and participate in regional science initiatives; develop plans to avoid, minimize, or mitigate any risks identified; and increase trust between the offshore wind and fishing industries through transparent communication.

SECTION 15
ENVIRONMENTAL MITIGATION PLAN

15.1 ENVIRONMENTAL MITIGATION PLAN SUMMARY

[redacted] Our approach to site assessments and developing environmental protection measures for both lease areas is largely the same, except where specifically noted.

Vineyard Offshore is committed to developing, constructing, operating, and decommissioning well-sited offshore wind projects with minimal environmental impact. For Vineyard Wind 1, the nation's first commercial-scale offshore wind project, we pioneered a successful approach that prioritized avoiding, minimizing, or mitigating potential impacts whenever possible. We will continue our industry-leading efforts for the Projects to proactively conserve and protect threatened and endangered species while considering changing technologies, the best available data, and lessons learned from other offshore wind projects.

We have conducted a thorough review of existing literature and site-specific data to characterize the species and habitats within the areas potentially impacted by the Projects. Our assessment draws upon a considerable body of existing data for the Massachusetts Wind Energy Area (MA WEA) and New York Bight region (see the references list provided in Attachment 15-1). Additionally, for the 522 Lease Area, we have completed numerous site-specific surveys, including offshore avian, fisheries, and benthic habitat surveys. For the 544 Lease Area, we are fully engaged in the Programmatic Environmental Impact Statement (PEIS) process, led by the Bureau of Ocean Energy Management (BOEM), to analyze potential impacts from wind energy development activities in the New York Bight region.

As the Projects move forward, we will continue to invest considerable time and resources to identify and employ practicable and appropriate measures that afford the highest levels of environmental protection while maintaining project viability. This data-driven process will incorporate the experience gained from Vineyard Wind 1 as well as other offshore wind projects. We will also continue work in close collaboration with agencies and stakeholders to understand their concerns regarding the potential environmental impacts of offshore wind projects; incorporate their feedback into project design and siting measures; and develop, trial, and implement innovative environmental protection measures.

[redacted]

15.2 COMMUNICATIONS AND COLLABORATION

15.2.1 Stakeholder Identification

The Vineyard Offshore team has spent much of the past decade working with a variety of stakeholder groups to develop and permit commercial-scale offshore wind projects in the Northeast—first as Vineyard Wind and now as Vineyard Offshore. Along the way, we have formed productive working relationships with many stakeholders interested in environmental issues, including those in New York. As further described in Section 16, we identify stakeholders relevant to both onshore and offshore environmental issues by: (1) participating in federal, state, and regional environmental and fisheries technical working groups, advisory boards, councils, and commissions; (2) engaging in project partnerships; (3) attending and sponsoring conferences and events; (4) site visits; and (5) informal networking, among many other strategies.

Members of our team have been actively engaged in the New York State Energy Research and Development Authority's (NYSERDA's) Environmental Technical Working Group (E-TWG) since its formation.[2] We are also a member of and/or actively participate in a number of other technical working groups, advisory boards, councils, and commissions that focus on environmental issues and offshore wind. [redacted] We are also active members of the Regional Wildlife Science Collaborate for Offshore Wind (RWSC) and the New York Offshore Wind Alliance. We regularly participate in the Massachusetts Habitat Working Group on Offshore Wind Energy and we consult with local offshore wind groups, including Wind Works Long Island. These groups allow us to keep stakeholders apprised of our project development efforts, better understand concerns, build relationships, and collaborate on research, education, and work opportunities.

We are in regular contact with relevant federal agencies (e.g., BOEM, and National Marine Fisheries Service [NMFS]) on environmental matters. We will also continue engaging with New York State agencies, including meeting with Consulting State Agencies. [redacted]

2 Going forward, as required by NYSERDA, we will formally designate at least two team members to serve as Vineyard Offshore's representatives in E-TWG for at least one-year terms.

[redacted]

Finally, we have partnered on research and innovation initiatives with multiple organizations and institutions in connection with Vineyard Wind 1. These include the New England Aquarium, the University of Massachusetts School for Marine Science and Technology (SMAST), Woods Hole Oceanographic Institution (WHOI), and Greentown Labs (see Attachment 16-1). [redacted]

15.2.2 Communication

Vineyard Offshore's engagement with stakeholders interested in environmental issues prioritizes information sharing, soliciting feedback on the design and execution of the Projects, and supporting an efficient and timely permitting process. Throughout every phase of the Projects, we will continue to actively engage and communicate with stakeholders; foster, build, and maintain trusted relationships; work to better understand and address concerns; and clearly communicate the reasons behind the decisions we make. We accomplish this through our involvement in the groups described above, our website and social media platforms, and attending and sponsoring conferences and events, among several other methods. Our communication methods and tools are further detailed in Section 16.

15.3 ENVIRONMENTAL MONITORING AND RESEARCH PRE-, DURING-, AND POST-CONSTRUCTION

15.3.1 Baseline Data and Pre-Construction Monitoring

Since acquiring the 522 Lease Area in 2019, we have performed numerous surveys, including offshore avian, fisheries, and benthic habitat surveys, to collect baseline data on the presence of wildlife in and around the Lease Area. These site-specific surveys supplement the considerable body of existing literature and survey data for MA WEA. [redacted]

For the 544 Lease Area, BOEM is preparing a PEIS to analyze potential impacts from wind energy development activities in the New York Bight region (see Section 10). As part of the PEIS process, BOEM will draw on the wealth of existing literature and survey data to characterize the distribution, abundance, and composition of wildlife potentially affected by offshore development activities in the New York Bight region. [redacted]

[redacted]

[redacted]

[redacted] We would also continue to design our surveys to be compatible with established survey methods, whenever practicable, so that data generated can be compared to existing data and ongoing regional studies. For example, our fisheries surveys in the 522 Lease Area followed the same protocols used for Vineyard Wind 1 and are aligned with ongoing regional surveys (see Section 14.3). Going forward, we will seek to align our survey approaches with the outcomes of ongoing efforts by ROSA, RWSC, and agencies to standardize scientific methods, surveys, and monitoring plans.

15.3.2 During- and Post-Construction Monitoring

Vineyard Offshore will conduct appropriate monitoring during construction and post-construction to assess potential changes to the ecological baseline established for the Projects (see Sections 15.5–15.7). [redacted]

Vineyard Offshore will continue to gain valuable experience assessing changes attributable to project activities through the monitoring plans being developed and implemented for Vineyard Wind 1. For example, scientifically sound, statistically rigorous methods employed for Vineyard Wind 1 include a beyond Before-After-Control-Impact (BACI) framework to assess potential impacts to fish and a combination BACI-Before-After Gradient sampling design to assess potential impacts to benthic resources. In collaboration with federal and state agencies, leading ornithologists, and environmental non-government organizations (eNGOs), we developed a pre- and post-construction bird and bat monitoring program framework for Vineyard Wind 1 that could be applied to the Projects. [redacted] We expect that the Projects' monitoring plans will build on lessons learned from implementing the Vineyard Wind 1 plans and those that come after it.

15.3.3 Environmental Data Transparency

The survey and monitoring work that we have conducted or plan to conduct (see Sections 15.5–15.7) will continue to generate a substantial body of environmental, fisheries, and other data that is currently or will be made available in the public domain. Much of the data will be publicly available through the federal and state permitting processes, as well as reports or academic publications that result from survey or monitoring work, and will be readily accessible to stakeholders.

We will continue working with agencies, stakeholders, and other offshore wind developers to find cost-effective and user-friendly ways to streamline and standardize available data across lease areas, particularly where there are gaps in extant databases. Where practicable, we will disseminate raw environmental data to the most appropriate database(s), such as those recommended in NYSERDA's (2021) *Wildlife Data Standardization and Sharing: Environmental Data Transparency for New York State Offshore Wind Energy*, as soon as feasible following internal quality assurance and quality control (QA/QC), to maximize the data's exposure and utility. However, as noted in the study, "benthos, zooplankton and fish data, Protected Species Observer (PSO) data, and some other data types are poorly served by extant databases" and should be housed and made available by the data originator until appropriate databases exist. Accordingly, as further discussed in Section 14, we proactively publish our fisheries research on our website. Several years of fisheries data collected in the 522 Lease Area are already available on Vineyard Offshore's website at: https://www.vineyardoffshore.com/fishermen.

In accordance with Section 2.2.8 of ORECRFP22-1, Vineyard Offshore will provide a Data Management and Availability Plan to NYSERDA detailing how Site and Environmental Data will be made available for use by third parties on an ongoing basis as soon as practicable after collection and QA/QC.

15.4 SUPPORTING OTHER ENVIRONMENTAL RESEARCH

15.4.1 Data Sharing and Site Access

As described in Section 15.3.3, we have made or intend to make much of our environmental and fisheries data public. We will continue to coordinate with third-party scientists regarding the provision of data and site access, and we will review any requests on a case-by-case basis. We note that, except for temporary safety buffer zones established around work areas, third-party research vessels will be permitted to transit through and within the 522 and 544 Lease Areas. In certain instances, Vineyard Offshore may impose restrictions on data provision or the deployment of research equipment (e.g., buoys, environmental sensors, telemetry receivers, cameras) within our lease areas, OECCs, and on our facilities to protect proprietary and/or competitively sensitive information, maintain site security, ensure safety, etc. All requests will be considered and discussed with the requestor and will not be unreasonably denied.

We have previously provided data to support regional data collection programs and studies, such as: (1) data from boat-based avian surveys in Lease Area OCS-A 0501 to support BOEM's study *Anticipating Shifts in Marine Bird Distributions for Planning, Leasing, and Assessment of Energy Development on the Outer Continental Shelf (AT 20-03)*; (2) metocean data for BOEM's study *Hydrodynamic Modeling and Particle Tracking in the U.S. Mid-Atlantic Bight (NSL 19-04);* (3) environmental data (e.g., metocean data) to improve and verify NYSERDA's model of underlying hydrodynamics in the region. We expect to participate in similar data collection programs in connection with the Projects.

[redacted]

15.4.2 Supporting Regional Studies and Funding Independent Research

Vineyard Offshore is firmly committed to supporting regional studies and other independent environmental research. For example, we previously partnered with Ørsted, Equinor, Mayflower, the Massachusetts Clean Energy Center (MassCEC), and the New England Aquarium to fund a year of the Northeast Large Pelagic Survey Collaborative Aerial Surveys. We also previously partnered with the New England Aquarium's Anderson Cabot Center for Ocean Life to study highly migratory species presence across the MA WEA and Rhode Island/Massachusetts Wind Energy Area (RI/MA WEA). In continuance of this study, we are providing funding for tags and acoustic receivers in the 522 Lease Area to support highly migratory fish research by the New England Aquarium and INSPIRE Environmental (see Section 14.4). We also deployed a metocean buoy in the 522 Lease Area that is transmitting live weather/ocean data to a public website and is equipped with an acoustic receiver to track highly migratory fish species.

[redacted]

15.5 MARINE MAMMALS AND SEA TURTLES

15.5.1 Presence of Marine Mammals and Sea Turtles

Numerous data sources characterize the distribution and abundance of marine mammals and sea turtles potentially affected by the Projects. Primary data sources include Marine Mammal Stock Assessment Reports; the Atlantic Marine Assessment Program for Protected Species surveys; the Duke University Habitat-based Cetacean Density Models (Roberts et al. 2016; Roberts 2022); the Northeast Large Pelagic Survey Collaborative aerial and acoustic surveys; the Megafauna Aerial Surveys in the Wind Energy Areas of Massachusetts and Rhode Island; the New York Bight Whale Monitoring Program aerial and acoustic surveys; the Wildlife Conservation Society/WHOI New York Bight Acoustic Buoy; and NYSERDA Digital Aerial Baseline Surveys. To supplement existing data, we conducted multi-year high-resolution digital aerial surveys of the 522 Lease Area to collect spatial data on wildlife including marine mammals and sea turtles (see Section 15.6.1). [redacted]

Based on these sources, a summary of marine mammal and sea turtle species potentially affected by the Projects is provided below. [redacted]

15.5.1.1 Marine Mammals

Thirty-eight marine mammal species (whales, dolphins, porpoises, seals, and manatees) have been documented as present in the Western North Atlantic Outer Continental Shelf (OCS) region, which encompasses the lease areas and OECCs (BOEM 2013, 2014). All 38 marine mammal species are protected by the Marine Mammal Protection Act and some are also listed under the Endangered Species Act (ESA). The five ESA-listed marine mammal species that could occur in the lease areas and OECCs are the NARW, sperm whale (*Physeter macrocephalus*), fin whale (*Balaenoptera physalus*), blue whale (*Balaenoptera musculus*), and sei whale (*Balaenoptera borealis*). These species are listed as endangered at the federal and State level. The distinct population segment of humpback whale (*Megaptera novaeangliae*) that occurs in the vicinity of the Projects has been delisted as an endangered species federally and has been proposed for removal from the State's list of threatened or endangered species (NYSDEC 2019).

The five federally listed species are the species of greatest concern given their biology, habitat use, low abundance, ESA status, existing threats, and potential to occur at least seasonally in and around the lease areas and OECCs. The presence of NARW is well-studied and continuously monitored (see Sections 15.5.2 and 15.5.3). The highest seasonal density of NARW in the MA WEA occurs in the winter through early spring (December–May) and in the New York Bight region from late fall through early spring (November–May), although there is increasing evidence that NARW distribution is shifting in both regions. In recent years, NARW have appeared to increase their use of waters in and around Nantucket Shoals, particularly in winter and early spring (Roberts et al. 2016; Roberts 2022). NARW density in the 544 Lease Area is relatively low (Roberts et al. 2016; Roberts and Halpin 2022). Fin whales and sei whales primarily occur in the MA WEA in the spring and summer whereas sperm whales primarily occur in the summer and fall. In the New York Bight region, fin whales primarily occur in the summer, sei whales primarily occur in the spring, and sperm whales have been observed in all seasons. Blue whales are thought to mainly occur in both regions in the winter.

15.5.1.2 Sea Turtles

Four species of sea turtles are likely to occur in the Western North Atlantic OCS region, which encompasses the lease areas and OECCs: loggerhead sea turtles (*Caretta caretta*), Kemp's Ridley sea turtles (*Lepidochelys kempii*), leatherback sea turtles (*Dermochelys coriacea*), and green sea turtles (*Chelonia mydas*). Under both federal and New York State law, Kemp's ridley and leatherback sea turtles are endangered and the loggerhead and green sea turtle populations that occur in the vicinity of the Projects are threatened (NYSDEC 2015). Sea turtle presence in the lease areas and OECCs is primarily limited to the summer and fall as sea turtles use warmer water habitats in the winter and spring. In addition, no nesting sites are expected near the Project's potential landfall sites. Nevertheless, in light of sea turtles' status under the ESA and their occurrence in and around the lease areas and OECCs, all four species of sea turtles are considered species of greatest concern.

15.5.2 Surveys to Establish an Ecological Baseline and Assess Impacts

Vineyard Offshore has a solid understanding of marine mammal and sea turtle species that may be present in and around the 522 Lease Area based on the numerous data sources described in the preceding section. [redacted]

[redacted]

[redacted]

15.5.3 Minimizing Potential Impacts to Marine Mammals and Sea Turtles

Vineyard Offshore will continue our efforts to collaboratively develop measures that effectively avoid, minimize, and mitigate the risk of impacts to marine mammals and sea turtles from offshore wind development. This will be an iterative and adaptive process that accounts for changing technologies, shifting patterns in species distribution, and lessons learned from other offshore wind projects in the Northeast. For example, Vineyard Wind 1 will conduct sound field verification (SFV) during pile driving, which will provide information on the effectiveness of the noise attenuation systems (NAS) used and could inform the selection of NAS for the Projects. Vineyard Offshore would also integrate any relevant learnings from and/or new technologies advanced through Vineyard Wind 1's Wind and Whales Fund and the Offshore Wind Challenge (which focused on innovations in marine mammal monitoring; see Attachment 16-1). We are continuing to work with renowned bioacoustician, Dr. Christopher Clark, to inform our efforts to identify appropriate measures.

15.5.3.1 Preliminary Measures to Reduce Acoustic Impacts

While it is premature to finalize monitoring and mitigation measures at this stage of the Projects' development, a number of preliminary measures to reduce acoustic impacts have been identified. [redacted]

[redacted]

Pile Driving Noise Attenuation Systems: [redacted]

Soft-Start/Ramp-Up Procedures: A soft start will be used at the beginning of pile driving events. A soft start utilizes an initial set of very low-energy strikes from the impact hammer, followed by a waiting period. Additional strike sets gradually increase in energy to what is needed to install the pile. This gradual increase in hammer energy (and correspondingly, sound levels) provides a "warning" to marine mammals and sea turtles in the area and allows time for them to move away, avoiding any potential injury or impairment of their hearing abilities. [redacted]

Use of Protective Zones, PSOs, and Underwater Vocalization Detection Systems: As practicable, pre-start clearance and shutdown (i.e., exclusion) zones will be established to minimize potential impacts of underwater sound on marine mammals and sea turtles during pile driving and certain HRG survey activities (for acoustic sources operating below-specified frequencies based on species' hearing ranges). [redacted]

[redacted]

Sound Field Verification: [redacted] In accordance with Section 2.2.11 of ORECRFP22-1, Vineyard Offshore will provide an Underwater Acoustic Monitoring Plan to NYSERDA that details how the SFV data will be collected and made available for use by third parties.

[redacted]

15.5.3.2 Preliminary Measures to Minimize Risk of Ship Strikes

[redacted]

speed restrictions, all vessels will comply with the final amendments to the North Atlantic Right Whale Vessel Strike Reduction Rule at 50 Code of Federal Regulations (CFR) Part 224. All personnel working offshore will receive environmental training, stressing individual responsibility for marine mammal and sea turtle awareness and reporting as well as marine debris awareness.

15.6 BIRDS AND BATS

15.6.1 Presence of Birds and Bats

15.6.1.1 Birds

[redacted]

The 522 Lease Area is in the MA WEA, which was identified by BOEM through a public, multi-step process over a period of approximately six years. During this siting process, BOEM extensively reduced the size of the MA WEA to address agency and stakeholder concerns, including removing an area of high sea duck concentration on Nantucket Shoals. [redacted] A total of 44 bird species were detected in the 522 Lease Area during the MassCEC surveys and the site-specific digital aerial surveys. These include waterfowl, sea ducks, shorebirds, skuas, jaegers, auks, gulls, terns, loons, storm-petrels, shearwaters, petrels, northern gannet (*Morus bassanus*), wading birds, and osprey (*Pandion haliaetus*). In addition, migratory birds may pass through the 522 Lease Area, including coastal waterbirds, falcons, and songbirds. [redacted]

[redacted]

[redacted]
The marine bird species likely to occur in and around the 544 Lease Area include sea ducks, phalaropes, auks, gulls and terns, loons, shearwaters and storm-petrels, and gannets. Other migratory non-marine bird species may pass through the 544 Lease Area. [redacted]

Of the bird species that may pass through the vicinity of the 522 and 544 Lease Areas, the species of greatest concern are the three federally listed species (which are also State listed): roseate tern (*Sterna dougallii*), piping plover (*Charadrius melodus*), and red knot (*Calidris canutus rufa*). However, these species of birds are expected to have minimal to low exposure to the lease areas. Other State-listed species that may occur in the vicinity of the 544 and/or 522 Lease Areas include peregrine falcon (*Falco peregrinus*), common tern (*Sterna hirundo*), least tern (Sternula antillarum), common loon (*Gavia immer*), and osprey (*Pandion haliaetus*).[6] State-listed bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are not expected in either lease area given their distance from shore.

[redacted]

15.6.1.2 Bats

[redacted]

Acoustic and radio-tracking studies indicate low use of the offshore environment by cave-hibernating bats and such use is likely limited to the fall migration period (Peterson et al. 2014; Dowling et al. 2017). The cave-hibernating northern long-eared bat (*Myotis septentrionalis*)

[6] Osprey have been proposed for removal from the States' list of species of special concern (NYSDEC 2019).

was recently reclassified as endangered under the ESA and is currently listed as threatened under New York State law. Although the range of the northern long-eared bat extends throughout the Northeast, they are not expected to be exposed to the 544 or 522 Lease Areas. Similarly, it is unlikely that the eastern small-footed bat (*Mytotis leibii*; a New York State species of special concern), little brown bat (*Myotis lucifugus*; a proposed New York State species of special concern), or tri-colored bat (*Perimyotis subflavus*; proposed for listing as endangered under the ESA) would encounter the OWFs during migration. The Indiana bat (*Myotis sodalis*) is listed as endangered under federal and State law, but its range does not extend to the lease areas or Long Island. While migratory tree bats are detected more often in the offshore environment than cave-hibernating bats, exposure is likely to be limited to the migration period.

The northern long-eared bat is expected to be the species of greatest concern given its recently updated ESA status and because the Onshore Development Areas may include roosting or foraging habitat. Vineyard Offshore will work with the New York Natural Heritage Program as necessary to determine the onshore facilities' proximity to known roost trees or hibernacula. [redacted]

15.6.2 Methods to Evaluate Risks to Birds and Bats

The primary potential impact of the Projects to birds is mortality or injury due to collision with the wind turbine generators (WTGs). [redacted]

As with birds, the primary potential impact of the OWFs to bats is mortality or injury from collision with the WTGs. [redacted]

Potential exposure and impacts to bats from the onshore facilities are expected to be limited. [redacted]

15.6.3 Measures to Minimize Risk to Birds and Bats

The OWFs' location far offshore avoids and minimizes exposure to birds and bats. The WTGs will be spaced far apart and have significant air gaps, which minimizes collision risk to marine birds given that many seabirds will fly below the rotor-swept zone. In particular, sea ducks are generally not considered vulnerable to collision (Furness et al. 2013), in part because they primarily fly below the rotor-swept zone. Anti-perching is incorporated into the design of the WTGs by using tubular support towers. To the extent practicable and in accordance with health and safety requirements, we will evaluate the feasibility of installing bird deterrents at WTGs that have been identified as having high use by birds.

To avoid attracting birds and bats (and thus reduce the risk of collision and mortality), Vineyard Offshore will reduce lighting to the extent practicable by using best management practices (e.g., using down-shield lighting or down-lighting) and adhering to federal regulations and BOEM guidance. During operations, we will use an Aircraft Detection Lighting System (ADLS) or similar system that automatically activates all aviation obstruction lights on the WTGs and electrical service platforms (ESPs) when aircraft approach the structures, subject to BOEM approval. The use of an ADLS will dramatically reduce the amount of time that the aviation obstruction lights are illuminated. [redacted]

15.6.4 Approaches to Assess Impacts to Birds and Bats

[redacted]

[redacted] The Vineyard Wind 1 monitoring framework, which was developed in collaboration with federal and state agencies, leading ornithologists, and eNGOs, includes: (1) acoustic monitoring for birds and bats for at least two years post-construction; (2) installation of Motus receivers on WTGs, support with upgrades or maintenance of two onshore Motus receiver stations, and providing up to 150 Motus tags to third-party avian researchers to track roseate terns and possibly common terns and/or nocturnal passerine migrants; (3) pre- and post-construction boat surveys; and (4) avian behavior point count surveys at individual WTGs for up to three years. By the time the Projects are near construction, implementation of the Vineyard Wind 1 framework will be well underway.

In accordance with the BOEM Lease Agreement for the 544 Lease Area (the "544 Lease Agreement"), we will install Motus stations on meteorological or environmental data buoys in coordination with USFWS's Offshore Motus network. [redacted]

15.7 FISH, INVERTEBRATES, AND THEIR HABITATS

15.7.1 Presence of Finfish, Invertebrates, and Their Habitats

[redacted] The MA WEA, which includes the 522 Lease Area, is well-studied. The most relevant regional data sources include, but are not limited to, Northeast Fisheries Science Center multispecies bottom trawl surveys, Atlantic surfclam and ocean quahog surveys, and Atlantic sea scallop dredge surveys as well as SMAST regional video survey data and drop camera surveys. To supplement existing data, we have collected multiple years of site-specific baseline data on fish species, invertebrate species, and their habitat within the 522 Lease Area via trawl surveys, drop camera surveys, benthic grab samples, underwater video, and other geophysical survey techniques (see Section 14.3). We are also funding the New England Aquarium and INSPIRE Environmental's research on the movements of highly migratory fish species (sharks, tunas, and marlins) in the MA WEA and RI/MA WEA.

From these sources, we have a strong understanding of fish, invertebrates, and their habitats, including those of greatest concern, in the vicinity of the 522 Lease Area. Four federally listed threatened or endangered fish species may occur off the northeast Atlantic coast: the shortnose sturgeon (*Acipenser brevirostrum*), Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), Atlantic salmon (*Salmo salar*), and giant manta ray (*Manta birostris*). However, these species are unlikely to occur in the 522 Lease Area. Based on data from seasonal trawl surveys conducted from spring 2019 through fall 2021, the top five species caught in the 522 Lease Area were little skate (*Leucoraga erinacea)*, red hake (*Urophycis chuss*), spiny dogfish (*Squalus acanthias*), scup (*Stenotomus chrysops*), and silver hake (*Merluccius bilinearis*). Other species of commercial or regulatory significance captured were American lobster (*Homarus americanus*), Atlantic cod (*Gadus morhua*), Atlantic halibut (*Hippoglossus hippoglossus*), Atlantic sea scallop (*Placopecten magellanicus*), haddock (*Melanogrammus aeglefinus*), summer flounder (*Paralichthys dentatus*), winter flounder (*Pseudopleuronectes americanus*), and yellowtail flounder (*Limanda ferrugin*) (He and Rillahan 2020a, 2020b, 2020c, 2020d). Essential Fish Habitat (EFH) is designated for 42 species within the 522 Lease Area and 44 species within the associated OECCs, and no Habitat Areas of Particular Concern (HAPCs) are present, although the New England Fishery Management Council has proposed a new Southern New England HAPC that overlaps the entire MA WEA and RI/MA WEA.

[redacted] Of the four federally listed fish species that may occur off the northeast Atlantic coast (shortnose sturgeon, Atlantic sturgeon, Atlantic salmon, and giant manta ray) only the Atlantic sturgeon is anticipated to potentially occur within the 544 Lease Area and surrounding waters. EFH is designated for 38 species within the 544 Lease Area and 39 species within the associated OECC, and no HAPCs are located within either the 544 Lease Area or OECC. [redacted]

15.7.2 Methods to Evaluate Risks to Fish, Invertebrates, and Their Habitats

The potential impact-producing factors (IPFs) that may affect finfish, invertebrates, and their habitats during the construction, operations, and/or decommissioning of the Projects are seafloor disturbance and habitat modification, suspended sediments and deposition, entrainment and impingement, electromagnetic fields (EMF), and noise. [redacted]

[redacted]

[redacted]

15.7.3 Measures to Minimize Risk to Fish, Invertebrates, and Their Habitats

Vineyard Offshore is considering several measures to reduce potential impacts on fisheries resources and other sensitive species. Generally, mitigation measures to protect marine mammals and sea turtles (see Section 15.5.3) also protect fish species. For example, pile driving noise will be mitigated through a soft start, which allows fish time to move away from the area, [redacted] The WTGs and ESPs are widely spaced so that their foundations (and associated scour protection), along with cable protection for inter-array cables (if needed), only occupy a minimal portion of the lease areas, leaving a vast majority of the sites undisturbed. [redacted]

[redacted] Cable burial techniques will be selected to maximize the likelihood of achieving sufficient cable burial, minimize the need for cable protection, and minimize suspended sediments during installation. [redacted] The use of mid-line anchor buoys will be considered, where feasible and safe, as a potential measure to reduce impacts from anchor line sweep. [redacted] Additional measures to reduce impacts to fish and invertebrates will be determined based on knowledge gained in the field from other offshore wind projects and consultations with agencies and stakeholders during the permitting process.

15.7.4 Fisheries Research and Other Mitigation Measures

Vineyard Offshore will continue to evolve and refine its pre-, during-, and post-construction fisheries and benthic habitat monitoring methods to incorporate results from other offshore wind projects, to be compatible with or a part of regional science efforts, and to adopt advancements in other science and technology. We will continue to work with agencies and stakeholders to explore research opportunities and other measures to reduce potential impacts to fish, invertebrates, or their habitats. [redacted]

15.8 CONSIDERATIONS FOR SUBSEA AND OVERLAND CABLES

Siting OECCs is an extremely complex endeavor that must account for a multitude of technical, environmental, commercial, and logistical constraints. [redacted]

[redacted] We will require our cable installation contractor(s) to prioritize the least environmentally impactful cable installation methods(s) and tool(s) that are practicable for each segment of cable. Our goal is to minimize the use of cable protection to the greatest extent possible through a careful routing assessment and the selection of the most appropriate cable burial tool(s) to achieve a sufficient burial depth, taking into account site-specific environmental conditions and cable properties.

Identifying landfall sites and onshore export cable routes is a similarly complex endeavor largely driven by Delivery Point availability. [redacted]

[redacted]

[redacted]

15.9 ADDITIONAL CONSIDERATIONS

Offshore wind is a critical climate change mitigation solution. The rapid deployment of offshore wind by a company that understands the process has fostered relationships with stakeholders, and has a proven track record of responsible development—like Vineyard Offshore—is essential to meet New York State's emission reduction goals (see Section 21). Vineyard Offshore is committed to ensuring that we employ measures that afford the highest levels of environmental protection while maintaining project viability. Throughout the Projects' multi-year permitting process, we will continue to assess potential risks to species and identify measures to avoid, minimize, or mitigate potential impacts to wildlife in line with applicable federal and state permitting requirements as well as regional monitoring efforts. Stakeholder input as well as lessons learned from Vineyard Wind 1 and other offshore wind projects will inform this effort.

15.10 PROJECT DECOMMISSIONING

The Projects' decommissioning will occur approximately 30 years from now. Based on current regulations and our Lease Agreements, Vineyard Offshore expects to consult with BOEM prior to that and submit Decommissioning Applications for review and approval. This process will include an opportunity for public comment and consultation with agencies (including relevant New York State agencies) and stakeholders. Upon receipt of the necessary BOEM approvals and any other required permits, Vineyard Offshore would implement the approved Decommissioning Applications to remove offshore components.

[redacted]

Information about Project component reuse and recycling is provided in Section 11.

SECTION 16
STAKEHOLDER ENGAGEMENT PLAN

16.1 STAKEHOLDER ENGAGEMENT PLAN SUMMARY

Vineyard Offshore's approach to stakeholder engagement, pioneered on the Vineyard Wind 1 project, has cultivated enduring support for offshore wind projects and delivered tangible benefits to state and local economies (see Attachment 16-1). This approach is stakeholder-driven and centered on a collaborative process whereby projects and project benefits are developed in partnership with local communities, stakeholders, and regulators.

By meeting stakeholders where they are and communicating openly and transparently, Vineyard Offshore has built trust and productive working relationships with a diverse array of stakeholders across the region. We spend a great deal of time listening to and learning from local communities and leaders. We also regularly attend, speak at, and sponsor community events. We believe this kind of outreach and engagement is not only important to build support for our projects but is a necessary part of being a good corporate citizen.

Our stakeholder engagement activities are led by local teams that include community organizing and campaign veterans who have spent years working for environmental non-profits, community organizations, elected officials, and political campaigns in and around the region. Recognizing the success of this approach, Vineyard Offshore is currently establishing a local team that will lead our stakeholder engagement activities in New York. This team will continue to expand after ORECRFP22-1 contract award and execution in ways that reflect the diverse geography and communities of our project area(s) to ensure consistent, authentic engagement with community members, cultivate trusting relationships, maximize economic benefits, and support a just transition.

This Stakeholder Engagement Plan (the "SEP") applies to all three proposed Offshore Wind Generation Facilities—Excelsior Wind, Liberty Wind North, and Liberty Wind South— and their associated transmission systems, which are referred to as the "Projects" and further described in Section 4. Additional information about our stakeholder identification, engagement, and partnership plans are provided in Sections 10, 13, 14, and 18 of this Proposal Narrative, 4.8 Stakeholder Engagement Plan, 4.10 Economic Benefits Plan, and 4.11 New York Jobs and Workforce Plan.

16.2 STAKEHOLDER IDENTIFICATION AND STAKEHOLDER LIST

As a hub of the United States (US) offshore wind industry, our New York stakeholder engagement efforts have been ongoing for several years – first as Vineyard Wind and now as Vineyard Offshore. In preparing this ORECRFP22-1 Submission, Vineyard Offshore attended or hosted over 170 meetings with more than 100 stakeholders across stakeholder groups and participated in more than 40 New York events (see Attachment 16-2).

These efforts, along with stakeholder mapping exercises, have advanced our understanding of the offshore wind stakeholder ecosystem in New York and the region. This ecosystem has become increasingly complex as the scope of New York's offshore wind solicitations has expanded to facilitate significant port, manufacturing, supply chain-related infrastructure investments, and other job creation opportunities. The complexity of this scope presents multiple challenges and further expands the universe of stakeholders that offshore wind developers must identify, consider, and engage with before, during, and after the offshore wind project development process.

At the same time, the expanded scope presents an opportunity for developers to support the creation of an inclusive and equitable marketplace for the offshore wind industry. We intend to do this in New York by playing a leading role in the development of a local and diverse supply chain and workforce, facilitating a just transition, and prioritizing historically marginalized, Disadvantaged Communities (DACs), Environmental Justice (EJ), and other underserved communities throughout the life cycle of the Projects.

[redacted]

[redacted]

16.2.0 Stakeholder Groups

Vineyard Offshore defines "stakeholders" broadly to include individuals, institutions, organizations, groups, or communities directly or indirectly affected by project-related activities or with a direct or indirect interest in them. This diverse group is centered in New York but spans several states and is comprised of communities and individuals; their formal and informal representatives, including national, tribal, and local government authorities; elected officials; community organizations; public interest groups; and many others.

The stakeholder groups identified herein may overlap with one another, and the groups themselves may not include every stakeholder potentially impacted by, or interested in, our projects. As such, they should be viewed as non-exhaustive and representative of the broad range of stakeholders that Vineyard Offshore has been and will continue to consult, collaborate, and communicate with as the Projects move forward. To avoid repetition, the discussion below addresses similar stakeholder groups together. Communication and engagement approaches are elaborated on in Section 16.3.0.

16.2.0.0 Offshore Communities, Onshore Communities, Port Communities

As a first step, Vineyard Offshore identifies stakeholders potentially relevant to our projects in relation to a project's footprint. The project footprint includes all onshore and offshore areas where project infrastructure may be located, as well as ports that projects may utilize in support of construction and operation and maintenance (O&M) activities. For the purposes of this SEP, we refer to these geographically defined stakeholder groups as Offshore Communities, Onshore Communities, and Port Communities. Stakeholders within these stakeholder groups vary widely and include representatives from the stakeholder groups identified by NYSERDA in ORECRFP22-1 Appendix F.2, as well as others.

[redacted]

[redacted]

16.2.0.1 *Federal, State, and Local Agencies*

Government agencies are central to site assessment, survey, and project permitting activities. A host of federal, state, and local agencies are involved in the offshore wind permitting process with the Bureau of Ocean Energy Management (BOEM) serving as the lead federal agency through the National Environmental Preservation Act (NEPA) review and the New York State Public Service Commission leading the Article VII review process at the state level.[1] [redacted]

16.2.0.2 *Indigenous Nations*

Indigenous Nations are generally comprised of federal- and state-recognized tribes. We understand and respect that the areas where our Projects may be developed are part of Indigenous Nations' cultural heritage and their traditional bonds to the past, and importance to their cultural identity, sense of self, and future well-being. [redacted]

[1] See Section 10 for a full discussion of agency stakeholders and their role in the offshore wind permitting process.

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[redacted]

The lease agreements that developers enter into with BOEM require consultation with a subset of federally recognized tribes ahead of archaeological survey activities.[2] [redacted] Vineyard Offshore is currently in discussions with BOEM and other offshore wind developers to ease the consultation burden for Indigenous Nations that results from these requirements and processes.

16.2.0.3 Commercial and Recreational Fishermen

Commercial and Recreational Fishermen – vessel owners and operators and crew – is a diverse stakeholder group comprised of individuals and companies that earn all or a portion of their income from fishing activities and/or engage in fishing activities on a recreational basis.[3] [redacted] Over the last decade, we have forged constructive working relationships with fisheries stakeholders despite very challenging

[2] For Lease Area OCS-A 0522, Vineyard Offshore is required to invite the following federally recognized tribes to pre-survey meetings: Mashpee Wampanoag Tribe, The Narragansett Indian Tribe, and Wampanoag Tribe of Gay Head (Aquinnah). For Lease Area OCS-A 0544, Vineyard Offshore is required to invite the following federally recognized tribes to pre-survey meetings: Absentee-Shawnee Tribe of Indians of Oklahoma, Delaware Tribe of Indians, Eastern Shawnee Tribe of Oklahoma, Mashantucket Pequot Tribal Nation, Mashpee Wampanoag Tribe, Mohegan Tribe of Connecticut, Shawnee Tribe, Stockbridge-Munsee Community, The Delaware Nation, The Narragansett Indian Tribe, The Shinnecock Indian Nation, and Wampanoag Tribe of Gay Head (Aquinnah).

[redacted]

circumstances. Additional information about our approach to engagement with Commercial and Recreational Fishermen is provided in Section 14.

16.2.0.4 Other Marine Users

The offshore environment is a busy space, and many stakeholder groups access the marine environment for various purposes, including shipping, recreation, tourism, and conducting research. Other Marine Users include all non-commercial and recreational fishermen stakeholders and overlaps with stakeholder groups that may access nearshore and offshore marine waters. [redacted] To facilitate communication with stakeholders in this group, we employ a Marine Operations Officer who is responsible for safe marine operations and ensuring that Vineyard Offshore is a good neighbor while on the water.

16.2.0.5 Labor Unions and Organizations

This group is comprised of the trade unions, councils, and representatives likely to be involved or interested in Project Labor Agreement (PLA) and Labor Peace Agreement (LPA) negotiations, as well as any New York-based organizations that support and/or deliver pre-apprenticeship services and related programming. Stakeholders in this group are central to the success of any effort to ensure the availability of a local, trained, and capable workforce for offshore wind project construction. Relatedly, this stakeholder group will play a key role in building a more diverse offshore wind workforce and delivering a just transition to a clean energy economy. Additional information about our approach to engagement with Labor Unions and Organizations is provided in 4.11 New York Jobs and Workforce Plan.

16.2.0.6 Economic Development, Workforce Development, and Training Institutions

This group includes workforce training and service providers, community leaders, local chambers of commerce, economic and industrial development corporations, and career services representatives from academic institutions. These actors play an important role in preparing the offshore wind workforce and anchoring economic benefits in local communities. [redacted] Additional information about our approach to engagement with these stakeholder groups is provided in 4.11 New York Jobs and Workforce Plan.

16.2.0.7 Supply Chain Businesses

This group encompasses all tiers of businesses that may provide goods and services to offshore wind projects, including US iron and steel companies, and New York-based MWBE and SDVOB firms. Supply chain businesses are essential to delivering cost-effective, reliable projects in line with project schedules and serve as a primary avenue for providing direct economic development benefits to local communities. They are also a leverage point for efforts aimed at increasing diversity and inclusion in the offshore wind supply chain and workforce. [redacted] Additional information about our approach to engagement with supply chain businesses is provided in Sections 11 and 19 as well as 4.10 Economic Benefits Plan. An assessment of the existing MWBE and SDVOB landscape is provided in Attachment 16-4.

16.2.0.8 Disadvantaged Communities and Environmental Justice Communities

This group includes communities designated as DACs under the interim criteria provided in ORECRFP22-1, communities that will be designated as DACs under the final criteria, and low-income areas and communities of color that are formally designated or informally referred to as EJ communities.

DAC and EJ community stakeholders as essential to our Projects' success. EJ advocacy efforts created the space for the offshore wind industry to grow in New York, and organizations are advocating for a just transition centered on racial justice and equity. Vineyard Offshore cannot achieve this vision without advice, input, and guidance from these groups, nor can we succeed in hiring a representative workforce from the local communities where our Projects will be located without their help. [redacted] Additional information about our approach to engagement with DACs and EJ communities is provided in Section 18.

16.2.0.9 Environmental Organizations

This group is comprised of national, regional, New York, and local environmental, conservation, and community organizations interested in offshore wind, climate change, conservation, and/or related issues, as well as those based in or campaigning on topics relevant to Offshore Communities, Onshore Communities, and Port Communities. [redacted] Additional information about our approach to engagement with Environmental Organizations is provided in Section 15.

16.2.0.10 Academic and Research Institutions

This group comprises middle schools, high schools, Boards of Cooperative Educational Services, community colleges, universities, extension programs, and research institutions. Academic and Research Institutions play a cross-cutting role in the offshore wind sector. Among other things, they support research initiatives aimed at improving the understanding of baseline conditions in the offshore environment, and the potential impacts of offshore wind development. They lead efforts to collaborate with developers and agencies on developing guidance, monitoring guidelines, and data standardization. They also play a pivotal role in educating and training the future offshore wind workforce. For these reasons, they are essential stakeholders and partners in the offshore wind sector. Additional information about our approach to engagement with Academic and Research Institutions is provided in Sections 14 and 15 as well as 4.11 New York Jobs and Workforce Plan.

16.2.1 Stakeholder Engagement Goals

Vineyard Offshore understands that each stakeholder group and community we engage with is unique and may have different perspectives and goals regarding offshore wind's benefits and potential impacts. Our ongoing stakeholder engagement efforts are grounded in building trust with people and organizations who live in, are representative of, and work in project-impacted communities, to better understand their goals and desired outcomes with regard to the growing offshore wind ecosystem.

Overarching stakeholder engagement goals for all stakeholder groups across all Project phases include the following:

- Identify a diverse and representative set of stakeholders and opportunities for collaboration that will yield impactful community benefits.
- Forge constructive stakeholder relationships built on trust and transparency.
- Provide accurate, factual, timely, and relevant information.
- Ensure information regarding project features and benefits is accessible and well-understood.
- Provide a range of opportunities for meaningful public engagement and stakeholder consultation.
- Incorporate stakeholder input into project design, construction, and operations plans wherever feasible.
- Develop a shared understanding of practicable opportunities to avoid, minimize, and mitigate potential impacts.
- Deliver tangible, direct, and sustained economic benefits to New York State, host communities, and DACs.

[redacted]

16.2.1.0 ORECRFP22-1 Approach

Vineyard Offshore has developed a dedicated stakeholder engagement strategy for ORECRFP22-1 to inform the development of this Submission. [redacted]

[redacted]

[redacted]

PUBLIC

[redacted]

16.3 STAKEHOLDER ENGAGEMENT ACTIVITIES AND PARTNERSHIPS

Stakeholder engagement activities necessarily vary over time and across stakeholder groups as projects move from the development phase through construction to operation. Our approach to stakeholder engagement is inherently flexible as it is focused on meeting stakeholders where they are and accommodating their changing needs. We aim to start engagement as early as possible in the project development process and build relationships grounded in transparency and trust, thereby ensuring permitting success and maximizing project benefits. As the Projects move forward, we will continue to adapt and refine our approach in response to evolving stakeholder and project needs.

16.3.0 Communication and Engagement Methods

Vineyard Offshore is well-practiced in engaging and educating the public about offshore wind, building support for projects, and responding to opposition in a respectful and constructive manner. Our track record readily demonstrates the ability of our hands-on collaborative approach to stakeholder engagement to forge positive relationships with a variety of stakeholders at the federal, state, county, and local levels (see Attachment 16-1).

Recognizing that individuals and stakeholder groups have different needs when it comes to receiving information and participating in the project development process, we employ an array of methods to disseminate information and engage stakeholders, and we continually evaluate and adapt our approach to ensure the effectiveness of our efforts. As the COVID-19 pandemic has eased, we have transitioned from a fully virtual stakeholder engagement model to a hybrid model that includes a mix of in-person and virtual meetings and events in New York and other states. Table 16-1 summarizes the primary communication and engagement methods in our stakeholder engagement toolkit.[4] Additional engagement activities that we will consider utilizing with different stakeholder groups as engagement activities progress are included in Attachment 16-5.

Table 16-1 Communication and Engagement Methods

Stakeholder Group	Communication and Engagement Method
All Stakeholder Groups	Vineyard Offshore website; social media; newsletters; e-mails; videos; press releases; newspaper, radio, podcast, and television interviews; virtual and in-person meetings and events; digital advertisements; third-party grievance mechanism
Offshore Communities, Onshore Communities, and Port Communities	[redacted]

[4] Additional communication methods for fishermen and fisheries stakeholders can be found in our Fisheries Communication Plans provided in Section 14.

Stakeholder Group	Communication and Engagement Method
	[redacted]
Federal Agencies	[redacted]
Indigenous Nations	[redacted]
State and Local Agencies	[redacted]
Commercial and Recreational Fishermen	[redacted]
Other Marine Users	[redacted]
Labor Unions and Organizations	[redacted]
Economic Development, Workforce Development, and Training Institutions	[redacted]
Supply Chain Businesses	[redacted]
DAC and EJ Communities	[redacted]

Stakeholder Group	Communication and Engagement Method
Environmental Organizations	[redacted]
Academic and Research Institutions	[redacted]

16.3.0.0 *Accessibility*

Accessibility is always a consideration when determining how best to reach different stakeholder groups and we understand that there is no single approach that works for any given group or community. [redacted]

[redacted]

[redacted]

16.3.1 Development Phase Activities

[redacted] Stakeholder engagement during the development phase (i.e., early in the project) is a significant and important investment in the long-term success of a project, the delivery of economic benefits, and the implementation of bid commitments associated with any awarded long-term contracts. [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

16.3.2 Potential Partnerships

Vineyard Offshore is committed to delivering tangible benefits to New York, host communities, and DAC and EJ communities. One way we have sought to do this at the local level is through agreements in which we commit to long-term partnerships that are aligned with the impacts, and needs of, the community. For Vineyard Wind 1, we secured several key agreements that delivered significant benefits to host communities and others located in proximity to the project, as further described in Attachment 16-1.

[redacted]

[redacted]

16.4 TRACKING PROGRESS AND COMMUNICATION

For ORECRFP22-1, Vineyard Offshore meticulously tracked engagements activities, and conversations, including summarizing and confirming key stakeholder priorities and concerns, in a manner consistent with the goals outlined above in Section 16.2.1.0. A summary of these tracking efforts is provided in Attachments 16-2 and 16-5. We will evolve our stakeholder engagement goals as the Projects move forward, develop success metrics for engagement activities, and modify our tracking mechanisms to ensure the effectiveness of how goals are measured given BOEM's lease area reporting requirements, ORECRFP22-1 reporting requirements, and other data collection and reporting requirements.

[redacted]

[redacted]

16.4.0 Marketing and Communications

Throughout all project phases, Vineyard Offshore will continue to use a combination of communication tools and methods to effectively communicate project updates, keep stakeholders informed, and invite/gather meaningful feedback. As noted above, we recognize that individuals and stakeholder groups have different needs when it comes to receiving information and participating in the project development process. To account for that, we will continue to employ an array of methods to disseminate information and engage stakeholders, and we will continually evaluate and adapt our approach to ensure the effectiveness of our efforts. As the Projects move forward, we will develop public awareness campaigns that are tailored to reach their intended audience and effectively communicate project updates, hiring opportunities, and other information.

We will develop these campaigns based on our experience with Vineyard Wind 1 and with stakeholder input on the tools and methods that are required to reach specific audience segments across different stakeholder groups. We will also continue to update and refine the approaches and communication protocols outlined in our various stakeholder communication plans and modify or develop new communication protocols as appropriate.

SECTION 17
VISIBILITY AND VIEWSHED IMPACTS

17.1 OVERVIEW

This section addresses the visibility and potential viewshed impacts of all three proposed Offshore Wind Generation Facilities (OWFs)—Excelsior Wind (EW), Liberty Wind North (LW-N), and Liberty Wind South (LW-S)–[redacted] EW will be installed in Lease Area OCS-A 0544 (the "544 Lease Area"). LW-N and LW-S will be installed in Lease Area OCS-A 0522 (the "522 Lease Area"). For all three OWFs, the nearest wind turbine generator (WTG) will be more than 20 statute miles from the closest shoreline point in any state.

[redacted]

The location and design of the OWFs (as they relate to potential visual impacts) and the results of the visual assessments are detailed below.

17.2 OFFSHORE WIND GENERATION FACILITY SITES

[redacted]

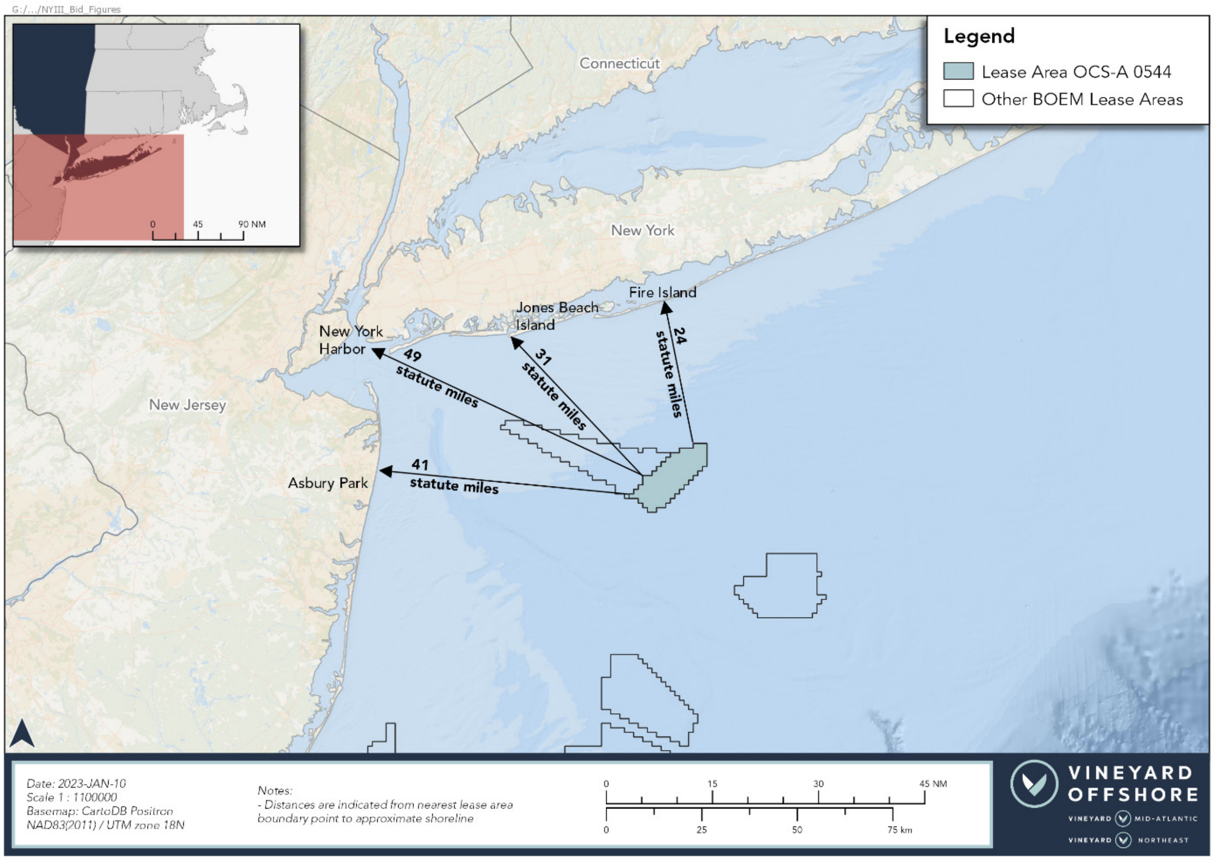
17.2.1 544 Lease Area

The 544 Lease Area is approximately 43,056 acres in size and is located in the open Atlantic Ocean approximately 24 and 41 mi, respectively, from New York's and New Jersey's nearest shorelines (see Figure 17-1).[1] The 544 Lease Area is south of Long Island in the New York Bight

[1] These distances to shore are measured from the 544 Lease Area boundary.

region and abuts Lease Area OCS-A 0512 (where the Empire Wind 1 and 2 projects will be installed) along its western edge.

Figure 17-1 544 Lease Area Distance to Shore

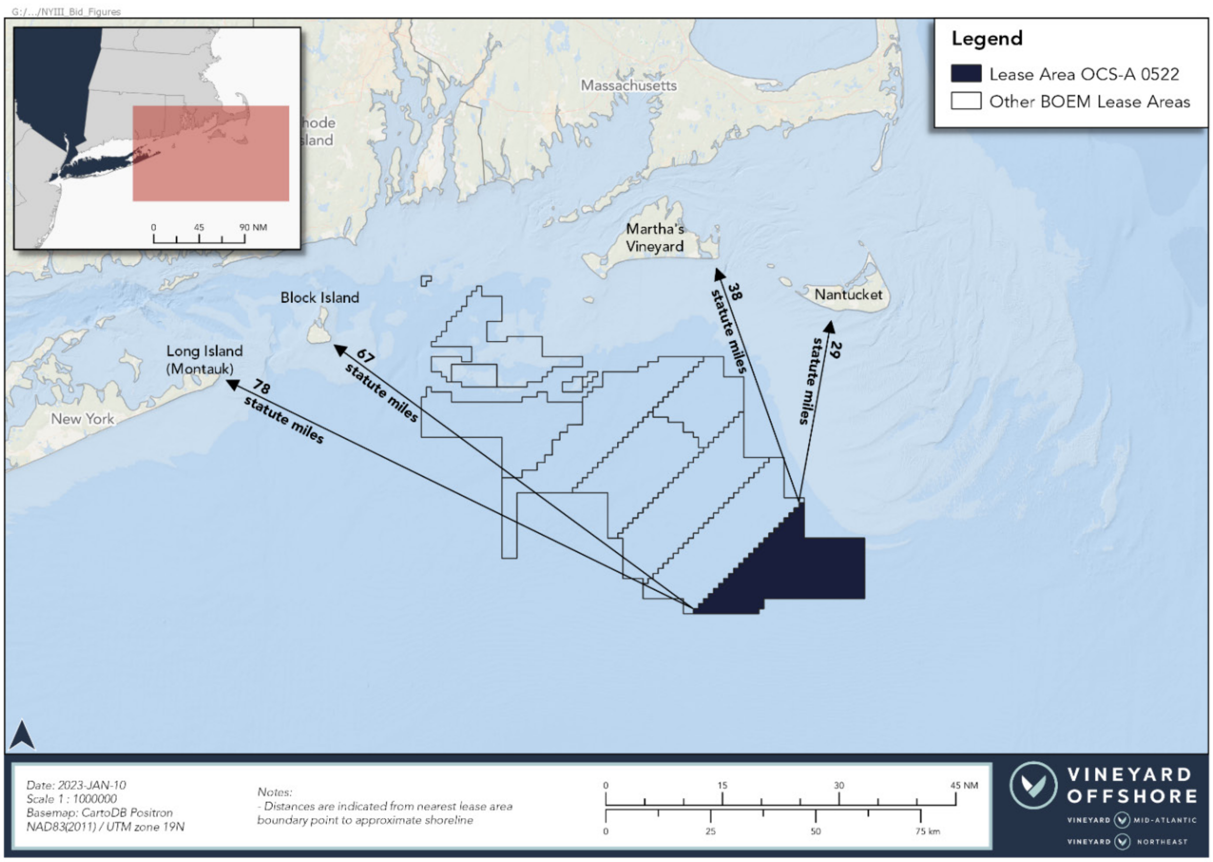


17.2.2 522 Lease Area

The 522 Lease Area is approximately 132,370 acres in size and is located in the open Atlantic Ocean approximately 29 miles south of Nantucket, Massachusetts and 78 miles southeast of New York's nearest shoreline (Montauk Point on Long Island) (see Figure 17-2).[2] The 522 Lease Area is one of nine lease areas in the Massachusetts Wind Energy Area (MA WEA) and Rhode Island/Massachusetts Wind Energy Area (RI/MA WEA) and abuts Mayflower Wind's Lease Area OCS-A 0521 along its northwestern edge.

[2] These distances to shore are measured from the 522 Lease Area boundary.

Figure 17-2 522 Lease Area Distance to Shore



17.2.3 Offshore Wind Generation Facility Layouts

17.2.3.1 Excelsior Wind

[redacted] No WTGs are located less than 20 miles from the nearest shoreline point of any state.

[redacted]

17.2.3.2 Liberty Wind North and Liberty Wind South

[redacted] No WTGs are located less than 20 miles from the nearest shoreline point of any state.

[redacted]

17.3 VISIBILITY ASSESSMENTS

In accordance with the requirements of Section 6.4.17 of ORECRFP22-1, Vineyard Offshore has assessed the Projects' visibility from shore and prepared photo simulations to support the assessments.

[redacted]

[redacted]

17.3.1 544 Lease Area Visibility Study

[redacted]

[redacted]

17.3.1.1 Theoretical Visibility of the WTGs and ESP

[redacted]

[redacted]

[redacted]

17.3.1.2 Effects of Meteorological Conditions on Visibility

[redacted]

17.3.1.3 Visual Simulations

[redacted]

17.3.1.4 Daytime Visibility of the WTGs and ESP in the 544 Lease Area

[redacted]

[redacted]

17.3.1.5 Visibility of Nighttime Lighting in the 544 Lease Area

All WTGs will include an aviation obstruction lighting system in compliance with Federal Aviation Administration (FAA) and/or BOEM requirements (see Section 11). [redacted]

[redacted]

[redacted]

17.3.2 522 Lease Area Visual Impact Assessment

[redacted]

17.3.2.1 Theoretical Visibility of the WTGs and ESPs

[redacted]

[redacted]

[redacted]

17.3.2.2 Effects of Meteorological Conditions on Visibility

[redacted]

17.3.2.3 Visual Simulations

[redacted]

[redacted]

17.3.2.4 Daytime Visibility of the WTGs and ESPs in the 522 Lease Area

[redacted]

[redacted]

17.3.2.5 Visibility of Nighttime Lighting in the 522 Lease Area

[redacted]

[redacted]

17.4 MITIGATION MEASURES

[redacted]

[redacted]

SECTION 18
DISADVANTAGED COMMUNITY IMPACTS

18.1 DISADVANTAGED COMMUNITY ASSESSMENT

Disadvantaged Communities (DACs) must be at the forefront of efforts to maximize the economic development, job creation, and environmental benefits of offshore wind. In this section, we detail Vineyard Offshore's process for defining, identifying, and engaging with DACs, assessing environmental and socioeconomic burdens in these communities, and crafting community benefits that are centered on environmental justice and sensitive to community needs.

18.1.1 Approach

Assessing the benefits and burdens associated with the potential impacts of an offshore wind project on host and/or proximate DACs is a multi-faceted endeavor that requires consideration of many factors and stakeholder views, as well as a recognition that stakeholder views are not static and may change over time. The DAC assessment provided herein is preliminary as New York State's DAC criteria have yet to be finalized. Similarly, the siting, design, and mitigation measures that determine the location, nature, and extent of potential negative impacts (referred to as "burdens" by the New York State Energy Research Development Authority [NYSERDA]) are in the early phase of development and will be advanced through the permitting process.

For the same reasons, the location, nature, and extent of the potential positive impacts (referred to as "benefits" by NYSERDA) cannot be fully assessed at this stage. With some exceptions, developing community and other project benefits requires significant stakeholder engagement over the course of several years. This engagement effort cannot be circumvented or condensed to fit a competitive solicitation's timeline; however, a framework for community and project benefits, that reflects the priorities and needs identified by stakeholders through consultation and dialogue, can be established at the proposal development stage and evolved as the Projects (as defined in Section 18.1.2) move forward. That is what Vineyard Offshore has endeavored to accomplish in this ORECRFP22-1 Submission.

[redacted]

[redacted]

[redacted]

The preliminary DAC mapping exercise was conducted in accordance with Section 3.3.1 of the ORECRFP22-1, utilizing NYSERDA's interim criteria for DACs, which include two types of communities, those: "(i) located within census block groups that meet the U.S. Housing and Urban Development (HUD) 50% area median income (AMI) threshold of the top quartile of census block groups in New York, ranked by the percentage of low and moderate-income (LMI) households, defined as households with annual incomes at or below 50% of the AMI of the county or metro area where the census block group resides, that are also located within the DEC Potential Environmental Justice Areas; or (ii) located within New York State Opportunity Zones."

[redacted]

Vineyard Offshore intends to conduct a revised DAC analysis after ORECRFP22-1 contract award and execution using the final DAC criteria. This analysis would further inform project siting, design, and mitigation measures, stakeholder engagement priorities, and community benefit frameworks.

18.1.2 Study Areas

Vineyard Offshore is proposing to install up to two Offshore Wind Generation Facilities (OWFs) – Excelsior Wind (EW) in Lease Area OCS-A 0544 and Liberty Wind North (LW-N) and Liberty Wind South (LW-S) in Lease Area OCS-A 0522. [redacted] New York supply chain facilities are detailed in 4.12 Supply Chain Investment Plan (SCIP). The Projects' onshore and offshore footprints in New York, including potential port facility use, are summarized in Table 18-1.

[redacted]

[redacted]

- [redacted]

- **Port of Coeymans:** The Port of Coeymans is located on the Hudson River 10 miles south of Albany in the town of Coeymans. It is a relatively new marine terminal owned by the Carver Companies. The Port of Coeymans may serve as a manufacturing site for WTG blades and/or nacelles.

- [redacted]

- [redacted]

18.1.3 Potential Impacts

18.1.3.1 Offshore Wind Benefits

Offshore wind offers a range of potential benefits, including reduced energy costs, avoided health impacts, added climate resiliency, avoided environmental costs/added environmental benefits (e.g., reducing carbon emissions from the power sector), and avoided social costs. While these benefits are generally socialized across ratepayer classes, DACs may experience a higher level of benefits if an offshore wind project reduces reliance on fossil fuel power stations located in or near DACs, thereby reducing local air pollution.[1] Additionally, any energy cost savings realized by offshore wind projects may be more meaningful to low-income households who experience higher energy burdens compared to middle- and high-income households.

Importantly, offshore wind also creates significant economic development and job benefits; however, capturing a large portion of these benefits for DACs, or any community, often requires project infrastructure and/or port activities to be located in or near DACs. Relatedly, education facilities, training centers, and recruitment efforts must also be localized in DACs to ensure benefits are accessible. [redacted]

[redacted]

[redacted]

Given the range of potential benefits, offshore wind should result in a net benefit to DACs regardless of the project location. Specific benefits associated with the Projects, as identified through engagement with DACs, are discussed in Section 18.3.

18.1.3.2 Offshore Wind Burdens

Unlike fossil fuel generation facilities, offshore wind produces energy without generating harmful emissions, producing hazardous waste, or exacerbating climate change. The "burdens" associated with this renewable energy resource are therefore comparatively minor. Moreover, unlike fossil fuel generation facilities, offshore wind is not anticipated to cause any adverse health effects to any population.

A brief overview of the potential impacts of offshore wind is included below. Potential impacts associated with the Projects, as identified through engagement with DAC stakeholders, are discussed in Section 18.3.

Construction Impacts

Potential onshore impacts are primarily construction-related and largely confined to landfall sites, onshore export cable routes, onshore converter station/onshore substation sites, and port facilities. These temporary impacts are typical of large construction projects and likely to include traffic, noise from heavy construction equipment and vessels, and air emissions from construction equipment, support vehicles, and vessels. [redacted].

Potential offshore impacts may include increased marine and vessel traffic, which could result in temporary inconveniences and viewshed impacts. Visual impacts associated with construction would be limited to vessels carrying components, equipment, and partially built structures. [redacted]

Operations Impacts

Potential onshore impacts from O&M activities may include traffic, noise, air emissions, and viewshed impacts. O&M facilities will function for the operational life of an offshore wind project; however, such impacts are likely to be negligible. Periodic planned and unplanned maintenance of onshore facilities may cause minor, temporary, and short-term impacts to DACs and other communities in the immediate vicinity of these activities. Any disruption to normal and routine functions would cease upon completion of the maintenance activity.

Potential offshore impacts from O&M activities may include those associated with port utilization, such as air emissions, vessel traffic, and viewshed impacts. Periodic inspections, maintenance, and repairs to offshore facilities are expected to occur during O&M. Such activities would only be expected to result in negligible and temporary impacts. Viewshed impacts may also result from the introduction of WTGs on the horizon. Such impacts would persist for the life of a project.

18.2 DISADVANTAGED COMMUNITY MAPPING

18.2.1 Onshore Development Areas

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

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[redacted]

[redacted]

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[redacted]

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[redacted]

[redacted]

[redacted]

[redacted]

18.2.2 Port Facilities

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

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[redacted]

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[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

18.2.2.4 Port of Coeymans

The Port of Coeymans is located on the Hudson River 10 miles south of Albany in the town of Coeymans. A relatively new marine terminal owned by the Carver Companies, a heavy-load wharf is currently being constructed at the port facility and the site is being graded to allow for the construction of offshore wind fabrication and assembly buildings and services. The Port of Coeymans may serve as a General Electric (GE) manufacturing site for WTG blades and/or nacelles.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

18.3 STAKEHOLDER ENGAGEMENT

As a hub of the US offshore wind industry, our New York stakeholder engagement efforts have been ongoing for several years – first as Vineyard Wind and now as Vineyard Offshore – as discussed in Section 16. Ultimately, listening deeply and responding sensitively to the community has been, and will continue to be, Vineyard Offshore's top priority when engaging with DACs. [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

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[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Vineyard Offshore will continue to prioritize and expand engagement with DACs potentially impacted by the Projects, with a specific focus on making the economic benefits of offshore wind development available to these constituencies; we recognize that direct representation of communities is central to the issues of racial and economic justice. Through the commitments elaborated below, we are taking steps to ensure that the Projects' benefits are available and accessible to and/or realized in DACs.

[redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

Vineyard Offshore firmly believes that offshore wind development has the potential to address decades of economic and environmental burdens in the energy sector that are disproportionately concentrated in low-income communities and communities of color. We look forward to continuing our DAC engagement and working with stakeholders to realize the vision of a just and equitable energy future for all New Yorkers.

SECTION 19
NEW YORK ECONOMIC BENEFITS ECONOMIC BENEFITS PLAN

The development, construction, and operation of the Excelsior Wind (EW), Liberty Wind North (LW-N), and Liberty Wind South (LW-S) project configurations (the "Projects"), as described in Section 4, will solidify New York's position as the center of the nation's offshore wind supply chain. [redacted]

19.1.1 Proposal Overview

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted] The two-OWF Proposals and their associated SCIP investments would represent the largest direct economic benefit commitment of any offshore wind project in the US to date. [redacted]

19.1.3 SCIP Initiatives [redacted]

Vineyard Offshore's SCIP [redacted] is outlined in detail in Section 19.2 and 4.12 Supply Chain Investment Plan. This SCIP will:

- **Enable the first full-scope wind turbine generator (WTG) blade manufacturing facility in the Capital Region** through a transformative partnership with LM Wind Power (LM), a General Electric (GE) Vernova business, [redacted] to build the proposed facility at the Port of Coeymans. [redacted]
- **Facilitate New York's first nacelle assembly facility** through an expanded partnership with GE [redacted]
- **Establish a much-needed** [redacted] **cable manufacturing facility** in partnership with [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

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[redacted]

19.2 SUPPLY CHAIN INVESTMENT PLAN

This ORECRFP22-1 Submission includes a "Made in New York" SCIP that seeks to leverage [redacted] in New York State Funding to facilitate the investment of more than [redacted] component manufacturing and production facilities. The SCIP is built on partnerships with some of the world's leading offshore wind primary component suppliers, who are established and experienced partners of Vineyard Offshore on Vineyard Wind 1, the nation's first commercial-scale offshore wind project.

[redacted] The SCIP Facilities will provide long-term employment opportunities within DACs and facilitate a substantial expansion of subcomponent manufacturing and other subcontracting opportunities for New York manufacturers, MWBEs, SDVOBs, and other local businesses.

Our "Made in New York" SCIP for the Projects includes the following SCIP Facilities:

- **LM Wind Power / GE WTG Blade Manufacturing Facility:** Our SCIP will secure the first full-scope blade manufacturing facility in the United States (US) through a transformative partnership with LM, a GE Vernova Business, at the Port of Coeymans [redacted]
- **GE Nacelle Assembly Facility:** Our SCIP could also enable GE to further localize WTGs by expanding their investment in New York to include a nacelle assembly facility at the Port of Coeymans, [redacted]
- [redacted] **Cable Manufacturing Facility**: Our SCIP will also facilitate [redacted] investment in New York's first subsea cable manufacturing facility [redacted]

19.2.1 SCIP Facility Overview

Our "Made in New York" SCIP includes three proposed SCIP Facilities, as described in Table 19-2. These facilities will represent the single largest investment in the US offshore wind supply chain, unlocking the nation's only and the world's second combined blade and nacelle manufacturing hub while securing New York's first subsea cable manufacturing facility. They will also significantly expand the region's offshore wind supply chain capabilities, exponentially increase opportunities for local businesses, and cement New York as the center of the nation's rapidly expanding offshore wind industry. These facilities also support Climate Act goals and Vineyard Offshore's commitment to realize 35%, with a goal of 40%, of the Projects' Incremental Economic Benefits in DACs.

Table 19-2 Supply Chain Investment Plan Overview

SCIP Facility	SCIP Facility Proposal Summary
LM Wind Power / GE New York Blade Facility	▪ LM / GE are proposing to develop and construct a SCIP Facility at the Port of Coeymans in Coeymans, New York to manufacture WTG blades with a total investment of [redacted] ▪ The SCIP Facility will include the entirety of the blade production process from layup through casting and final finishing and quality control processes. [redacted] ▪ Once fully operational, the SCIP Facility will host 650 long-term jobs, with at least 35% coming from DACs. [redacted]

SCIP Facility	SCIP Facility Proposal Summary
GE New York Nacelle Facility	▪ GE is proposing to develop and construct a SCIP Facility at the Port of Coeymans in Coeymans, New York to produce and assemble WTG nacelles with a total investment of [redacted] ▪ The SCIP Facility will include full hub production, full backend production, final assembly, and quality control processes. [redacted] ▪ Once fully operational, the SCIP Facility will host 220 long-term jobs, with at least 35% coming from DACs. [redacted]
[redacted] New York Cable Facility	▪ [redacted] is proposing to develop and construct a SCIP Facility at [redacted] ▪ The SCIP Facility will include wire drawing, annealing, twisting and stranding, extrusion, cabling, testing, and spooling. [redacted]

[redacted]

[redacted]

[redacted]

A summary of the SCIP Facilities' costs and benefits to New York is provided in Table 19-3.

Table 19-3 Summary of Vineyard Offshore SCIP Facility Initiatives

SCIP Facility	Funding Recipient	NYSERDA Funding Request ($'000)	Total Facility Investment ($'000)	Total Facility-related Direct Expenditures ($'000)	Total Facility-related Jobs (FTE Job-Years)
Blade Manufacturing	LM Wind Power / GE	[redacted]			
Nacelle Assembly	GE	[redacted]			
Cable Manufacturing	[redacted]				
[redacted]					

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19.2.2 LM Wind Power / GE Blade Facility

LM has proposed a [redacted] investment to establish the nation's first full-scope WTG blade manufacturing facility at the Port of Coeymans in Coeymans, New York. [redacted]

[redacted]

[redacted]

[redacted] In addition, the facility will create 650 long-term direct jobs along with 900 indirect jobs. LM / GE are also committed to ensuring 35% of the facility's long-term direct jobs are filled by DAC residents.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

GE has proposed to invest [redacted] to establish one of the nation's first WTG nacelle assembly facilities at the Port of Coeymans in Coeymans, New York. [redacted]

[redacted]

[redacted]

[redacted]

[redacted] GE is also committed to ensuring 35% of the facility's long-term direct jobs are filled by DAC residents.

[redacted]

[redacted]

[redacted]

[redacted]

19.2.4 [redacted] Cable Facility

[redacted] has proposed to invest [redacted] to establish New York's first subsea cable manufacturing facility [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

19.3 NEW YORK JOBS AND WORKFORCE PLAN

Vineyard Offshore will support the realization of the job creation benefits for New York through the New York Jobs and Workforce Plan (the "NYJWP"), which details our community-led approach to workforce development, in support of a just transition, centered on racial justice and equity. DACs must be at the forefront of efforts to maximize the economic development, job creation, and environmental benefits of offshore wind. As part of this, we believe that prioritizing community-defined needs is essential to ensuring an equitable and inclusive approach to workforce development.

19.3.1 Workforce Development Framework

[redacted]

- [redacted]
- [redacted]
- [redacted]

[redacted]

19.3.2 Project Labor Agreement and Labor Peach Agreement

Vineyard Offshore, through Vineyard Wind 1, is the first offshore wind developer to execute a Project Labor Agreement (PLA) for an offshore wind project. We will leverage that experience in New York to continue our precedent-setting efforts to deliver increased opportunities for union labor while also building an equitable and inclusive offshore wind workforce. [redacted]

19.3.3 Just Transition

Vineyard Offshore has also identified several key opportunities to support a just transition of New York's communities, local unions, and workers impacted by reduced use of fossil fuel electricity generation or repurposing of fossil fuel infrastructure. [redacted]

- [redacted]
- [redacted]
- [redacted]

[redacted]

19.4 MWBE AND SDVOB ECONOMIC BENEFITS

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

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SECTION 20
ENERGY STORAGE

20.1 OVERVIEW

[redacted]

[redacted]

[redacted]

20.2 ENERGY STORAGE DEVELOPER EXPERIENCE

[redacted]

[redacted]

20.3 ENERGY STORAGE FACILITIES DESCRIPTIONS

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

20.4 DEVELOPMENT STATUS AND PLANS

[redacted]

[redacted]

20.4.1 Engineering and Technology Plan

20.4.1.1 Major Equipment Procurement

[redacted]

20.4.1.2 Fire Safety and Engineering

[redacted]

[redacted]

[redacted]

20.4.2 Financing Plan

[redacted]

20.4.3 Permitting Plan and Schedule

[redacted]

[redacted]

[redacted]

20.4.4 Interconnection Plan

[redacted]

[redacted]

[redacted]

20.4.5 Disadvantaged Community Benefits and Burdens

[redacted]

[redacted]

[redacted]

20.4.6 Carbon Accounting

[redacted]

20.5 ASSUMPTIONS

[redacted]

[redacted]

20.6 ENERGY STORAGE BENEFITS

20.6.1 Reducing Carbon Emissions

[redacted]

[redacted]

[redacted]

[redacted]

20.6.2 Electrical Grid Benefits

[redacted]

[redacted]

PUBLIC

[redacted]

PUBLIC

20.7 ENERGY STORAGE TECHNICAL WORKING GROUP PARTICIPATION

[redacted]

SECTION 21
REDUCING CARBON EMISSIONS AND EMBODIED CARBON

21.1 CLIMATE BENEFITS

Offshore wind is essential to tackling the climate crisis and meeting New York's emission reduction targets. [redacted]

[redacted]

While the construction of any new infrastructure will generate emissions, the Projects' construction impacts will be quickly offset by their benefits. For Vineyard Wind 1, for example, without any additional mitigation, direct CO_2e emissions from construction, operation, and decommissioning of the project will be offset after less than five months of operation by

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displacing electricity produced by fossil fuel power plants; Vineyard Offshore expects the Projects will offset their direct CO_2e emissions within a similar timeframe.

As used in this section, "carbon emissions" refers to *direct* carbon emissions from the construction, operation, and decommissioning of the Projects. While more expansive definitions exist, and the difference between *direct* and *indirect* emissions is not always clear-cut, for this Submission, "embodied carbon" refers to *indirect* carbon emissions generated during the manufacturing and supply of Project components.

21.2 CARBON EMISSIONS AND EMBODIED CARBON

Vineyard Wind 1 serves as the starting point for understanding the Projects' potential direct and indirect emissions. [redacted]

[redacted]

[redacted]

21.3 MINIMIZING CARBON EMISSIONS

21.3.1 Direct Emissions

Similar to Vineyard Wind 1, Vineyard Offshore expects that vessels will be the Projects' primary source of direct emissions during the construction and O&M phases. [redacted]

[redacted]

[redacted]

Additionally, engines and equipment that are regulated by the Environmental Protection Agency (EPA) as Outer Continental Shelf (OCS) sources are expected to meet Best Available Control Technology (BACT) standards for applicable pollutants. To meet BACT standards, we expect to use vessels and equipment meeting or emitting less than the most stringent applicable engine emission limits, including IMO's International Convention for the Prevention of Pollution from Ships Annex VI limits, EPA's top-Tier marine engine standards at 40 Code of Federal Regulations (CFR) Part 1042, and/or EPA's top-Tier nonroad engine standards at 40 CFR Part 1039 (subject to equipment and vessel availability). Meeting BACT will lower direct carbon emissions and provide important co-benefits by minimizing fuel combustion-related emissions during construction and operation.

[redacted]

21.3.2 Embodied Carbon

Vineyard Offshore expects that materials and manufacturing will comprise the bulk of the Projects' emissions and largely be driven by emissions from steel manufacturing. [redacted]

[redacted]

Finally, upon decommissioning, many of the Projects' components (e.g., foundations, steel WTG towers, offshore cables, etc.) will be transported to shore for recycling or re-use. It is anticipated that much of the WTGs and foundations will be recyclable, and several methods for recycling the rotor blades are under development (see Section 11). Recycling components at the end of their useful life has the potential to significantly lower the Projects' carbon footprint.

21.4 EMISSION METHODOLOGIES

Vineyard Offshore is committed to analyzing and understanding the Projects' carbon footprint on an ongoing basis. Our efforts to better understand and quantify carbon intensity in design, sourcing, and construction, including tools or methodologies that could be used to estimate and validate Project emissions, are discussed below.

[redacted]

21.4.1 Direct Emissions from Construction, Operation, and Decommissioning

Through Vineyard Wind 1, we developed a comprehensive methodology for estimating direct emissions from the construction and operation of an offshore wind project. This emission estimating methodology was subsequently reviewed and accepted by both the Bureau of Ocean Energy Management (BOEM) and EPA. This methodology set the industry standard and has been subsequently adopted by other developers' projects (e.g., South Fork Wind Farm). While some variation exists in the implementation of this methodology, a similar approach to estimating emissions allows for better apples-to-apples comparison among projects.

21.4.2 Estimating Direct Emissions

[redacted]

Emissions from commercial marine vessels (the primary source of emissions during construction and operation) are calculated following the methodology used in BOEM's Offshore Wind Energy Facilities Emission Estimating Tool, which was developed by BOEM to provide a consistent approach for estimating emissions associated with the proposed offshore wind projects and to ensure consistency in BOEM's environmental review process.[8] The BOEM Emission Estimating Tool contains default vessel characteristics and emission factors for a variety of vessel types commonly used in offshore wind projects. Where necessary, BOEM's emission calculation methodology is supplemented with information from EPA publications.[9] Representative vessels, preliminary Project schedules, and approximated vessel routes must

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[redacted]

[9] The methodology is supplemented by the following EPA publications: (1) EPA's (2022) *Ports Emissions Inventory Guidance: Methodologies for Estimating Port-Related and Goods Movement Mobile Source Emissions*; (2) EPA's *2017 National Emission Inventory Technical Support Document* and supporting commercial marine vessel documentation; (3) EPA's *2014 National Emission Inventory Technical Support Document*; and (4) EPA's (2009) *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories*.

be used to estimate potential direct emissions during Project planning stages. Emissions are generally estimated for each engine using the following equation:

$$E = kW * Hours * LF * EF * 1.10231 \times 10^{-6}$$

Where:

- E = total emissions (US tons)
- kW = total engine size (kilowatt [kW])
- Hours = duration of each activity (hours)
- LF = engine load factor (unitless)
- EF = emission factor (g/kW-hr)
- 1.10231×10^{-6} = grams to ton conversion factor

Currently, there is limited operational data for marine engines because vessels' engines are typically only regulated via emission standards for engine manufacturers (e.g., EPA's tiered marine emission standards) rather than through tracking actual emissions. Through tracking emissions for Vineyard Wind 1 per the requirements of its OCS Air Permit, we will gain important operational data on vessel engine usage, particularly engine load factors, which have a significant influence on emissions estimates. In the future, we expect to use these operational data to estimate emissions more accurately.

21.4.3 Validating Direct Emissions

During the OCS Air Permitting process for Vineyard Wind 1, we worked with EPA to develop a rigorous method to track and validate actual emissions. This method employs the same equation identified above but uses specific engine parameters and operational data to derive a more precise quantification of actual emissions. The methodology to calculate actual emissions entails the following steps:

1. Record the make, model, maximum rated power output, cylinder size, engine speed rating, and manufacturing date of each engine.
2. For each engine, record daily the total hours of operation and fuel usage (if possible).
3. Calculate the engines' load factor based on the ratio of actual fuel used to the fuel consumption rate at maximum engine power (or use EPA's default load factors).
4. Estimate actual emissions using each engine's size, hours of operation, load factor, and the emission factor associated with the engine's emission certification (or the default emission factors provided by EPA).

Vineyard Offshore will implement a similar methodology to validate direct emissions during and following the commissioning of the Projects, subject to EPA approval.

21.4.4 Indirect Emissions from the Supply Chain and Manufacturing

[redacted]

[redacted]

Table 21-3 Summary of Existing Embodied Carbon Calculators

Database/Tool	Description[1,2]	Suitability for Offshore Wind Projects
Databases		
DEFRA (United Kingdom)	▪ Provides an Excel spreadsheet with activity-based emission factors, including Well-to-tank and tank-to-wheel emissions of fossil fuels. ▪ https://www.gov.uk/guidance/measuring-and-reporting-environmental-impacts-guidance-for-businesses	▪ Used to measure Scope 1 emissions for onshore and offshore wind farms.
Inventory of Carbon and Energy	▪ Provides an Excel spreadsheet of embodied carbon emission factors in terms of kilogram (kg) of CO_2e per kg of material for over 200 building materials. ▪ Downloaded by over 30,000 professionals worldwide. ▪ https://circularecology.com/embodied-carbon-footprint-database.html	▪ Provides embodied carbon emission factors for most key offshore wind farm building materials (e.g., steel, concrete, aluminum, fiberglass), but not all (e.g., certain plastics). ▪ The weight of project components depends on site-specific conditions, making it challenging to use this tool before performing detailed engineering.
IMPACT	▪ A standardized whole-building LCA database of emission factors that are integrated into other software or embodied carbon tools (e.g., One Click LCA). ▪ https://www.bregroup.com/impact/features/	▪ This database appears to be tailored for onshore buildings and would not be suitable for estimating the embodied carbon of an offshore wind project.
ecoinvent	▪ A popular life-cycle inventory database that provides process data for thousands of products and contains global supply chains. ▪ https://www.ecoinvent.org/	▪ Has been used for LCAs of several onshore and offshore wind projects.
GaBi Database	▪ An LCA database with over 15,000 plans and processes for numerous industries, including energy and utilities. ▪ http://www.gabi-software.com/america/databases/gabi-databases/	▪ Has been used to perform LCAs for onshore wind projects and may be suitable for offshore wind projects.

Database/Tool	Description[1,2]	Suitability for Offshore Wind Projects
Tools		
EC3	▪ Provides embodied carbon emission factors in terms of kg of CO2e per unit or per unit weight for over 17,000 individual products for the US and Canada. ▪ Uses building material quantities from construction estimates and/or Building & Information Modeling and a robust database of digital, third-party verified EPDs. ▪ Launched as a public beta in November 2019. The scope for the A4 (transport to site) and A5 (installation) modules are not complete. ▪ https://www.buildingtransparency.org/en/	▪ Provides embodied carbon emission factors for some key offshore wind farm building materials (e.g., steel, concrete, aluminum), but not all (e.g., plastics, fiberglass). ▪ The design and weights of project components depend on site-specific conditions, making it challenging to use this tool before performing detailed engineering.
Carbon Designer	▪ Allows for comparisons of a baseline building to a design building (created by making changes to the baseline). Embodied carbon emissions are largely based on the building type, gross floor area, and number of floors. ▪ https://www.oneclicklca.com/carbon-designer/	▪ Carbon designer is specifically tailored to optimizing carbon performance in the early design stages for onshore buildings. This tool would not be suitable for estimating the embodied carbon of an offshore wind project.
Athena Impact Estimator for Buildings	▪ A widely respected software tool designed to evaluate whole buildings and assemblies based on internationally recognized LCA methodology. ▪ Only recommended for building projects in the US or Canada. ▪ https://calculatelca.com/software/impact-estimator/	▪ When selecting a climate zone, there is no option for an offshore environment. ▪ This software is designed for estimating embodied carbon from onshore buildings and is not suitable for offshore wind projects.
One Click LCA	▪ Software used to perform LCAs for buildings and infrastructure (roads and motorways, transmission systems, pipelines and power grids, marine works, reservoirs, etc.). ▪ Based on EPD data, which may be too specific and unreliable. ▪ https://www.oneclicklca.com/	▪ Pending further investigation, this tool may be suitable for offshore wind projects, but no specific examples of using One Click LCA for onshore or offshore wind projects were found.
Tally	▪ Provides a whole-building LCA and allows for comparative analysis of design options. ▪ Database draws from and contains 68 product-specific and 74 industry-wide EPDs ranging from cladding systems to flooring. The dataset is based on North American averages. ▪ https://choosetally.com/	▪ This tool is specifically tailored to LCAs for onshore buildings and would not be suitable for estimating the embodied carbon of an offshore wind project. ▪ A Revit plug-in that is not practical for use before a Revit model is created.

Database/Tool	Description[1,2]	Suitability for Offshore Wind Projects
eTool	▪ A web-based whole-building LCA software. ▪ https://etoolglobal.com/about-etoollcd/	▪ Although no specific examples of using eTool for offshore wind projects were found, the website suggests the tool can assess electricity generators.
SimaPro	▪ A popular LCA software used in over 80 countries that incorporates the latest version of econinvent. ▪ https://simapro.com	▪ Has been used for LCAs of several onshore and offshore wind projects.
OpenLCA	▪ LCA software that can incorporate numerous datasets including ecoinvent and GaBi. ▪ http://www.openlca.org/openlca/	▪ No specific examples of using OpenLCA for offshore wind projects were found, but it incorporates datasets from offshore wind farms.

Notes:

1. Embodied carbon calculators that were evaluated but determined to be outdated or were very industry-specific include: the Quartz Database, the Construction Carbon Calculator, and EcoCalculator, the Highways England Carbon Emissions Calculation Tool, the AggRegain Carbon Dioxide (CO_2) Emissions Estimator Tool – For Aggregates, and Asphalt Pavement Embodied Carbon Tool – asPECT.
2. Additional sources: Melton P. (2019). Embodied Carbon Tools: Assessing the Options. Retrieved from https://www.buildinggreen.com/news-analysis/embodied-carbon-tools-assessing-options. Circular Ecology. (2020). Embodied Carbon Footprint Calculators for Construction. Retrieved from: https://circularecology.com/carbon-footprint-calculators-for-construction.html.

[redacted]

21.4.5 Estimating Energy and Carbon Payback Periods

21.4.5.1 Energy Payback Period

The energy payback period for an offshore wind project indicates how long a project would need to operate before the energy it generates offsets the energy required to build and operate the project. The energy required to build a project includes the energy needed to source raw materials through mining and refining; the energy needed to manufacture, assemble, and transport components; and the energy used to install, construct, and operate a project. Once a project's total energy use from inception through decommissioning is quantified, the energy payback period in years can be estimated by dividing the total energy required over a project's life by the average annual energy produced by the project.

When estimating energy payback periods, it is important to consider the following:

- The boundaries of the total energy required to build and operate a project have significant impacts on the final estimate, so to compare energy payback between projects, the boundaries of the analysis must be clearly defined, and the energy produced by a project should reflect the average annual energy delivered to the onshore substation (i.e., measured on a net injection basis).
- Energy use estimates developed for the O&M phase are likely conservative as vessels used for the projects will likely be more efficient than those available today due to refinements in engines and electrification.

Vineyard Offshore will work with original equipment manufacturers and other suppliers to obtain the required information to perform an energy payback period calculation for the Projects.

21.4.5.2 Carbon Payback Period

The carbon payback period of an offshore wind project indicates how long a project would need to operate before the emission-free electricity it generates offsets the carbon emissions associated with the construction and operation of the new infrastructure. Once a project's total direct carbon emissions and embodied carbon are quantified, the carbon payback period can be estimated by dividing a project's total carbon footprint by the carbon emissions avoided annually by the project.

When estimating carbon payback periods, it is important to consider the following:

- The boundaries of the embodied carbon analysis have significant impacts on the final estimate, so to compare the carbon footprint between projects, the boundaries of the analysis must be clearly defined.
- Emission estimates developed for permitting processes are likely very conservative due to uncertainty in a project's design and schedule at the early planning stages. At this time, the lack of operational data for marine engines also requires the use of more conservative assumptions. In the future, direct experience with the Vineyard Wind 1 project will allow Vineyard Offshore to provide a more accurate accounting of carbon

impacts from the Projects' construction activities and more clearly show the Projects' benefits.

- Engines available for use at the time of decommissioning will likely be cleaner than those available today due to refinements in engines, emission control technologies, and electrification.
- The avoided emissions analysis is not an apples-to-apples comparison between different types of electric generators. Unlike the emissions estimates that will be generated for the Projects, estimates of operational emissions from onshore power generation facilities used to develop their annual non-baseload output emission rates do not account for emissions from mobile sources (e.g., delivery of fuel, worker transits) or construction of the facilities.
- Similarly, the avoided emissions analysis does not account for the construction of additional power generation facilities that would likely be required to meet the region's electricity demand if the projects were not constructed.

For Vineyard Wind 1, we have previously demonstrated that the project would (without any additional mitigation) offset its direct CO_2e emissions from construction, operation, and decommissioning after less than five months of operation by displacing higher-polluting electricity.